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Brazil: Competitive Factors in Brazil Affecting U.S. and Brazilian Agricultural Sales in Selected Third Country Markets

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Abstract

- This report describes and analyzes competitive factors in Brazil affecting U.S. and Brazilian sales of agricultural goods, including grains, soybeans, and meats, in third-country markets. It provides (a) an overview of Brazil's agricultural imports, exports, consumption, and production during 2006–11; (b) an overview of Brazilian government programs and regulations relating to agricultural production and exports; (c) an analysis of the growth of Brazilian agribusiness firms and their impact on global supply chains; (d) a description of competitive factors affecting Brazil's agricultural sector; and (e) special focus chapters surveying the soybean, grains, poultry, beef, and pork sectors, with an emphasis on important third-country markets where U.S. and Brazilian exports directly compete. The study also uses economic modeling to analyze the effects of the removal of tariff preferences within the Mercosul customs union, of which Brazil is a member, on U.S. agricultural exports, as well as the effects of certain nontariff measures (NTMs) in third-country markets on both Brazilian and U.S. exports.

- Brazil's agricultural exports have grown rapidly since 2000, coinciding with the increase in global demand for food and animal feed over the last decade. Exports are concentrated in a few major commodities, with soybeans, soybean meal and oil, sugar, and coffee accounting for more than 50 percent of Brazil's total agricultural exports between 2006 and 2011, and poultry and beef accounting for an additional 19 percent.

- Our findings suggest that low on-farm production costs have helped to make Brazil a competitive exporter of soybeans, grains, and meats in recent years, despite significant challenges, such as inadequate transportation infrastructure, high interest rates, currency appreciation, and burdensome labor laws and tax structures. Brazilian exports are likely to grow more slowly in the current environment, particularly if rising domestic demand siphons Brazilian agricultural supplies from third-country markets. Nonetheless, Brazilian agricultural production and exports have the potential to continue growing significantly; large areas of untapped agricultural land remain, and research and development programs will likely foster improvements in production practices and yields in many agricultural sectors.

CONTENTS

CONTENTS—*Continued*

Page

CONTENTS—*Continued*

Page

CONTENTS—*Continued*

Page

Chapter 6 Soybeans—*Continued*

CONTENTS—*Continued*

Page

CONTENTS—*Continued*

Page

Chapter 9 Beef—*Continued*

Chapter 10 Pork 10-1

CONTENTS—*Continued*

Page

Chapter 10 Pork—*Continued*

Chapter 11 Estimated Effects of Nontariff Measures and Brazil's Preferential Tariffs 11-1

Appendixes

Boxes

CONTENTS—*Continued*

Page

Figures

Tables

CONTENTS—*Continued*

Page

Tables

CONTENTS—*Continued*

Page

Tables—*Continued*

CONTENTS—*Continued*

Page

Tables—*Continued*

CONTENTS—*Continued*

Page

Tables—*Continued*

ACRONYMS AND ABBREVIATIONS

ABC	Agricultura de Baixo Carbono (Low Carbon Agriculture) program
ABCS	Associação Brasileira de Criadores de Suínos (Brazilian Association of Swine Producers)
ABEF	Associação Brasileira dos Produtores e Exportadores de Frangos (Brazilian Chicken Producers and Exporters Association)
ABIOVE	Associação Brasileira das Indústrias de Óleos Vegetais (Brazilian Vegetable Oil Industry Association)
ABIPECS	Associação Brasileira da Indústria Produtora e Exportadora de Carne Suína (Brazilian Pork Industry and Exporter Association)
AD	antidumping
ADM	Archer Daniels Midland
AGF	Aquisição do Governo Federal (Federal Government Purchasing)
AGRAER	Agência de Desenvolvimento Agrário e Extensão Rural (Agricultural Development and Extension Agency)
AGU	Advogado-Geral da União (Federal Solicitor General)
AI	artificial insemination
AI	avian influenza
ALL	America Latína Logística (transportation conglomerate)
AMI	American Meat Institute
AMS	aggregate measurement of support
ANEC	Associação Nacional dos Exportadores de Cereais (Brazilian Grain Exporters Association)
ANP	Agência Nacional do Petróleo, Gás Natural e Biocombustíveis (National Agency for Petroleum, Natural Gas and Biofuel)
ANTT	Agência Nacional de Transportes Terrestres (National Agency for Land Transportation)
ANTAQ	Agência Nacional de Transportes Aquaviários (National Agency for Waterway Transportation)
APTA	Agência Paulista de Tecnologia dos Agronegócios (São Paulo Agency for Agribusiness Technology)
ARF	Automatic Registration Forms
ARS	Agricultural Research Service (USDA)
AUVs	average unit values
BCB	Banco Central do Brasil (Central Bank of Brazil)
BNDES	Banco Nacional de Desenvolvimento Econômico e Social (Brazil National Social and Economic Development Bank)
BNDESPAR	BNDES Participações (a business corporation that is an integral subsidiary of the BNDES)
BOVESPA	BM&F BOVESPA (the principal Brazilian stock market)
BRF	Brasil Foods (second-largest Brazilian food company)
BSE	bovine spongiform encephalopathy (“mad cow” disease)
CARICOM	Caribbean Community and Common Market
CDCA	Certificado de Direitos Creditórios do Agronegócio (Agribusiness Credit Rights Certificate)
CDIAL	Centro de Divulgação do Islam para a América Latina (Center for Islamic Information in Latin America)
CEPEA	Centro de Estudos Avançados em Economia Aplicada (Center for Advanced Studies on Applied Economics)

ACRONYMS AND ABBREVIATIONS—*Continued*

CIBAL	Central Islâmica Brasileira de Alimentos Halal (Brazilian Islamic Center for Halal Food)
CIF	cost, insurance and freight
CLQs	chicken leg quarters
CNA	Confederação da Agricultura e Pecuária do Brasil (Agriculture and Livestock Confederation of Brazil)
CNBS	Conselho Nacional de Biossegurança (National Biosafety Council)
CNT	Confederação Nacional do Transporte (National Transportation Confederation)
CONAB	Companhia Nacional de Abastecimento (National Food Supply Company) (Ministry of Agriculture)
CONSEPA	Conselho Nacional dos Sistemas Estaduais de Pesquisa Agropecuária
COP	cost of production
CPI	Consumer Price Index
CRA	certificado de recebíveis do agronegócio (agribusiness receivables certificate)
CRH	cédula rural hipotecária (rural mortgage note)
CRP	cédula rural pignoratíca (rural pledging note)
CSE	consumer support estimate (OECD)
CTNBio	Comissão Técnica Nacional de Biossegurança (National Technical Commission on Biosafety)
CVD	countervailing duties
DET	differential export tax
DGSANCO	Directorate-General for Health and Consumers (EU)
DIPAP	Divisão de Pesquisa Agropecuária (Agricultural Research Division)
DNIT	Departamento Nacional de Infra-Estrutura de Transportes (National Department of Transportation Infrastructure)
DNPEA	Departamento Nacional de Pesquisa e Experimentação Agrícola (National Agricultural Research and Experimentation Department)
Doux Frangosul	Doux Frangosul S.A. Agro Avicola Industrial
EBDA	Empresa Baiana de Desenvolvimento Agrícola (Bahía Agricultural Development Corporation)
EC	European Commission
EGF	Empréstimo do Governo Federal (federal marketing credit program)
EIU	Economist Intelligence Unit
EMATER–GOA	Empresa de Assistência Técnica e Extensão Rural do Estado de Goiás (Goiás State Technical Assistance and Rural Extension Corporation)
Embrapa	Empresa Brasileira de Pesquisa Agropecuária (Brazilian Agricultural Research Corporation)
EMDAGRO	Empresa de Desenvolvimento Agropecuário de Sergipe (Sergipe Agricultural Development Corporation)
EMEPA	Empresa Estadual de Pesquisa Agropecuária da Paraíba (Paraíba State Agricultural Research Corporation)
EMPAER–MT	Empresa Mato-grossense de Pesquisa, Assistência e Extensão Rural (Mato Grosso State Corporation for Agricultural Research, Technical Assistance, and Rural Extension)
EMPARN	Empresa de Pesquisa Agropecuária do Rio Grande do Norte (Rio Grande do Norte Agricultural Research Corporation)

ACRONYMS AND ABBREVIATIONS—*Continued*

EPAGRI	Empresa de Pesquisa Agropecuária e Extensão Rural de Santa Catarina (Santa Catarina Agricultural Research and Rural Extension Corporation)
EPAMIG	Empresa de Pesquisa Agropecuária de Minas Gerais (Minas Gerais Agricultural Research Corporation)
ERS	Economic Research Service (USDA)
EU; EU-27	European Union; the EU in its current membership status (27 members)
FAO	Food and Agriculture Organization of the United Nations
FAPRI	Food and Agricultural Policy Research Institute (U.S.)
FAS	Foreign Agricultural Service (USDA)
FDI	foreign direct investment
FECOTRIGO	Federação das Cooperativas de Trigo e Soja do Rio Grande do Sul (Rio Grande do Sul Federation of Wheat and Soy Cooperatives)
FEPAGRO	Fundação Estadual de Pesquisa Agropecuária (State Agricultural Research Foundation)
FIESP	Federação das Indústrias do Estado de São Paulo (São Paulo State Federation of Industries)
FMD	foot and mouth disease
FUNCAFE	Fundo de Defesa da Economia Cafeeira (Coffee Fund)
FUNDACEP	Fundação Centro de Experimentação e Pesquisa Fecotrigo (Wheat Experimentation and Research Center Foundation)
FUNDECITRUS	Fundo de Defesa da Citricultura (Citrus Plant Protection Fund)
FVO	Food and Veterinary Office (EU)
GDP	gross domestic product
GM	genetically modified
GMO	genetically modified organism
GNI	gross national income
GSSE	general services support estimate (OECD)
GTIS	Global Trade Information System
HPAI	high-pathogen avian influenza
HS	Harmonized System (global tariff system)
IAC	Instituto Agronômico de Campinas (Campinas Institute of Agronomy)
IAPAR	Instituto Agronômico do Paraná (Paraná Institute of Agronomy)
IBAMA	Instituto Brasileiro do Meio Ambiente e dos Recursos Naturais Renováveis (Brazilian Institute for the Environment and Renewable Natural Resources)
IBGE	Instituto Brasileiro de Geografia e Estatística (Brazilian Institute of Geography and Statistics)
ICMS	imposto sobre a circulação de mercadorias (state-level value-added tax)
IMEA	Instituto Mato-grossense de Economia Agrícola (Mato Grosso Institute for Agricultural Economics)
INCAPER	Instituto Capixaba de Pesquisa, Assistência Técnica e Extensão Rural (Espírito Santo Institute for Research, Technical Assistance and Rural Extension)
INCRA	Instituto Nacional de Colonização e Reforma Agrária (National Institute for Colonization and Land Reform)
INPE	Instituto Nacional de Pesquisas Espaciais (National Institute of Space Research)
IP	identity preserved
IPA	Instituto Agronômico de Pernambuco (Pernambuco Institute of Agronomy)
IPI	imposto sobre produtos industrializados (national-level value-added tax)

ACRONYMS AND ABBREVIATIONS—*Continued*

IRGA	Instituto Rio-Grandense do Arroz (Rio Grande Rice Research Institute)
kg	kilograms
LCA	letro de crédito do agronegócio (agribusiness letter of credit note)
LPAI	low-pathogen avian influenza
MAPA	Ministério da Agricultura, Pecuária e Abastecimento (Ministry of Agriculture, Livestock, and Food Supply)
Marfrig	Marfrig Frigorificos e Comercio de Alimentos S.A. (large Brazilian food processing company)
MBA	master of business administration degree
Mercosul	Mercado Comum do Sul (Common Market of the South—“Mercosur” in Spanish)
MDA	Ministério do Desenvolvimento Agrário (Ministry of Agricultural Development)
MFN	most favored nation
MMA	Ministério do Meio Ambiente (Ministry of the Environment)
mt	metric tons
mmt	million metric tons
MNC	multinational corporation
MPOG	Ministério do Planejamento, Orçamento e Gestão (Ministry of Planning, Budget, and Management)
MST	Ministério da Ciência e Tecnologia (Ministry of Science and Technology)
MY	marketing year
NASS	National Agricultural Statistics Service (USDA)
NCR	nota de crédito rural (rural credit memo)
nesoi	not elsewhere specified or included
NHTC	Non-Hormone Treated Cattle program
NPK	nitrogen, phosphorus, and potassium fertilizer
NPLT	National Plan for Logistics and Transportation
NTMs	nontariff measures
OCEPAR	Organização das Cooperativas do Estado do Paraná (Paraná State Cooperatives Organization)
OECD	Organisation for Economic Co-operation and Development
OEPAs	Organizações Eestaduais de Pesquisa Agropecuária (state agricultural research organizations)
OIE	World Organisation for Animal Health
OLI	ownership-location-internalization paradigm
OPEC	Organization of Petroleum Exporting Countries
PAC	Programa de Aceleração do Crescimento (Growth Acceleration Program)
PAP	Plano Agrícola e Pecuário (Agriculture and Livestock Plan)
PEP	Prêmiopara Escoamento de Produto (Premium for Marketing of Products) program
PEPRO	Prêmio Equalizador Pago ao Produtor (Equalizing Premium Paid to the Grower) program
PES	payments for environmental services
PESAGRO–RIO	Empresa de Pesquisa Agropecuária do Estado do Rio de Janeiro (Rio de Janeiro State Agricultural Research Corporation)
PGPM	política de garantia de preço mínimo (guaranteed minimum price policy)
PIS	Programa de Integração Social (Program for Social Integration—taxes)
PPA	Plano Plurianual (Multiyear Plan)

ACRONYMS AND ABBREVIATIONS—*Continued*

PROAGRO	Programa de Garantia da Atividade Agropecuária (Agricultural Activity Guarantee Program)
PROAMBIENTE	Programa de Desenvolvimento Socioambiental da Produção Familiar Rural (Program for the Socio-Environmental Development of Family Farming)
PRODES	Projeto de Estimativa de Desflorestamento da Amazônia (Amazon Deforestation Estimate Project)
PRONAF	Programa Nacional de Fortalecimento da Agricultura Familiar (National Program for Strengthening Family Farming)
PROP	Prêmio de Riscopara Aquisição de Produto Agrícola Oriundo de Contrato Privado de Opção de Venda (Risk Premium for Acquisition of Agricultural Products Deriving from Contract Option Private Sales) program
PRTs	pathogen reduction treatments
PSD	Production, Supply, and Distribution
PSE	producer support estimate (OECD)
PSR	Programa de Subvenção ao Prêmio do Seguro Rural (Rural Insurance Premium Subsidy Program)
RED	Renewable Energy Directive (EU)
R$	Brazilian currency: *real* (singular); *reais* (plural)
SNCR	Sistema Nacional de Crédito Rural (National Rural Credit System)
SEAF	Seguro de Agricultura Familiar (Insurance for Family Farms)
SFA	Secretariada Agricultura Familiar (Department of Family Farming)
Sindirações	Sindicato das Indústrias de Alimentação Animal (National Animal Feed Industry Association)
SOE	state-owned enterprise
SPS	sanitary and phytosanitary
Seara	Seara Alimentos S.A. (large food company, part of Marfrig Group)
TBTs	technical barriers to trade
TRIPS	Trade-Related Aspects of Intellectual Property Rights
TRQs	tariff-rate quotas
TSE	total support estimate (OECD)
UAE	United Arab Emirates
UNITINS	Fundação Universidade do Tocantins (Foundation University of Tocantins)
USAPEEC	U.S.A. Poultry and Egg Export Council
USDA	United States Department of Agriculture
USTR	United States Trade Representative
VAT	value-added tax
VEP	Valor para Escoamento de Produto (Value for Marketing of Products) program
WTO	World Trade Organization

Executive Summary

Brazil is one of the world's largest agricultural economies. It is the leading global producer of coffee, cane sugar, oranges and orange juice, and dry beans, and one of the top three producers of soybeans, beef, poultry, corn, and dozens of other meats, grains, oilseeds, and horticultural products. With over 200 million people, Brazil is also a significant consumer of many agricultural products, particularly beef, poultry, corn, soybean meal, and soybean oil. The Brazilian agricultural sector has rapidly increased domestic production through land expansion and higher yields, thereby meeting rising food requirements for Brazilian consumers and creating opportunities to supply foreign customers. Over the past 20 years, Brazil has emerged as a leading global exporter of commodities such as soybeans, soybean meal and oil, corn, beef, poultry, pork, cotton, and orange juice.

Brazil's status as a major agricultural exporter has significant implications for the United States. The U.S. agricultural sector relies heavily on export markets. In 2011, the United States exported $146 billion in agricultural goods, up from $76 billion in 2006; these exports represented one-third of U.S. farm cash receipts. Brazil's exports increased from $37 billion in 2006 to $82 billion in 2011. With the exception of cane sugar and coffee, Brazil's exports are typically goods that the United States also exports in large volumes, such as beef, poultry, pork, corn, and soybeans.

U.S. agricultural exports to its top five markets—Canada, China, Mexico, Japan, and the European Union (EU-27)—rose 76 percent during 2006–11, from $49 billion to $87 billion. Agricultural exports from Brazil to those markets increased 132 percent over the same period, from $16 billion to $38 billion. In other major markets, such as the Republic of Korea ("Korea"), Taiwan, Saudi Arabia, and to a lesser extent the Russian Federation ("Russia"), the pattern is much the same; the value of U.S. agricultural exports increased, but Brazil outpaced U.S. export growth rates, starting from a lower level of trade. Comparative statistics for Brazil and the United States regarding agricultural trade are presented in table ES.1.

Many in the U.S. agricultural community, business representatives, and policymakers have expressed concern that Brazilian agricultural exports to major third-country markets are competing directly with U.S. exports of similar goods. The rapid modernization and growth of Brazil's agricultural production has been fueled by an advantageous climate, ready access to new agricultural lands, public and private sources of funding for agricultural research, and rising levels of investment by consolidated agribusinesses with a global focus. Together, these factors are leading to rising exports and continued export orientation by Brazilian firms and cooperatives. Furthermore, Brazilian government policies boost lending to farmers, provide inexpensive capital to agribusinesses, streamline the regulatory process for adopting high-yielding seed varieties, and provide payments to producers or wholesalers of selected crops. These actions partially offset transportation costs and strengthen the competitive position of Brazilian exports in markets where U.S. products also directly compete.

TABLE ES.1 Brazil and the United States: Comparative statistics related to agricultural trade, 2011

	Brazil	United States
Population (est. July 2010)	203 million	313 million
Total Gross Domestic Product (2010)	$2.1 trillion	$14.7 trillion
Cropland (2009)[a]	69 million hectares	165 million hectares
Value of farm production (2010)	$122 billion	$352 billion
Farm production as share of GDP (2010)	5.8 percent	2.4 percent
Agricultural import value	$11.0 billion	$102.7 billion
Top five agricultural imports by value	Wheat and wheat flour, ethanol, malt, cotton, and vegetable oils	Alcoholic beverages, processed foods, vegetables, coffee, meats
Top five agricultural import suppliers	Argentina, EU-27, United States, Uruguay, Paraguay	EU-27, Canada, Mexico, Brazil, China
Agricultural export value	$81.7 billion	$146.3 billion
Top five agricultural exports by value	Soybeans, cane sugar, coffee, frozen chicken cuts, frozen boneless beef	Soybeans, corn, wheat, cotton, processed foods
Top five agricultural export markets	EU-27, China, United States, Russia, Japan	Canada, China, Mexico, Japan, EU-27

Source: GTIS, Global Trade Atlas database (accessed February 13, 2012); CIA, *The World Factbook: Brazil and United States*; FAO, *Land Use Indicators,* 2011 (accessed March 13, 2012); The World Bank, World Indicators database, 2011 (accessed November 4, 2011).

[a]The latest year available.

This report responds to a request made to the U.S. International Trade Commission (USITC) by the Senate Committee on Finance (SFC) for information on and analysis of competitive factors in Brazil affecting U.S. and Brazilian agricultural sales in major third-country markets. Noting the importance of Brazil in global export markets for a range of agricultural products, the SFC pointed to the rapid rise of Brazil's agricultural exports and the changing competitive landscape for U.S. sales of certain products in selected markets. The SFC asked that the USITC's report include the following:

- an overview of agricultural markets in Brazil, including recent trends in production, consumption, and trade;
- an overview of U.S. and Brazilian participation in global export markets for meat, grain, and oilseed products, particularly in the EU-27, Russia, China, and Japan, and markets with which Brazil has negotiated trade agreements;
- a description of the competitive factors affecting the agricultural sector in Brazil, in such areas as costs of production, transportation and marketing infrastructure, technology, exchange rates, domestic support, and government programs related to agricultural markets;
- a description of the growth of Brazilian agribusiness firms and their effects on global food supply chains;

- a description of the principal measures affecting U.S. and Brazilian agricultural exports of meat, grain, and oilseed products in major third-country export markets, including sanitary and phytosanitary measures and technical barriers to trade; and

- a quantitative analysis of the economic effects of preferential tariffs negotiated under Brazil's free trade agreements on U.S. and Brazilian exports of meat, grain, and oilseed products, as well as the economic effects of selected nontariff measures on U.S. and Brazilian exports of meat, grain, and oilseed products in major third-country markets.

Major Findings and Observations

Brazil's Agricultural Trade

Brazil is a major exporter of agricultural products and ships to a number of global markets.

During 2006–10, Brazil accounted for almost 9 percent of global agricultural exports, making it the world's third-largest agricultural exporter, behind only the EU-27 and the United States. Exports are concentrated in a few major commodities, with soybeans, soybean meal and oil, sugar, and coffee accounting for more than 50 percent of Brazil's total agricultural exports between 2006 and 2011, and poultry and beef accounting for an additional 19 percent.

Brazil's exports are dispersed among a large number of destination markets that are also important to U.S. exporters. In 2011, the EU-27 was Brazil's largest agricultural market, accounting for 24 percent of total export value, followed by China (18 percent), the United States (6 percent), and Russia (5 percent). Other important markets include Japan, Venezuela, and several markets in the Middle East (Saudi Arabia, Iran, and Egypt). Brazilian agricultural exports to countries that are fellow members of the Mercado Comum do Sul (Mercosul) (Argentina, Paraguay, and Uruguay) accounted for less than 2 percent of total export value in 2011.

Brazil's competition with the United States for exports of grains, oilseeds, and meats to third country markets is somewhat limited.

Although Brazil and the United States are both global exporters of grains, oilseeds, and meats, direct competition between the two countries currently is muted. For example, both countries supply China with soybeans and soybean products. But given the rapid growth in Chinese soybean demand, increases in U.S. and Brazilian production are readily consumed, and global prices remain strong. In terms of poultry exports, while Brazil and the United States are the world's leading suppliers, top destination markets for each country do not overlap, except for Hong Kong. Brazilian poultry is primarily produced and packaged for customers with exacting specifications in mind (such as halal or hand-cut poultry), while the U.S. product tends to be undifferentiated broiler cuts, such as leg quarters. In the beef sector, U.S. competition with Brazil is also limited because each country serves a different market segment. The United States supplies high-quality, grain-fed beef destined for Canada, Mexico, Japan, and Korea, while Brazil supplies grass-fed beef used in processed products to other markets such as Russia. Because of import bans related to foot-and-mouth disease (FMD), there is limited market access for Brazilian beef in many of the largest U.S. export markets.

Brazilian Domestic Production and Consumption

Agriculture accounts for 6 percent of the Brazilian economy, and the Brazilian agricultural sector has become a major world producer.

In 2010, Brazil's agricultural production, valued at $122 billion, accounted for 6 percent of gross domestic product (GDP) and 20 percent of formal employment. In 2010, Brazil was the world's largest producer of cane sugar, coffee, oranges and orange juice, and edible dry beans. Brazil was one of the three largest producers of many other products as well, including, among others, tobacco, soybeans, beef, broilers (chicken meat), and corn.

Consumption of agricultural products is changing in Brazil; because of rising incomes, consumers are demanding higher quantities of food and a wider variety of choices.

With the fifth-largest population in the world, Brazil is one of the world's leading consumers of meats, cereals, pulses, and oilseeds. Over the past five years, higher per capita incomes have encouraged a shift away from traditional staple foods to a more diversified diet, especially in the poorer North and Northeast regions, where substantial increases in the minimum wage and income subsidies to low-income families have boosted food consumption. Rising economic prosperity also has allowed consumers to increase the proportion of food consumed outside the home. As a result of these changing consumption patterns, many Brazilian agricultural producers are expanding their marketing efforts in the home market instead of concentrating on export promotion.

Competitiveness of Brazil's Agricultural Sector

Despite significant inefficiencies, Brazil's agricultural sector is globally competitive owing to the country's considerable natural endowments, skilled farmers, supportive government policies, and sophisticated industry strategies.

Brazil's low-cost resource base, including ample land and water resources and weather patterns conducive to intensive land use, enables high-yielding crop production across a wide range of agricultural products. Government-funded agricultural research has developed crop varieties that flourish in the acidic soils of Brazil's previously untapped Center-West region. Large-scale commercial farms run by skilled operators with extensive business and investment acumen contribute to a high level of sophistication and modern production practices in the sector. For the most part, low on-farm production costs have helped to make Brazil a competitive exporter, despite significant challenges. Brazilian agricultural production and exports have the potential to continue growing significantly, stemming from large areas of untapped agricultural land and research and development programs that will likely foster improvements in production practices and yields in many agricultural sectors.

Significant obstacles will continue to create a drag on Brazil's agricultural production and exports, mitigating future increases in export potential.

Despite the tremendous potential to continue to expand production as a result of Brazil's natural endowments and untapped land, several important factors are likely to slow potential production expansion. Much of the available farmland is in areas that lack good access to transportation infrastructure. Increasing demands for transportation, storage, and port infrastructure and capacity will likely outpace supply for quite some time, despite government efforts in this area. At the same time, high interest rates and currency appreciation appear likely to persist in the near future, making exports more expensive. In addition, livestock disease issues are years away from being resolved, and growing environmental and social demands will take government resources away from other investments. Brazil's burdensome labor laws and tax structures also increase costs. Brazilian exports are likely to grow more slowly in this environment, particularly if rising domestic demand siphons Brazilian agricultural supplies from third-country markets.

Inadequate transportation infrastructure erodes many of the production cost advantages enjoyed by Brazilian agricultural producers.

Brazil's vast geography, the long distances between inland agricultural production areas and ports, and the lack of expansive rail networks or viable waterways contribute to an overreliance on expensive road transport, transportation inefficiencies, and high logistics costs. For example, the domestic transportation costs of soybeans harvested in Mato Grosso, one of Brazil's largest agricultural states, account for 25–30 percent of the total cost at the port of export, compared with only 8–10 percent for soybeans harvested and transported in the United States.

Brazil's Government Policies Affecting Agriculture

Government policies have played a major role in the Brazilian agricultural sector, but their goals have evolved over time.

Brazilian government policies have been instrumental in shaping the current size and structure of its agricultural and food products sector. Driven by considerations such as food security, inflation, social inclusion, modernization, and global competitiveness, the goals and scope of these policies have changed over time. In the past, agricultural policies focused on direct market-intervention measures such as government purchases, price controls, high import duties, and export controls. Now they have shifted to measures that seek to leverage private sector involvement, such as preferential credit and project financing, as well as agricultural research and development. In addition, newer policies address growing concerns among Brazilian policymakers about various social and environmental issues.

Brazilian government assistance to the agricultural sector has grown in recent years, but remains lower than that of other major agricultural competitors.

Funding for agricultural programs in Brazil rose 82 percent during 2006–10 to R$18.5 billion ($11.1 billion), while rural credit allocations rose 102 percent, to

R$107.5 billion ($64.4 billion). However, the level of support to producers, as measured by the producer support estimate of the Organisation for Economic Co-operation and Development, is low compared with other major agricultural producers and exporters, both in absolute terms and as a share of agricultural output. In 2010, Brazil's PSE represented about 4.5 percent of the value of agricultural production, compared with 7.0 percent in the United States, 17.4 percent in China, 19.8 percent in the EU-27, and 21.4 percent in Russia. While many of Brazil's government policies lower the cost of production for farmers and processors, some policies, including intrastate taxes, environmental regulations, and restrictions on foreign investment in farmland, impose costs on Brazilian agricultural producers and erode their competitiveness in export markets.

Brazil's government recognizes the need to improve the country's transportation infrastructure, and has undertaken initiatives to increase both public- and private-sector investment in new projects.

Through its National Plan for Transportation and Logistics (NPTL) and the Growth and Acceleration Plan (PAC), the Brazilian government intends to undertake significant levels of public investment in infrastructure development to improve and expand railways, waterways, road networks, and ports. Between now and 2023, the NPTL calls for a substantial reduction in the use of road transport, coupled with increases in railway and waterway use. The PAC and its successor, PAC 2, are shorter-term plans covering 2007–14, and provide tax cuts, investment incentives, credit, and long-term financing for infrastructure projects. Through a variety of mechanisms, including concession agreements, private industry is also expected to account for a significant portion of PAC funding.

Despite significant government investments in infrastructure, progress has generally been characterized as uneven and slow. Meanwhile, demand for infrastructure continues to rise, fueled by expanded agricultural production. Spending on infrastructure development will have to increase if it is to outpace demand growth and lessen transportation costs.

Private sector investment will play an important role in meeting the government's infrastructure development goals.

Government efforts to privatize the operation of public sector assets in the 1990s, notably ports and railways, have led to increased private sector investment and improved conditions in these sectors. Private sector investments in port terminals are improving overall port capacity and efficiency. Significant efforts are underway to expand and integrate Brazil's rail network through concessions to private companies in order to better connect agricultural regions to ports and reduce transportation costs. In addition, many of Brazil's agricultural producers have made their own investments in local road networks, storage and warehousing facilities, and port terminals to improve their supply chains and reduce transportation inefficiencies.

Brazilian Agribusiness and Global Supply Chains

Three Brazilian meat and poultry firms have substantial investments outside of Brazil and are among the largest producers and exporters in the world.

The strong real and foreign import barriers have encouraged Brazilian agribusinesses in the meat and poultry industries to grow by acquisition abroad. JBS Friboi, Marfrig Alimentos, and Brasil Foods, the three largest agribusiness firms in Brazil, have become some of the world's largest protein producers and exporters. Brazil's strong currency has made overseas acquisitions more affordable for Brazilian firms, and these acquisitions have allowed Brazilian firms to gain access to foreign markets where Brazilian beef and pork are banned because of the presence of FMD in Brazil.

Other multinational firms are key players in Brazilian exports of grains and oilseeds.

The "Big Four" multinational agribusiness firms (Cargill, Bunge, Archer Daniels Midland, and Louis Dreyfus) account for a significant share of Brazilian agricultural exports, particularly in the grain and soybean markets. Because of their global presence, these companies generally do not view global markets in terms of competition between large producing countries, such as Brazil and the United States. Instead, they see the principal exporting countries as an integrated system on which they depend to supply growing worldwide demand. Nearly all agribusinesses expect global food demand to continue to expand into the foreseeable future as rising incomes in many emerging markets result in increasing consumption levels. In particular, increasing animal protein consumption is boosting demand not only for beef, pork, and poultry, but also for grains and soybean meal used for animal feed.

Soybeans

Soybeans produced in Brazil are cost-competitive with those of all major producers, including the United States. However, there is only limited direct competition between U.S. and Brazilian soybeans in third-country markets.

Soybeans remain the backbone of Brazil's agricultural economy, fueling export-led growth since the 1990s. Brazilian soybeans are currently cost-competitive with production anywhere in the world, including the United States—the world's largest producer. For most export markets and marketing channels, soybeans from Brazil and the United States are interchangeable commodities. Yet direct competition between the two countries in third-country markets is limited, for several reasons. Global demand over the last five years has remained strong and is rising, particularly in China. Large increases in demand have often outpaced production increases. Also, the harvest seasons in Brazil and the United States do not completely overlap, which allows China and other importers to buy newly harvested soybeans throughout much of the year. In addition, consumers may favor one country's soybeans over another. For example, the golden color of U.S. soybeans is preferred in Japan for certain food-grade applications over the reddish color of Brazilian soybeans. In the EU-27, Brazil's ability to provide conventional (non-genetically modified) soybeans and traceability at a reasonable cost gives that country's soybeans a competitive advantage over U.S. soybeans.

Future growth prospects for Brazil's soybean production remain uncertain.

The Brazilian soybean sector faces important disadvantages that may slow its growth prospects in the future. These disadvantages include soil with poor nutrients that requires large volumes of imported fertilizer to maintain yields; poor transportation infrastructure in areas of Brazil where additional expansion of soybean production is likely; high capital costs, which tend to restrict investment in new storage facilities; and a complex tax system that somewhat discourages exports of value-added oil and meal. Whether Brazil can continue its rapid expansion of soybean production and increase the supply available for export at competitive prices depends largely on the ability of state and federal governments to improve railroads, roads, waterways, and ports and to maintain a business environment conducive to private investment.

Grains (Corn and Wheat)

Brazil's corn production is currently expanding, and the industry is cost-competitive in international markets, primarily due to low land costs.

Brazil is a significant producer, consumer, and trader of cereal grains. Corn accounts for 78 percent of Brazilian grain production and 85 percent of grain exports by volume. Corn production in Brazil increased 13 percent between 2006 and 2010, primarily due to higher yields from improved management practices, and a production shift to Center-West states, such as Mato Grosso. The tropical Center-West region is characterized by very large farms with the ability to plant corn immediately after the soybean harvest. Despite the on-farm cost advantages of production in the Center-West, infrastructure and transportation constraints raise the delivered costs to export markets.

Increased demand from the domestic livestock sector will compete with export markets for Brazilian corn production.

Domestically, the quantity of corn used for animal feed rose 23 percent from 2006 to 2010, reflecting higher Brazilian production of poultry and pork products. The growth of Brazil's corn production is expected to primarily serve rising domestic demand, while still allowing modest growth in exports. However, recent global price spikes have encouraged Brazilian exports, boosting feed costs for domestic livestock producers.

Brazil is rapidly becoming a consistent supplier of corn to international markets, despite transportation bottlenecks that raise costs. However, the United States should remain by far the largest corn exporter because of the size of its corn sector.

Brazilian corn exports increased 44 percent (by volume) between 2006 and 2010, in response to increased global demand and reduced global inventories. Brazil has developed relationships with specific markets in recent years—such as the EU-27, Taiwan, Iran, and Colombia—for particular product specifications, price-sensitive markets, and international buyers looking to diversify their suppliers. However, the United States exports more than four times as much corn as Brazil, and it has over half of the global market share of exports by volume. Both the United States and Brazil will need to increase production to satisfy the growing global demand for corn.

Brazil is a significant net importer of wheat, but has exported wheat as well due to tight global market conditions and aid from Brazilian government programs.

Brazil is a net importer of wheat, relying on foreign production (primarily from neighboring Argentina) for more than half its supply. Brazil's wheat industry does not produce wheat with desirable characteristics for milling because of unfavorable growing conditions. Wheat exports generally consist of lower-quality wheat for feed, competing more directly with corn and other feed grains than with the milling wheat most commonly exported from the United States. To help their product compete in third-country markets, Brazilian wheat producers receive government payments that partially offset transportation costs.

Poultry

Brazilian and U.S. poultry producers dominate global export markets because they are both cost-competitive against other global producers.

In 2010, Brazil was the world's third leading broiler meat (poultry)-producing country, behind the United States and China, and the largest exporter. Brazil and the United States have similar production methods, dominated by large, vertically integrated companies that control multiple stages of production. Cost structures of Brazilian and U.S. poultry production are also similar, largely because feed costs (the most important component of poultry costs) are closely linked to global corn and soybean prices.

Brazil's competitiveness in broiler exports vis-à-vis the United States is enhanced by product differentiation and Brazil's freedom from avian influenza. Competition between the two countries, however, is limited, and increasing costs are eroding Brazil's advantages.

Brazil and the United States tend to export different products to different countries. While U.S. producers focus primarily on the domestic market, exporting mostly surplus cuts, the Brazilian poultry industry is more dependent on overseas customers, especially those requiring halal standards and hand-cut production. Brazil's competitiveness is enhanced by its industry's willingness to produce poultry that is processed and packaged to the preferences of major customers. Further, Brazil's avian influenza-free status gives it an advantage over the United States in certain markets, such as Japan and China. Offsetting these competitive advantages are high transportation costs, the higher value of the real, and rising labor costs.

Beef and Pork

Brazil is a low-cost producer of beef and pork, and a major exporter of both.

Brazil's pork producers benefit from Brazil's large and increasing production of corn and soybean meal, the main ingredients in swine rations. Brazil's beef producers benefit from the country's extensive pastureland. Both beef and pork production benefit from relatively low labor costs. Consolidation in Brazil's beef and pork industries—within and across species, internationally, and vertically through the production process—has furnished the sector with both capital and technical expertise, enhancing its global competitiveness.

Competition between U.S. and Brazilian exports of beef and pork in many third-country markets is limited by sanitary trade restrictions.

Foreign sanitary measures that ban beef and pork from countries with a history of animal diseases, such as FMD, restrict Brazil's fresh/chilled and frozen beef and pork exports to a limited number of markets. Those measures also increase production costs because of required vaccination and monitoring. Although FMD was last reported in Brazil in 2006, some regions of Brazil are not considered by many importing countries to be FMD-free. While a number of countries consider most of Brazil to be FMD-free with vaccination, Brazil is ineligible to export fresh/chilled and frozen beef and pork to principal U.S. markets such as North America, Japan, and Korea because of FMD concerns.

Because Brazil's beef and pork exports are concentrated in a few markets, a loss of access can be very detrimental to those industries. In 2008, the EU-27 strengthened traceability requirements for cattle producing beef for European consumers, which removed the eligibility of many Brazilian cattle producers to export there. In 2010, Russia found that many Brazilian meat packers did not meet its sanitary requirements, a finding mainly affecting pork exports.

Brazilian and U.S. beef have different consumer characteristics. Even in export markets where both compete, they are sold for the most part to different consumer segments and sales channels.

Brazil produces primarily grass-fed beef, whereas the United States produces primarily grain-fed beef. The difference in consumer characteristics of grass-fed versus grain-fed beef limits competition between U.S. and Brazilian beef in third-country markets. Grain-fed beef is preferred for many dishes prepared using dry heat (steaks and most roasts) or in dishes in which thin slices of beef are cooked quickly. Grass-fed beef is generally leaner, with less intramuscular fat (marbling); it is often added to high-fat trimmings from grain-fed beef and used in processed beef products such as hamburgers. In some markets, such as Egypt, U.S. beef muscle cuts serve a high-end segment of the market, while U.S. edible offal (e.g., livers, hearts, and kidneys) competes with Brazilian grass-fed beef in more price-sensitive segments of the market.

The United States and Brazil compete directly in the markets for beef and pork in Russia, China, and Hong Kong.

In the Russian market, the United States and Brazil compete for similar customers in supplying beef and pork for the production of processed meat products (e.g., sausage). The United States benefits from country-specific quotas for both beef and pork, while imports from Brazil compete with other suppliers under Russia's "other countries" quota. On the other hand, because of Brazil's status as a developing country, Brazilian suppliers of beef and pork are assessed a duty equal to only 75 percent of the most-favored-nation (MFN) rate charged on imports from the United States.

Hong Kong is a major export market for pork and beef from both the United States and Brazil. Most U.S. pork producers are eligible to export to China, subject to testing for chemical residues. However, only three pork exporters in Brazil have been approved to export to China, and they have gained this approval recently, with the first shipments arriving at the end of 2011. China bans imports of beef from the United States, due to BSE concerns, and allows imports from only a limited number of beef producers in Brazil.

Modeling Results

Nontariff measures: Model simulation results prepared by USITC staff show that in 2010, food and agriculture NTMs in five major markets—the EU-27, Japan, Korea, China, and Russia—reduced U.S. exports of focus products (beef, pork, poultry, corn, and wheat) by $5.0–11.0 billion (table ES.2). NTMs in these markets also reduced Brazilian exports of focus products by $3.7–5.9 billion. Removal of these NTMs would, among other things, likely result in higher demand for the focus products in the EU-27 from all sources and increase imports of U.S. focus products in China, Japan, Korea, and Russia.

TABLE ES.2 Simulated effects of the removal of beef, pork, poultry, corn, and wheat NTMs

Product	Exporter	Exports to the world, 2010	Change in exports to the world	Change in imports				
				China	EU-27	Japan	Korea	Russia
		Million $						
All products	U.S.	29,748	4,956–10,965	703–2,008	3,385–8,317	939–1,433	167–330	123–377
	Brazil	15,763	3,669–5,936	(91)–(68)	4,692–7,391	(654)–(449)	40–90	461–536
	Other	38,678	5,073–7,449	(396)–(186)	2,623–2,874	2,240–3,195	(391)–(179)	(158)–78

Sources: Comtrade and USITC staff estimates.

Notes: Figures in parentheses indicate a negative number. EU-27 exports counted under “other exporters” exclude intra-EU trade. The simulated effects are given in ranges calculated by performing sensitivity analysis with respect to the values of the international trade elasticities in the simulation model. Changes in total exports may differ from the sum of changes in imports in the five focus markets because of import changes in other countries. Exports are free on board (f.o.b.). Imports are cost, insurance, and freight (c.i.f.).

Free trade agreements: Model simulation results also show that if none of Brazil’s imports or exports received preferential duties (i.e., all of Brazil’s trade faced normal trade relations duties), the effect on total U.S. agricultural exports would be negligible.

CHAPTER 1
Introduction

Brazil is one of the world's largest agricultural economies. It is the leading global producer of coffee, cane sugar, oranges and orange juice, and dry beans, and one of the top three producers of soybeans, corn, beef, poultry, and dozens of other meats, grains, and horticultural products.[1] With over 200 million people, Brazil is also a significant consumer of many agricultural products.[2] Its current share of global beef consumption is 14 percent, third largest after the United States and the European Union (EU-27). Brazil's global share of poultry (broiler) consumption is 12 percent, third after the United States and China, and its economy also consumes 6 percent of global corn production, largely for animal feed. In addition, Brazil consumes 8 percent and 13 percent of global soybean meal and soybean oil production, respectively.

The Brazilian agricultural sector is not only large, it is also highly dynamic. It has rapidly increased domestic production through land expansion and higher yields, thereby meeting rising food requirements for Brazilian consumers, but also creating opportunities to supply foreign customers. In the period immediately following World War II, Brazil exported only a few primary agricultural commodities such as sugar and coffee beans, for which it is still known. Over the past 20 years, however, Brazil has greatly diversified, emerging as a leading global exporter of many other commodities, including soybeans, soybean meal and oil, corn, beef, poultry, pork, cotton, and orange juice.

The emergence of Brazil as a major agricultural exporter has significant implications for the United States. The U.S. agricultural sector relies heavily on export markets. In 2011, the United States exported $146 billion in agricultural goods, up 92 percent from $76 billion in 2006 and representing approximately one-third of U.S. farm cash receipts.[3] Furthermore, U.S. agricultural exports to its top five markets—Canada, China, Mexico, Japan, and the EU-27—increased from $49.5 billion in 2006 to $87.2 billion in 2011, a rise of 76 percent.[4] Opportunities abound for the United States to increase agricultural sales in foreign markets, particularly China, Japan, the Russian Federation ("Russia"), and the Republic of Korea ("Korea").[5] These four countries have large populations, growing per capita incomes, and consumption patterns shifting toward foods in which the United States is internationally competitive—meats, feed grains, oilseeds, dairy, horticultural products, and processed foods.

During 2006–11, Brazil increased its agricultural exports by 123 percent, from $36.6 billion in 2006 to $81.7 billion in 2011. Moreover, total agricultural exports from

[1] FAO, FAOSTAT database (accessed November 18, 2011); USDA, FAS, PSD Online (accessed January 25, 2012).

[2] CIA, *World Factbook: Brazil* (accessed October 21, 2011).

[3] GTIS, Global Trade Atlas database (accessed December 5, 2011); USDA, ERS, *Value of U.S. Trade—Agricultural, Nonagricultural, and Total*, February 2011.

[4] GTIS, Global Trade Atlas database (accessed March 31, 2012).

[5] In this report, USITC staff use the terms "sales" and "exports" interchangeably. Therefore, when referencing sales made by Brazilian agribusinesses exporting from the United States, the report will refer to them as "U.S. sales" or "U.S. exports." Conversely, in discussing sales made by U.S. agribusinesses exporting from Brazil, the report will refer to "Brazilian sales" or "Brazilian exports."

Brazil to the United States' top five markets also increased substantially over that period, from $16.4 billion to $38.0 billion, or 132 percent. In other major markets, such as Korea, Taiwan, Saudi Arabia, and, to a lesser extent, Russia, the pattern is the same: the United States saw increases in the value of agricultural exports, but Brazil's exports grew at a faster rate, albeit from a lower base.

The overlapping nature of the two countries' exports is also noteworthy. With the exception of cane sugar and coffee, Brazil's increases in export sales have been in goods that the United States also exports in large volumes. Moreover, Brazilian agricultural exports to rapidly growing markets, such as China, are highly concentrated in a few products—soybeans and soybean products, cotton, corn, and animal hides. These products also accounted for the vast majority of Chinese imports of U.S. agricultural products during 2006–11.

The U.S. agricultural community, business representatives, and policymakers have expressed the concern that Brazilian agricultural exports to major third-country markets are competing directly with U.S. exports, thereby impacting U.S. market share and profits. Brazil is a formidable competitor in many products. The rapid modernization and growth of Brazil's agricultural production has been fueled by an advantageous climate, ready access to agricultural lands for expansion, generous funding for agricultural research, and rising levels of investment by consolidated agribusinesses with a global focus. Together, these factors have supported rising exports by Brazilian firms and cooperatives. Furthermore, Brazilian government policies that boost lending to farmers, provide inexpensive capital to agribusinesses, streamline the regulatory process for using high-yielding varieties of seeds, and provide payments to reduce transportation costs for selected crops have the potential to strengthen Brazil's competitive position in markets where U.S. companies also compete. Comparative statistics for Brazilian and U.S. agricultural trade are presented in table 1.1.

In its letter requesting this investigation, the Senate Committee on Finance (SFC) asked the U.S. International Trade Commission (USITC) to examine and report on the competitive factors in Brazil affecting U.S. and Brazilian agricultural sales in third-country markets. The SFC asked that the report cover the period 2006 through 2010 and focus on the global meat, grain, and oilseed markets.

The SFC asked that the USITC's report include the following:

- an overview of agricultural markets in Brazil, including recent trends in production, consumption, and trade;

- an overview of U.S. and Brazilian participation in global export markets for meat, grain, and oilseed products, particularly in the European Union, Russia, China, and Japan, and markets with which Brazil has negotiated trade agreements;

- a description of the competitive factors affecting the agricultural sector in Brazil, in such areas as costs of production, transportation and marketing infrastructure, technology, exchange rates, domestic support, and government programs related to agricultural markets;

TABLE 1.1 Brazil and the United States: Comparative statistics related to agricultural trade, 2011

	Brazil	United States
Population (est. July 2010)	203 million	313 million
Total Gross Domestic Product (2010)	$2.1 trillion	$14.7 trillion
Cropland (2009)[a]	69 million hectares	165 million hectares
Value of farm production (2010)	$122 billion	$352 billion
Farm production as share of GDP (2010)	5.8 percent	2.4 percent
Agricultural import value	$11.0 billion	$102.7 billion
Top five agricultural imports by value	Wheat and wheat flour, ethanol, malt, cotton, and vegetable oils	Alcoholic beverages, processed foods, vegetables, coffee, meats
Top five agricultural import suppliers	Argentina, EU-27, United States, Uruguay, Paraguay	EU-27, Canada, Mexico, Brazil, China
Agricultural export value	$81.7 billion	$146.3 billion
Top five agricultural exports by value	Soybeans, cane sugar, coffee, frozen chicken cuts, frozen boneless beef	Soybeans, corn, wheat, cotton, processed foods
Top five agricultural export markets	EU-27, China, United States, Russia, Japan	Canada, China, Mexico, Japan, EU-27

Source: GTIS, Global Trade Atlas database (accessed February 13, 2012); CIA, *The World Factbook: Brazil* and *United States*; FAO, *Land Use Indicators,* 2011 (accessed March 13, 2012); The World Bank, World Indicators database, 2011 (accessed November 4, 2011).

[a]The latest year available.

- a description of the growth of Brazilian agribusiness firms and their effects on global food supply chains;

- a description of the principal measures affecting U.S. and Brazilian agricultural exports of meat, grain, and oilseed products in major third-country export markets, including sanitary and phytosanitary measures and technical barriers to trade; and

- a quantitative analysis of the economic effects of preferential tariffs negotiated under Brazil's free trade agreements on U.S. and Brazilian exports of meat, grain, and oilseed products, as well as the economic effects of selected nontariff measures on U.S. and Brazilian exports of meat, grain, and oilseed products in major third-country markets.

Scope of the Report

While the request letter specifically highlights Brazil's meat, grain, and oilseed sectors, this report briefly surveys Brazil's entire agricultural sector, particularly Brazil's production, consumption, and trade. It also describes Brazil's domestic demand and patterns of land use to provide context for understanding Brazil's potential for exports of meats, grains, and oilseeds. Table 1.2 compares the report chapters with the bullets in the

TABLE 1.2 Comparison of report chapters to SFC request letter

Chapter of the report	Bullet of the SFC request letter and explanation
Chapter 2: Brazil's Agricultural Production, Consumption, and Trade	• Addresses bullet one of the request letter.
Chapter 3: Brazil's Government Policies and Transportation Infrastructure Related to Agriculture	• Addresses part of bullet three of the request letter. • Government policies and transportation infrastructure cross over all sections of the analytical framework for competitive factors (see more on the framework below in ch. 1). • Examines the importance of Brazil's infrastructure on its agricultural competitiveness, mostly by examining current policies and spending.
Chapter 4: Competitive Factors Affecting Brazil's Agricultural Sector	• Addresses part of bullet three of the request letter. • Examines conditions of competition in Brazilian agriculture through factors that affect the cost of delivery, product differentiation, and the reliability of supply.
Chapter 5: The Role of Brazilian Agribusiness in the Global Food Supply Chain	• Addresses bullet four of the request letter.
Chapters 6–10: Product chapters (soybeans, grains, poultry, beef, and pork)	• Addresses bullets two, three, and five of the request letter, as they relate to the five agricultural sectors targeted by the SFC (soybeans, grains, poultry, beef, and pork). • Examines conditions of competition between Brazil and the United States for a number of key export markets.
Chapter 11: Modeling Analysis of the Impact of Brazil's Trade Agreements and Select Nontariff Measures in Certain Export Markets	• Addresses bullet six of the request letter. • Provides a modeling analysis of the impacts of selected nontariff measures (NTMs) on key agricultural exports in certain export markets. • Also analyzes impacts of Brazil's duty-free access to Mercado Comum do Sul (Mercosul) markets on U.S. and Brazilian agricultural exports globally.[a]

Source: Compiled by USITC staff.

[a]*Mercosur* is the standard abbreviation for the Spanish name of the South American customs union comprising full members Argentina, Brazil, Paraguay and Uruguay, and *Mercosul* is the corresponding Portuguese abbreviation. Because this report focuses on Brazilian exports, USITC staff opted to use the term *Mercosul* throughout.

SFC's request letter, listed above (see appendix A). The remainder of chapter 1 presents a brief history of Brazilian policies impacting the farm sector, as well as the analytical framework underpinning the analysis on competitive factors used throughout the report.

Products covered in this study include all existing or potential U.S. and Brazilian agricultural exports, with a specific focus on wheat (Harmonized Schedule (HS) 1001), corn (HS 1005), soybeans (HS 1201, 1208.10, 1507), and beef, pork, and poultry (HS chapters 2 and 16). All commodities in this study are defined to match products covered under the World Trade Organization (WTO) Agreement on Agriculture, part XIII, article 21. These include 768 6-digit product codes classified in HS chapters 1 to 24, excluding fish and fish products (HS chapter 3),[6] plus certain additional products in other HS chapters, such as milk proteins (HS chapter 35); hides, skins, and furs (HS chapters 41 and 43); wool (HS chapter 51); and cotton (HS chapter 52).

As requested by the SFC, information presented in this report (including trends in trade, production, and consumption) covers primarily the period 2006–10, although 2011 data

[6] Processed fish products classified in HS chapter 16 are also excluded from the WTO definition of agricultural products.

are presented whenever available. Longer-term data are used to explain important historical trends. The study's analysis of competitive factors and the modeling analysis of the effect of Brazilian trade measures are based on the latest available information and data.

Approach

As requested by the SFC, this report uses qualitative and quantitative tools to analyze the conditions of competition facing selected U.S. and Brazilian agricultural exports in third-country markets. Data gathering for the report centered on a review of existing literature and interviews with U.S. government and agricultural sector sources, including representatives of individual firms, trade associations, and exporters.[7] USITC staff sought information from U.S. agricultural trade associations and U.S. firms with operations in Brazil, contacting more than 70 commodity- and sector-specific trade associations and companies. USITC staff held extensive meetings with U.S. government officials, including staff from USDA's Economic Research Service (ERS) and Foreign Agricultural Service (FAS). Staff also traveled to Brazil in August and September 2011 to meet with relevant Brazilian government officials, USDA officials, academic researchers, farmers, cooperatives and trade associations, exporters, and transportation and logistics officials.

USITC staff also conducted research on Brazil's trade and domestic policies that affect U.S. agricultural exports in selected third-country markets such as China, the EU-27, Japan, Korea, and Russia. Relevant trade and production data were obtained from Global Trade Information Services; the USITC's DataWeb; Brazilian government Web sites, including those of Embrapa and the Ministries of Transportation and Agriculture; the United Nations' Food and Agriculture Organization (FAO); and USDA. Information on Brazil's tariffs and NTMs was obtained from the World Trade Organization (WTO), Organisation for Economic Co-operation and Development (OECD), World Bank, and USDA, as well as many private sector and academic sources.

USITC staff used economic models to analyze the effects of removing NTMs on U.S. and Brazilian agricultural exports in selected third-country markets, as well as the effects of removing Brazil's preferential tariffs (i.e., all of Brazil's trade faced normal trade relations duties) under the Mercosul customs union on U.S. and Brazilian agricultural exports globally. The modeling analysis was based on an applied general equilibrium (AGE) model of world trade. This AGE simulation model focused on bilateral trade in food and agricultural products, including meat, grain, and oilseed products, among the United States, Brazil, and major third-country export markets. The AGE model used for the analysis was the Global Trade Analysis Project (GTAP) model, an economy-wide model of world trade specified at an aggregate product and sector level. The standard GTAP data have been disaggregated to allow analysts to estimate effects for specific products. The AGE model was also used to simulate the effects on U.S. and Brazilian exports of meat, grain, and oilseed products of preferential tariffs negotiated under Brazil's free trade agreements.

[7] Appendix B of this report contains the *Federal Register* notices, and appendix C summarizes the views of interested parties.

USITC staff analyzed the potential effects of NTMs using a three-step process. First, price gap data were developed. The existence of NTMs would likely raise prices of imports from the United States and Brazil and restrict the quantities imported. Thus, staff estimated the differences ("gaps") between import prices paid in third-country markets and U.S. and Brazilian export prices for the products of interest. Second, USITC staff identified a subset of products for which available information pointed to the presence of NTMs that may raise prices or restrict quantities. For these products, positive price gaps were treated as representing the direct economic effects of NTMs. Third, these price gaps were introduced into the simulation-modeling framework as being equivalent to tariffs, and the effects of their removal were estimated.

Recent History of Brazilian Agricultural Policies

The strong expansion of Brazil's agricultural sector during the last half of the 20th century and the first decade of the 21st century resulted in large part from a national economic development strategy designed by successive federal governments, starting in the 1930s and implemented over the next 70 years.[8] The strategy was based on several elements: farmland expansion to the Center-West and Northeast regions of the country, with infrastructure investments to support it; research and technology projects using primarily public funding; enhanced education for workers in the farm sector; and substantial migration (and immigration) to agricultural regions to support economic growth (figure 1.1).

Internal migration and the expansion of Brazil's agricultural frontier have been encouraged by the Brazilian government since the late 1950s, especially after land reform legislation was enacted in 1964. These reforms were largely designed to reduce social conflict in areas of southern Brazil where mechanized agriculture was expanding and to ensure Brazilian sovereignty over the Amazon region. Much of the agricultural expansion took place in the North and Center-West regions to open up frontier areas for export commodity production. Internal migration to the Center-West region, particularly to the state of Mato Grosso, continues today as a prominent feature of Brazilian society. Displaced Brazilian farm workers are encouraged by state and federal incentives to settle that region and provide labor for timber, ranching, and modernized agriculture.[9]

The opening of the Center-West region to agricultural production is one of several factors that gave rise to increasing Brazilian exports. Investment in agricultural research, removal of government price controls, and a more stable macroeconomic environment have also contributed to increasing agricultural trade since 2000.[10] Before that time, Brazil was not a significant agricultural exporter. Brazil's percentage of global agricultural exports, by value, declined from 4.0 percent in 1980 to 3.1 percent in 2000, as global agricultural exports grew 76 percent over the 20-year period and Brazil's rate of increase was only half as large. But by 2009, the last year for which global FAO data are

[8] Barros, "Brazil: The Challenges in Becoming an Agricultural Superpower," 2009, 82.

[9] Wittman, "Agrarian reform and the production of locality: resettlement and community building in Mato Grosso, Brazil," July/December 2005, 97-98, 101.

[10] Nassar, "Brazil as an Agricultural and Agroenergy Superpower," 2009, 55-80.

FIGURE 1.1 Brazilian states can be grouped into five regions

Source: Compiled by USITC staff.

available, Brazil's market share had risen to 5.6 percent of global agricultural exports. Much of the increase was in a limited set of products, including grains, soybeans, coffee, tobacco, cane sugar, meats, and certain horticultural products. With rates of production growth far exceeding growth in domestic consumption of those products, Brazil emerged as a leading global supplier.[11] For instance, Brazilian exports of soybeans now account for more than one-quarter of global exports, while exports of broiler (chicken) meat account for over 35 percent.[12]

[11] Food and Agriculture Organization of the United Nations (FAO). FAOSTAT Database (accessed March 29, 2012).
[12] Ibid.

Brazilian government policies have been instrumental in shaping the current size and structure of Brazil's agricultural and food products sector. Driven by considerations such as food security, inflation, and social cohesion, the goals and scope of these policies have changed over time, shifting away from government intervention to a more market-driven economy.[13] Thirty years ago, Brazil's agricultural policies were largely focused on market intervention measures such as government purchases, price controls, high import duties, and export controls, but they now include more private sector participation in measures such as preferential lending, project financing, and agricultural research and development.[14]

The total factor productivity of Brazilian farming doubled in the 30 years from 1975 to 2005 and accounts for approximately 70 percent of the growth in farm output over the period.[15] A strong contributing factor to Brazil's productivity gains was the creation of Empresa Brasileira de Pesquisa Agropecuária (Embrapa) in 1973, under the Ministry of Agriculture, Livestock, and Food Supply. Embrapa is a national agricultural research agency encouraging cooperation between federal and state experiment stations to improve agricultural productivity and increase yields for a wide variety of crops and livestock. Today, Embrapa has 47 separate research centers throughout Brazil, each with a crop (e.g., soybeans, grains), ecosystem (e.g., *cerrado*, Amazon), or thematic (e.g., biotech, climate change, agro-energy) emphasis. Employees collaborate with foreign government agencies around the world, including USDA, Agricultural Research Service (ARS).

Embrapa has contributed heavily to the adaptation of soybean, corn, and cotton varieties to Brazil's acidic soils and regional climates. Embrapa's scientists encouraged the use of large volumes of lime—as much as 5 metric tons (mt) per hectare (ha)—and gypsum to alter the acidic soils of the *cerrado* (Brazilian savannah).[16] They also researched legumes and bacteria to fix nitrogen in the soils throughout Brazil and lessen the need for imported fertilizers.[17] In recent years, Brazil's rising farm labor costs, declining interest rates, and fresh farmland converted from the *cerrado* all favored mechanization and large-scale farming, particularly in newly settled areas in the Center-West region (figure 1.1).

Analytical Framework for Competitive Factors

To analyze the competitive factors affecting the Brazilian agriculture sector, the USITC developed an economic framework incorporating the analytical assumptions, parameters, and structure that define competitive conditions in agricultural trade.[18] Competitive conditions in agriculture encompass the economic, institutional, and regulatory environment in which firms compete. Competitive factors are defined as direct and indirect determinants of the ability of suppliers to offer products with the characteristics

[13] Chaddad, Fabio, and Jank, "The Evolution of Agricultural Policies," 2006, 86–88; Chadha, Rajesh, and Davenport, "Agricultural Policy Reform in the BRIC Countries," February 2011, 7.
[14] Chaddad, Fabio, and Jank, "The Evolution of Agricultural Policies," 2006, 86.
[15] Barros, "Brazil: The Challenges in Becoming an Agricultural Superpower," 2008, 3.
[16] See figure 2.1 for a map of the *cerrado*.
[17] *Economist*, "Brazilian Agriculture: The Miracle of the *Cerrado*," August 26, 2010.
[18] USITC, *Guidelines for Developing an Economic Framework for an ITC Study*, 2008.

desired by buyers, who base their buying decisions on three main criteria: delivered cost, product differentiation, and reliability of supply.[19]

In markets around the world, agricultural competitiveness is measured by comparing these criteria for domestically produced goods against those of imports, both in the domestic market and in third-country markets. In this report, particularly chapters 3, 4, and 6–10, the USITC's analysis explores the relative importance of delivered cost, product characteristics, and reliability of supply in determining the competitiveness of Brazilian agricultural exports vis-à-vis U.S. competitors in third-country markets. Figure 1.2 identifies several specific competitive factors for agriculture.[20]

Delivered Cost

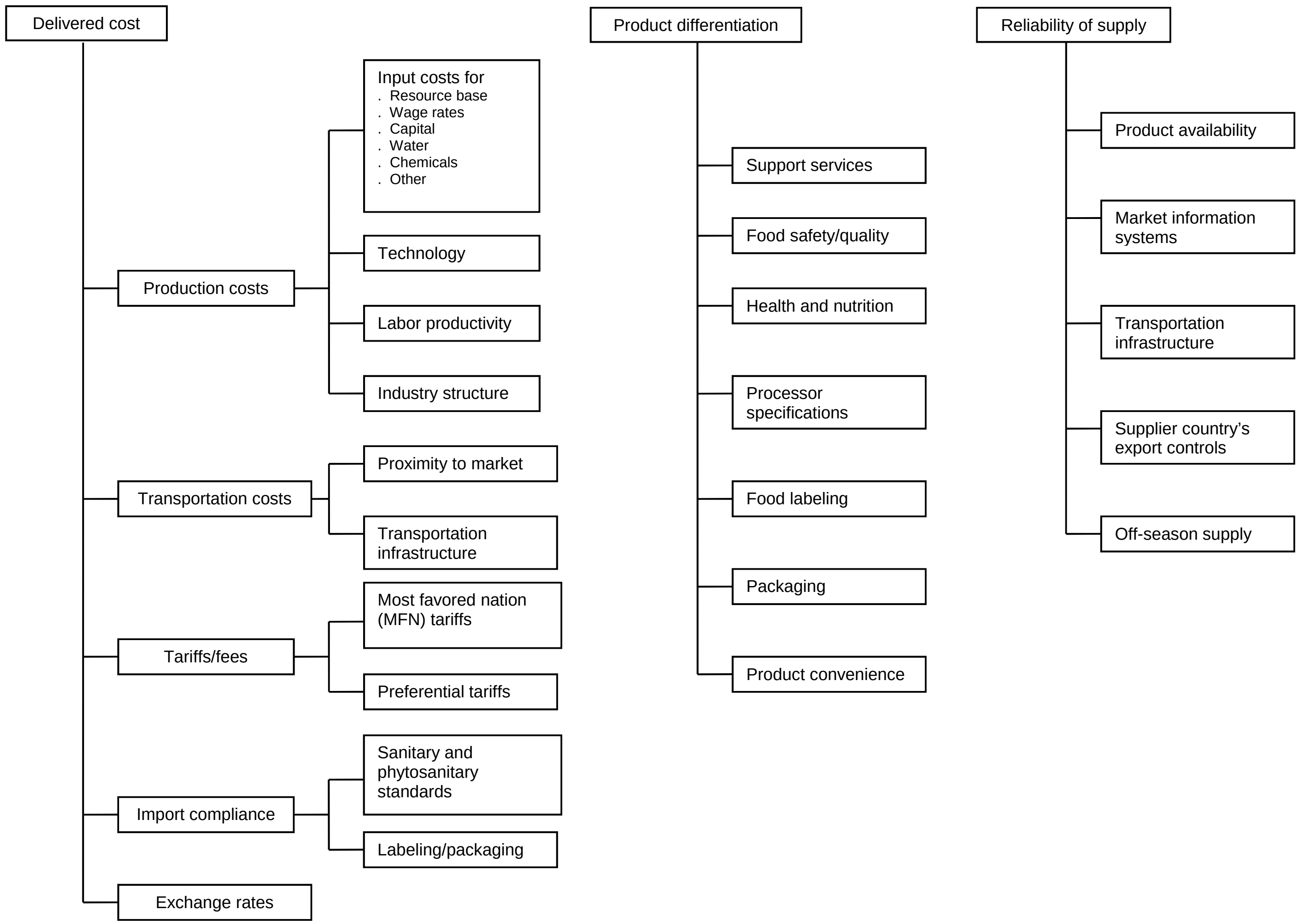
For many globally traded agricultural products, delivered cost is the most important criterion in making purchasing decisions. For producers of these goods to be competitive in export markets, they must be able to supply the products to purchasers at or below the price offered by other exporters and domestic producers. The price competitiveness of these suppliers therefore depends on factors that tend to lower or raise their delivered costs vis-à-vis the delivered costs of other imported and domestic products in their home market.

The delivered cost of domestically produced goods depends on the costs of producing the good and the cost of domestic transportation from production points to consumption points. Production costs in turn depend on the costs of inputs, such as fertilizer and wages. The use of biotechnology, such as in high-yielding seeds, and production technology, such as machinery and irrigation, also influences delivered cost. Transportation costs derive from several factors, including fuel costs and the efficiency of the transportation system, which in turn depends on such factors as the quality of roads and ports. Additional costs affect the overall delivered cost to export markets. These include the costs of international transportation, currency conversion, trade risk coverage, and tariffs in the foreign market. The delivered cost of exported goods also includes expenditures on import compliance, such as complying with sanitary and phytosanitary (SPS) standards, and meeting labeling and packaging requirements of third-country markets.

[19] Several recent Commission fact-finding investigations concern competitive conditions affecting U.S. agricultural markets. Examples include USITC, *Conditions of Competition for Milk Protein Products*, 2004, and USITC, *Canned Peaches, Pears, and Mixtures: Conditions of Competition*, 2007. For a detailed discussion of the framework used in this report, see app. E of USITC, *China's Agricultural Trade: Competitive Conditions and Effects*, 2011.

[20] Figure 1.2 does not list government policies and foreign direct investment (FDI) as competitive factors because they have the potential to influence all three categories (delivered cost, product differentiation, and reliability of supply). For example, government programs or policies that subsidize credit to farmers or provide tax exemptions for producers lower the delivered cost of domestic products. Government-funded research and development, as well as government-mandated grades and standards requirements, offer a means of differentiating products. Government intervention can influence the reliability of supply by publicly funding or subsidizing marketing and transportation infrastructure, and by imposing supply and export controls on producers. See box 4.1 for further discussion of FDI's impact on delivered cost, product differentiation, and reliability of supply.

FIGURE 1.2 A broad range of factors affect competitiveness in agricultural markets



Source: Compiled by USITC staff.

Product Differentiation

In addition to delivered cost, purchasers compare the level of product differentiation of domestically produced and imported products in making their buying decisions. The more processed and branded the product, the more likely product characteristics and reputation will form the basis of the purchasing decision, thereby making delivered cost less important. Similar products are differentiated from one another through their unique product characteristics, such as brand packaging, labeling, and their level of convenience, with the help of large investments in marketing, promotion, and media advertising.

Reliability of Supply

Reliability of supply refers to the ability of a supplier to deliver a specified product, of a particular quality and in an agreed-upon volume, to a specified location at a contracted time. Risks inherent in agricultural production (potentially impacting both the quantity and quality of supply) make this criterion particularly important for purchasers to consider. Products can be differentiated by their availability at different times of year, particularly when overseas suppliers are able to ship goods in the off-season to domestic consumers. Reliability of supply depends on the efficiency of the supply chain, including storage and transportation infrastructure, as well as market information systems. In agriculture, several factors may disrupt the reliability of supply, such as government-imposed export controls, political unrest, poor transportation infrastructure, and unstable production quantities (owing to poor weather); these may in turn shrink a country's exportable surplus.

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CHAPTER 2
Brazil's Agricultural Production, Consumption, and Trade

Overview

Agriculture is important to the Brazilian economy. In 2010, agricultural production contributed 6 percent to the country's gross domestic product (GDP) and 20 percent to formal employment.[1] The sector consists of about 5 million farms, half of which are small, family operations that collectively produce only 7 percent of Brazil's total agricultural output. About 1.6 million farms, however, are large commercial operations, mostly located in the vast savannah region (*cerrado*) of central Brazil and accounting for more than three-quarters of Brazil's total agricultural production (figure 2.1).[2]

Brazil has abundant natural resources, including substantial arable land and nearly three times the freshwater reserves of the United States.[3] Brazil's varied climates and soils support a diverse group of crops, in certain regions allowing two harvests each year (and in some areas, even three harvests with irrigation).[4] Over the past 20 years, the Brazilian agricultural sector has been transformed into a major, modern world producer, owing to better farming techniques, increased mechanization, and the widespread use of technology to improve yields. While planted area increased by 30 percent over the 20-year period, crop production doubled. The doubling was a result of both higher yields and the expansion of farming into the *cerrado*, where considerable investment in capital equipment helped promote economies of scale.[5] In addition, public and private research entities, notably the Brazilian Agricultural Research Corporation (Embrapa),[6] developed seed varieties that are more productive and resistant to drought, acidic soil, pests, and diseases.[7]

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[1] CIA, *The World Factbook: Brazil*, July 5, 2011. Brazil's GDP was $2,088 billion in 2010. World Bank, Data: Brazil (accessed May 4, 2011).

[2] *Economist*, "Brazilian Agriculture: The Miracle of the *Cerrado*," August 26, 2010, 4–5. A combination of grassland and woodland, the *cerrado* irregularly covers 10 of Brazil's states: Goiás, Mato Grosso, Mato Grosso do Sul, Minas Gerais, São Paulo, Bahia, Piauí, Maranhão, Tocantins, and Rondônia. USDA, ERS, *Brazil's Cotton Industry: Economic Reform and Development*, June 2011, 4.

[3] According to the United Nations Food and Agriculture Organization (FAO), Brazil had 264 million hectares (ha) (652 million acres) of agricultural land in 2009, compared with 403 million ha (995 million acres) in the United States. Agricultural land includes both cropland and pastureland. The FAO estimates that Brazil has the potential to increase its agricultural land to 400 million ha (988 million acres). FAO, FAOSTAT (accessed March 13, 2012); *Economist, The Global Power of Brazilian Agribusiness*, November 2010, 4.

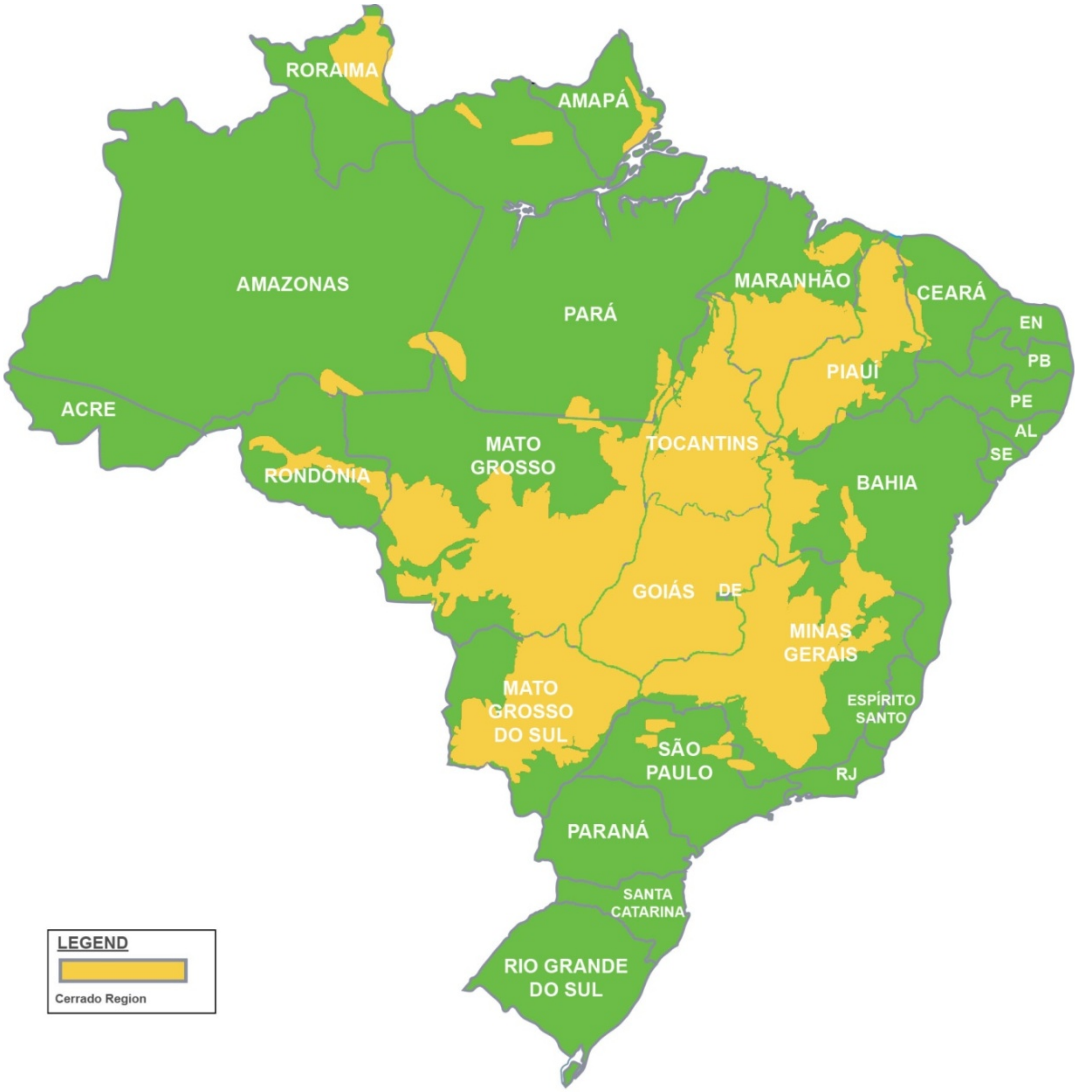
[4] Costa, Macedo, and Honczar, *Brazilian Agribusiness*, 2008, 7–8.

[5] The *cerrado* has an estimated 137 million ha (338 million acres) available for agricultural production. *Economist, The Global Power of Brazilian Agribusiness,* November 2010, 7; Matthey, Fabiosa, and Fuller, "Brazil: The Future of Modern Agriculture?" May 2004, 17.

[6] Embrapa is the world's leading tropical research institution. Started as a public company in 1973, it is largely credited with turning the *cerrado* into viable cropland. *Economist*, "Brazilian Agriculture: The Miracle of the *Cerrado*," August 27, 2010, 3.

[7] Costa, Macedo, and Honczar, *Brazilian Agribusiness*, 2008, 9.

FIGURE 2.1 The c*errado* region comprises nearly one-quarter of Brazil's total area



Source: Government officials, interview by USITC staff, Brasilia, Brazil, August 26, 2011. The map was provided to USITC staff in a presentation by Embrapa officials.

Today, Brazil is among the world's top agricultural countries. As noted in chapter 1, according to the FAO, Brazil was the world's leading producer of cane sugar, fiber crops, coffee, oranges, and edible beans in 2009/10, and among the top three producers of beef, cattle hides, poultry, soybeans, corn, and tobacco.[8]

Brazil is also one of the world's leading consumers of meats, grains, and oilseeds. Brazil's rapidly rising per capita income has led to two significant consumption trends: a sharp increase in domestic consumption of almost all agricultural products, and a shift in consumption away from traditional staple foods, such as grains, pulses, and tubers, toward non-staples such as vegetables, fruits, oils, meats, and dairy products. Rising

[8] FAO, FAOSTAT (accessed February 15, 2012).

domestic food demand has led many Brazilian producers to shift their marketing efforts toward supplying the domestic market, reducing the supply available for export.

Nonetheless, Brazil is a major exporter of agricultural products. During 2006–10, Brazil accounted for almost 9 percent of global agricultural exports, making it the world's third-largest agricultural exporter, behind only the European Union (EU-27) and the United States. Between 2006 and 2011, Brazilian agricultural exports to the world grew 123 percent, from $36.6 billion in 2006 to $81.7 billion in 2011 and representing close to a third of total Brazilian exports. Exports are concentrated in a few major commodities, with soybeans, soybean meal and oil, sugar, and coffee accounting for a little more than 50 percent of total agricultural exports during the six-year period, and poultry and beef accounting for an additional 19 percent. Tobacco products and corn are also important Brazilian exports. In contrast to its position as a global exporter, Brazil was the world's 20th-largest importer of agricultural products during 2006–10, although between 2006 and 2011 its imports more than doubled to reach a record $11 billion in 2011. Major Brazilian agricultural imports include wheat and milled grains, certain vegetable oils, processed vegetables, and fresh fruit.

Although Brazil and the United States are leading global exporters of many of the same products, direct competition between the two countries is limited. For example, both countries supply China with soybeans; however, the rapid growth of Chinese soybean demand has allowed both countries to expand exports. Brazil's major markets for soybean meal are the EU-27, Thailand, and Korea, while the United States focuses on Canada and Mexico. In poultry, while Brazil and the United States are the world's leading suppliers, the top five markets for each country (except for Hong Kong) do not overlap. This is because Brazilian poultry is produced and packaged with specific customers in mind, while the United States tends to offer undifferentiated, bulk poultry products. And although the United States is the world's third-largest global beef exporter, competition with Brazil is minimized for two reasons. First, the United States and Brazil serve different market segments: the United States supplies grain-fed beef destined for Canada, Mexico, Japan, and Korea, while Brazil supplies grass-fed beef used in manufactured beef products. Second, for regulatory reasons, Brazilian beef lacks access to many of the largest U.S. export markets, such as Japan and Korea.

Agricultural Production

Regional Farm Characteristics

Farming in Brazil was traditionally concentrated in the Southern and Southeastern states of São Paulo, Paraná, Santa Catarina, and Rio Grande do Sul, areas with nutrient-rich soil, sufficient water resources, and adequate infrastructure. But by the 1960s, inflated land values hampered agricultural expansion in these areas. Through a series of government incentives in the 1970s and 1980s, including low-cost credit and high support prices for wheat, farmers began buying cheaper land in the *cerrado* (figure 2.1) (specifically the Center-West states of Mato Grosso and Mato Grosso do Sul) for wheat production.[9] In contrast to the temperate climate of the South, the *cerrado* is tropical.

[9] Matthey, Fabiosa, and Fuller, "Brazil: The Future of Modern Agriculture?" May 2004, 2.

While its flat topography was ideal for crops, the region's acidic, thin soil had initially discouraged large-scale expansion of crop production. Instead, ranchers had moved into the region, grazing their herds on the unused pastureland.

In the early 1980s, advances in technology developed by Embrapa (including artificial soil enrichment and soybean seeds engineered for a tropical climate) revolutionized farming techniques and, coupled with the high price of soybeans, led to the expansion of crop production in the *cerrado*.[10] Embrapa further helped to boost yields in the region by developing "short cycle" plants that enabled two crops to grow annually on the same parcel.[11] Farmers in the *cerrado* used no-till cultivation to mitigate the erosion of soil, and faced fewer pest problems than in the Southeast because of the limited duration of crop production.[12] These developments allowed farmers to expand production beyond soybeans, including widespread use of corn in the second harvest to meet increased demand for swine and poultry feed. Supported by high prices, cotton also became commonplace in the *cerrado* beginning in the mid-1990s.[13]

While the Southern and *cerrado* states differ in farm size, climate, and cropping patterns, each region's farmers are well adapted to their environment. The South and Southeast regions have higher population densities. As a result, land is expensive and farms are generally small—30 hectares (ha) (74 acres) or less, on average; are less mechanized than those in the *cerrado*; and are more likely to depend on government-subsidized credit.[14] Cooperatives often help to mitigate small farmers' production challenges, such as a lack of credit for purchasing inputs, by allowing small farming operations to buy, sell, and transport goods collectively.[15] In contrast, farms in the *cerrado* benefit from economies of scale through size and mechanization. Farms in this region are primarily large and commercial—more than 65 percent are larger than 1,000 ha (2,470 acres)—and are continuing to consolidate. Multinational corporations supply the technology and the international lines of credit necessary to create highly sophisticated operations capable of competing in international markets.[16] While many *cerrado* states such as Mato Grosso and Goiás are continuing to experience rapid growth, agricultural expansion in the region could slow in the future. The development of potential roadblocks, including demands for reform by the landless poor, expansion of indigenous reservations, environmental concerns about deforestation, and the uncertainty of tree-planting stipulations required by Brazil's Forest Code, might favor the northeastern savannah lands in states such as Bahia as areas of strong agricultural growth.[17]

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[10] Use of export embargoes by the United States on crops including soybeans is also believed to have encouraged the expansion of crop production in the *cerrado*. Faminow and Hillman, "Embargoes and the Emergence of Brazil's Soybean Industry," 1987.

[11] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011; *Economist*, "Brazilian Agriculture: The Miracle of the *Cerrado*," August 27, 2010, 4.

[12] Matthey, Fabiosa, and Fuller, "Brazil: The Future of Modern Agriculture?" May 2004, 2–3.

[13] Ibid., 5.

[14] Ibid., 3–5.

[15] USDA, ERS, *Agriculture in Brazil and Argentina: Developments and Prospects*, November 2001, 41.

[16] Matthey, Fabiosa, and Fuller, "Brazil: The Future of Modern Agriculture?" May 2004, 3–5.

[17] Matthey, Fabiosa, and Fuller, "Brazil: The Future of Modern Agriculture?" May 2004, 18. Almost 50 percent of arable land belongs to 1 percent of the population. *Economist*, *Brazil Agriculture: Landless Peasants Take Farms, Government Buildings*, January 12, 2011. See chapter 3 of this study for further discussion of the Forest Code. Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

General Production Patterns

Though Brazilian agriculture has been thriving for decades, it experienced an especially strong expansion between 1995 and 2005, owing to economic reforms and liberalization by the government that increasingly led farmers to source capital, inputs, and technology from international investors.[18] In addition to growth in agricultural output and productivity, Brazil has experienced a gradual shift in the composition of agricultural production. Specifically, land planted with traditional, labor-intensive plantation crops (including bananas, tobacco, and citrus) has been redirected to crops made less labor-intensive through technology, such as soybeans, cotton, sugar cane, and corn.[19] The tropical climate and acidic soils of the *cerrado* once limited production of many such crops, but Brazilian scientists and farmers overcame these limitations by using lime and fertilizers, as well as developing new regional seed varieties. Technology has also played an important role: the use of genetically modified (GM) crops was legalized in 2004, and by 2009, Brazil was the second-largest grower of biotech crops in the world.[20]

In 2010, the value of Brazil's total crop production reached $R154 billion ($87.4 billion),[21] 9 percent more than the previous year, owing to high prices for exports.[22] Combined, the top three products represented just over half of total crop production value: soybeans (24 percent), sugar cane (18 percent), and corn (10 percent). By both value and planted area, soybeans were the dominant crop throughout 2006–10, with corn and sugar cane alternating between second and third place. While these three products are dominant nationally, other products, such as oranges and rice, account for a large percentage of production in certain states (figure 2.2).

Total planted area for all crops remained stable over the past five years at around 65 million ha (161 million acres), but production still increased as a result of rising investment, adoption of technology, and a favorable climate. Overall, pastureland for livestock fell slightly (by about 3 percent) over the past decade, but this decrease was concentrated in the South and Southeast, where pastureland has been converted to row crops (soybeans, corn, and edible beans) and sugar cane production. This loss was somewhat offset by an increase in pasture in the North region, where in some cases land is being cleared for cattle ranching.[23]

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[18] USDA, ERS, *Brazil's Cotton Industry: Economic Reform and Development*, June 2011, 13.

[19] Friedman, "The Geopolitics of Brazil: An Emergent Power's Struggle with Geography," July 2011, 9.

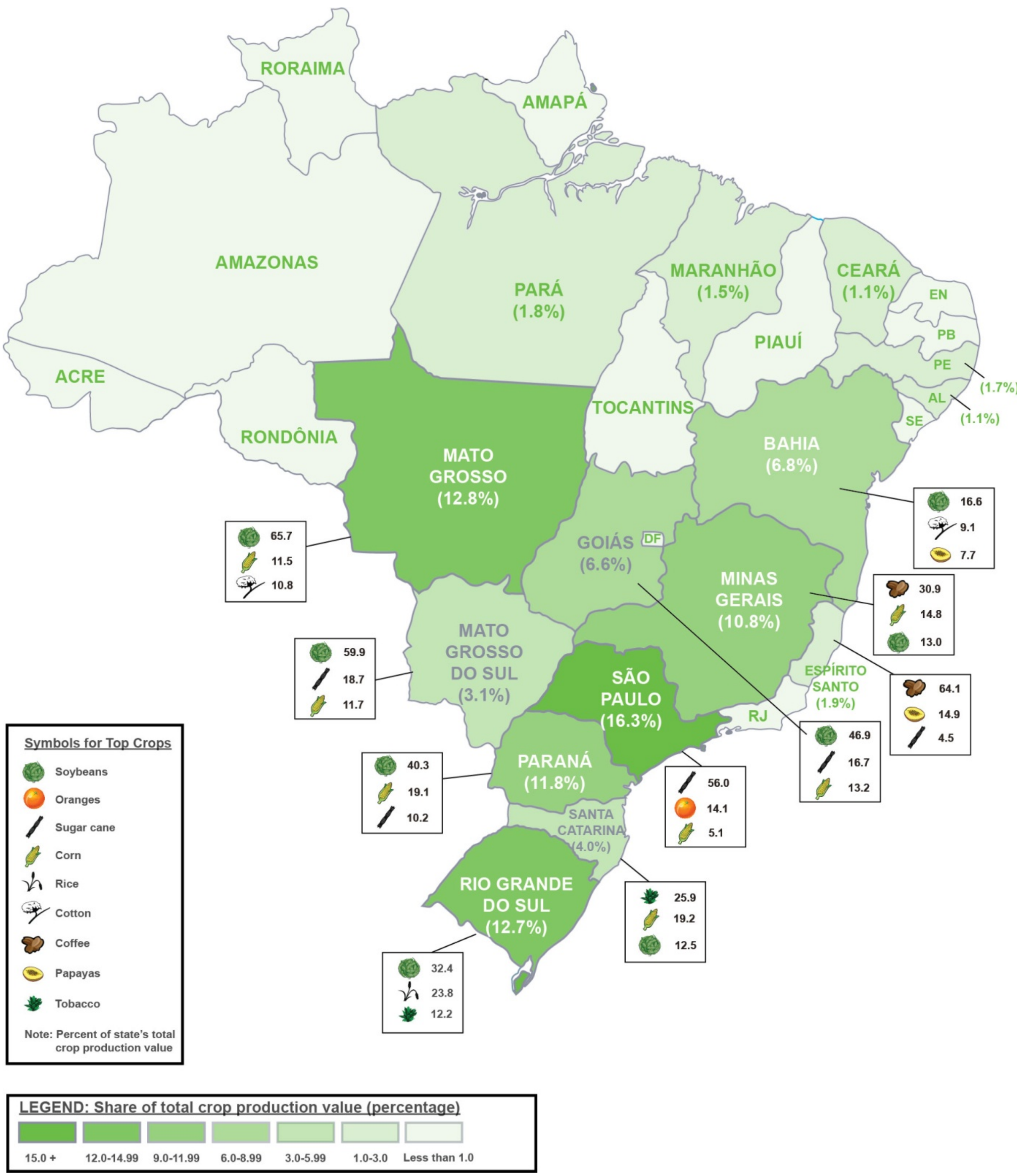
[20] With 21.4 million ha (52.9 million acres) planted, Brazil was second only to the United States, which cultivated 64 million ha (158 million acres) of GM crops in 2009. *The Ecologist*, "Brazilian GM Crop Surge Reported," February 23, 2010.

[21] The international symbol for the Brazilian *real* (or its plural, *reais*) is R$. In this report, we use $ to denote U.S. dollars. In the text, USITC staff has converted *reais* to dollars using IMF exchange rates for the applicable period.

[22] The value of Brazil's crop production includes the value of 64 different permanent and annual crops, but it does not include the value of many further processed or value-added food products. This may account for the difference in the value of farm production shown in table ES.1 and the value referenced here. IGBE, *Municipal Agricultural Production 2010*, October 2011.

[23] Brazil has the world's largest commercial cattle herd, occupying an estimated 84.6 million ha. *Economist*, "Brazilian Agriculture: The Miracle of the *Cerrado*," August 27, 2010; *Economist*, *Brazil Agriculture: Less Smoke, Less Ire*, September 24, 2010; Soybean and Corn Advisor, Inc., "Brazil Land Utilization," n.d.

FIGURE 2.2 Brazil's crop production extends countrywide and includes many commodities besides corn and soybeans



Source: Brazilian Institute of Geography and Statistics (IBGE).

Recent Production Trends

During marketing years spanning 2006/07–2010/11, production of most commodities grew, (table 2.1).[24] Increases in production were large for commodity exports, including sugar, cotton, and coffee, for which export volumes rose by 22 percent, 29, percent, and 24 percent, respectively, between 2006/07 and 2010/11.[25] A 28 percent increase in the production of oilseeds between 2006/07 and 2010/11 was mainly driven by rising demand, largely from China. Production of grains increased by 20 percent over the period, driven by growth in corn and wheat production for animal feed. Overall meat production increased by 16 percent, and the highest percent gain was achieved by broiler production, which grew by 31 percent between 2006/07 and 2010/11, owing to a combination of increased consumer demand and rising exports.

Oilseeds

Soybeans are by far the primary oilseed produced in Brazil. Soybean production rose from 59.0 million metric tons (mt) in 2006/07 to 75.5 million mt in 2010/11, an average annual increase of 6 percent. This expansion was primarily driven by a steady increase in annual yields, which is the result of improved seeds, technology, and equipment, as well as better soil management practices.[26] Also, higher demand from China and low prices for corn contributed to an increase in area planted to soybeans over the period.[27] Although Brazil is the world's largest non-GM soybean producer, GM soybeans accounted for 80 percent of production in 2010/11; however, this percentage varies significantly by region.[28]

Brazilian production of soybean oil and meal grew by about 4 percent annually between 2006/07 and 2010/11 in response to rising demand for animal feed by Brazil's growing livestock sector. The poultry industry uses one-quarter of Brazil's soybean meal production, followed by the swine industry which accounts for another 16 percent.[29] Also, demand for biodiesel, for which soybean oil is the primary feedstock, has been growing since the government increased its mandate for biofuel production in 2011.[30]

Grains

During 2006/07–2010/11, total Brazilian grain production increased by 5 percent annually. Corn was produced in the greatest volume, peaking at 59 million mt in 2007/08. Corn production grew at an average annual rate of 3 percent, and 13 percent overall for

[24] The marketing year is a 12-month period, usually beginning with a new harvest, during which the product is marketed. Marketing years differ for each commodity and country.

[25] GTIS, Global Trade Atlas database (accessed February 12, 2012).

[26] USDA, FAS, *Brazil: Oilseeds and Products; Annual*, April 4, 2011, 2.

[27] *Economist*, *The Global Power of Brazilian Agribusiness*, November 2010, 12.

[28] For example, in Mato Grosso, conventional soybeans accounted for close to 40 percent of the total state production in 2011. Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 31, 2011; industry representative, interview by USITC staff, Paraná, Brazil, August 31, 2011; USDA, FAS, *Brazil: Oilseeds Annual Report 2011*, April 4, 2011, 8.

[29] USDA, FAS, *Brazil: Oilseeds and Products; Annual*, April 4, 2011, 6.

[30] About 80 percent of Brazilian biodiesel production comes from soybeans. Industry representative, interview by USITC staff, São Paulo, Brazil, August 22, 2011; USDA, FAS, *Brazil: Oilseeds and Products; Annual*, April 4, 2011, 7.

TABLE 2.1 Brazil: Agricultural production of selected products, marketing years (MY) 2006/07–2010/11

	2006/07	2007/08	2008/09	2009/10	2010/11	Average annual change 2006/07–2010/11
	Million mt					Percent
Oilseeds						
Soybean	59.0	61.0	57.8	69.0	75.5	6.4
Cottonseed	2.6	2.7	2.0	2.0	3.4	6.9
All oilseeds	62.0	64.3	60.3	71.4	79.3	6.3
Meals						
Soybean	24.1	24.9	24.7	26.1	27.9	3.7
Cottonseed	1.0	1.1	0.9	1.0	1.4	8.8
All meals	25.3	26.1	25.8	27.2	29.4	3.8
Vegetable oils						
Soybean	6.0	6.2	6.1	6.5	6.9	3.6
All vegetable oils	6.6	6.9	6.8	7.1	7.7	3.9
Grains						
Corn	51.0	58.6	51.0	56.1	57.5	3.0
Rice, milled	7.7	8.2	8.6	7.9	9.3	4.8
Wheat	2.2	3.8	5.9	5.0	5.9	28.0
Sorghum	1.6	1.4	2.0	1.9	2.3	9.5
All grains	63.1	72.5	67.9	71.4	75.6	4.6
Meats						
Poultry (broiler)	9.4	10.3	11.0	11.0	12.3	7.0
Beef and veal[a]	9.0	9.3	9.0	8.9	9.1	0.3
Pork[a]	2.8	3.0	3.0	3.1	3.2	3.4
Poultry (turkey)	0.4	0.5	0.5	0.5	0.5	5.7
All meats	21.6	23.1	23.5	23.6	25.1	3.8
Fresh fruit						
Oranges[b]	18.5	16.9	17.0	15.4	20.6	2.8
Grapes	1.3	1.4	1.3	1.3	1.3	0.0
Apples	1.0	1.1	1.2	1.3	1.2	4.7
All fresh fruit	21.0	19.4	19.6	18.1	23.0	2.3
Other						
Green coffee[c]	36.1	46.7	39.1	53.3	44.8	5.5
Sugar	31.5	31.6	31.9	36.4	38.4	5.1
Fluid milk	25.2	26.8	27.8	28.8	29.9	4.4
Cotton[d]	7.0	7.4	5.5	5.5	9.0	6.5
Orange juice	1.5	1.3	1.3	1.1	1.4	–1.7

Source: GTIS, Global Trade Atlas database (accessed February 10, 2012).

[a]Carcass weight equivalent.
[b]Fresh orange production includes oranges destined for processing and the fresh market.
[c]1,000 60-kg bags.
[d]Million 480-lb. bales.

the period in response to high international prices and increased domestic demand for swine and poultry feed, of which corn is a major component.[31] Over the past decade Brazilian corn yields rose owing to the increased use of fertilizer, better soil conditions, and expanded use of GM seeds.[32] In 2010/11, 44 percent of the first corn crop was genetically modified, compared with 5 percent in 2008, when GM corn was officially approved for use.[33]

[31] Industry representative, interview by USITC staff, Brasilia, Brazil, August 24, 2011; USDA, FAS, *Brazil: Grain and Feed; Annual*, March 16, 2011, 4.
[32] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.
[33] USDA, FAS, *Brazil: Grain and Feed; Annual*, March 16, 2011, 3.

Wheat production averaged annual growth of nearly 28 percent over the past five years. In 2010/11, average yields rose by 30 percent over the previous year because of good weather.[34] The three Southern states accounted for more than 92 percent of Brazil's total wheat production in 2009.[35] In many cases, wheat is double-cropped after corn or soybeans.[36]

Between 2006/07 and 2010/11, rice production grew by about 5 percent annually. Over the past five years, production has moved away from the Center-West region toward irrigated production in the South as low prices and a global glut of rice have made the crop less profitable in the Center-West region than other major crops, particularly soybeans.[37] The Southern state of Rio Grande do Sul accounted for about 60 percent of Brazil's rice production in 2010/11.[38]

Coffee

Brazil leads the world in coffee production and exports. While production fluctuated over the period, it grew on average by 5.5 percent annually between 2006/07 and 2010/11 (table 2.1). The biennial cycle of arabica bean production, the predominant species grown in Brazil, affected both area harvested and yields. While area planted remained fairly consistent over the period, the number of fruit-bearing trees increased from 6.3 billion in 2006/07 to 6.6 billion in 2010/11.[39] Improved crop management, tree replacement with improved varieties, and better use of technologies (like irrigation) all contributed to the increase in production over the period. Coffee production is concentrated in the Southeast, with Minas Gerais accounting for more than 45 percent of Brazilian production during 2006/07–2010/11, followed by Espírito Santo and São Paulo.[40]

Sugar[41]

Brazil was the world's largest producer and exporter of sugar between 2006/07 and 2010/11.[42] During this period, Brazilian production of sugar increased by 22 percent, while area harvested increased by 45 percent.[43] Production was once centered in the Northeast region, but shifted to the Southeast for its more favorable climate, good soil, and proximity to the consumer market.[44] São Paulo accounts for a significant share of Brazilian sugar production (nearly 60 percent throughout the period[45]), but some of the recent growth in production has been in the Center-West and Minas Gerais, where land is relatively affordable.[46] Additionally, domestic prices for sugar increased sharply in 2010/11 as a result of high international sugar prices and reduced supply after poor

[34] USDA, FAS, *Brazil: Grain and Feed; Annual*, March 16, 2011, 9.
[35] IBGE, *Municipal Agricultural Production 2009*, October 2010.
[36] Industry representative, interview by USITC staff, São Paulo, Brazil, August 22, 2011.
[37] USDA, FAS, *Brazil: Grain and Feed; Annual*, March 18, 2009, 15–16.
[38] USDA, FAS, *Brazil: Grain and Feed; Quarterly*, October 31, 2011, 6.
[39] USDA, FAS, *Brazil: Coffee and Products; Annual*, May 9, 2011, 4.
[40] IBGE, *Municipal Agricultural Production 2009*, October 2010.
[41] Brazil produces sugar cane. The United States produces both sugar cane and sugar beets.
[42] McConnell, Dohlman, and Haley, "World Sugar Price Volatility Intensified," September 2010, 30.
[43] USDA, FAS, *Brazil: Sugar and Products; Annual*, April 14, 2011, 2.
[44] Costa, Macedo, and Honczar, *Brazilian Agribusiness*, 2008, 59.
[45] Because land in São Paulo state is relatively expensive, the share of land there dedicated to soybeans declined over the past five years as more land was allocated to sugar cane.
[46] USDA, FAS, *Brazil: Sugar and Products; Annual*, April 14, 2011, 2.

weather in Brazil hampered production in 2008/09.[47] Close to one-half of Brazilian sugar is used for the production of ethanol. The principal factors driving the expansion of sugar cane in Brazil are increasing domestic and international demand for renewable energy (particularly ethanol) as a response to high oil prices, high global sugar prices, an expansion of arable land, technological advancements in new sugar cane varieties, and government price support.[48]

Meats

In 2010/11, chicken accounted for nearly half of total meat production in Brazil. Production increased by 31 percent over the past five years in response to strong demand attributable to rising domestic per capita income, the competitive price of broiler meat compared with beef, higher demand from the food service industry for frozen and precooked chicken products, and greater demand for Brazilian poultry by China and Hong Kong.[49]

Beef production remained stable over the period, increasing by 1 percent between 2006/07 and 2010/11. Production declined slightly in both 2008/09 and 2009/10 as the global economic crisis reduced export volumes, although the effect of the crisis was mitigated somewhat by higher domestic consumption.[50] In addition, the strong *real* reduced the competitiveness of Brazilian exports of beef during the period.[51]

Between 2006/07 and 2010/11, Brazilian production of pork rose by about 14 percent, primarily as a result of stronger domestic demand but also due to increased exports. Domestic demand for pork rose over the period, owing to a strong public campaign by the domestic pork council and prices that were competitive with beef, while production benefited from stability in feed prices resulting from increased corn production.[52] Hog production in the Center-West (principally Mato Grosso) ramped up in 2007 as a result of domestic and international investment.[53] Still, in 2009 about 68 percent of Brazilian swine were slaughtered in three Southern states, which remain the primary production hub.[54]

Cotton

Brazilian production of cotton registered a net increase over the period, from 7 million bales in 2006/07 to 9 million bales in 2010/11. Production reached a record in 2007/08, but fell in the subsequent two marketing years owing to falling cotton prices as a result of global financial conditions, a reduction in planted area, and heavy rainfall that lowered

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[47] USDA, FAS, *Brazil: Sugar and Products; Annual*, April 14, 2011, 10; McConnell, Dohlman, and Haley, "World Sugar Price Volatility Intensified," September 2010, 33.

[48] USDA, ERS, *Sugar and Sweeteners Outlook*, June 4, 2007, 36.

[49] USDA, FAS, *Brazil: Poultry and Products; Annual*, September 28, 2007, 5; USDA, FAS, *Brazil: Poultry and Products; Semi-Annual*, February 3, 2011, 2.

[50] USDA, FAS, *Brazil: Livestock and Products; Annual*, September 22, 2009, 4.

[51] USDA, FAS, *Brazil: Livestock and Products; Annual*, August 30, 2010, 5.

[52] Costa, Macedo, and Honczar, *Brazilian Agribusiness*, 2008, 83–87.

[53] USDA, FAS, *Brazil: Livestock and Products; Annual,* August 25, 2006, 8.

[54] IBGE, *Municipal Agricultural Production 2009*, October 2010.

yields.[55] In 2010/11, planted area increased by 38 percent over the previous year in response to good domestic and international prices and a favorable climate for cotton production in Mato Grosso, the top producing state.[56] Since the 1990s, cotton production has shifted from the South and Southeast to the *cerrado*, owing to good soil, flat land suited to mechanization, and intensive use of technology.[57] GM cotton was introduced in 2005 and widespread plantings began in 2006/07; GM seeds are expected to account for the majority of the cotton crop in the near future.[58] Despite continued production growth in the *cerrado*, cotton requires many inputs and expensive, specialized machinery, which raise its production cost relative to soybeans and corn, and may dampen growth of cotton production in the future.

Oranges and Orange Juice

Brazil is both the largest orange producer in the world and the largest orange juice exporter, with export values more than three times that of the United States, the second-largest orange juice producer and exporter. Overall production of fresh oranges increased in Brazil by about 11 percent between 2006/07 and 2010/11. Production dropped to a six-year low of 15.4 million mt in 2009/10[59] as a result of poor weather, lower investment in crop management due to low prices,[60] and the continued spread of citrus greening disease in the main production areas of São Paulo and Minas Gerais.[61] Orange production rebounded to 20.6 million mt in 2010/11 thanks to a large second blossoming induced by water stress—a result of dry conditions the previous crop year. Although area planted to oranges has fallen in the past five years (particularly due to the expansion of acreage devoted to sugar cane in São Paulo),[62] overall tree numbers have remained relatively constant due to higher planting densities. São Paulo state accounts for nearly three-quarters of annual Brazilian orange production, and for virtually all orange juice processing and exports.[63] Despite a larger orange crop in 2010/11 compared to 2006/07, a greater share of production was diverted to the fresh market, resulting in a 3 percent decline in orange juice production. Brazilian orange juice production consists almost entirely of Valencia oranges, an ideal juicing variety because of its deep color and high sugar and juice content.[64] The largest Brazilian orange juice export markets in 2011 were the EU-27, the United States, Japan, and China.[65]

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[55] USDA, ERS, *Brazil's Cotton Industry: Economic Reform and Development*, June 2011, 21; IBGE, *Municipal Agricultural Production 2009*, October 2010.

[56] USDA, FAS, *Brazil: Cotton and Products Update*, November 30, 2010, 2–3.

[57] USDA, ERS, *Brazil's Cotton Industry: Economic Reform and Development*, June 2011, 3; Embrapa, "Cotton Culture in the *Cerrado*" (accessed November 10, 2011).

[58] USDA, ERS, *Brazil's Cotton Industry: Economic Reform and Development*, June 2011, 8.

[59] USDA, FAS, PSD Online (accessed February 2, 2011).

[60] USDA, FAS, *Brazil: Citrus Semi-annual*, June 15, 2010, 3.

[61] Citrus greening, also called huanglongbing, is a bacterial disease spread by psyllid insects that greatly reduces fruit production and yields and can kill citrus trees within a few years of infection. According to the USDA, more than 50 percent of sampled orange production blocks in São Paulo were affected by greening in 2011, although fewer than 4 percent of trees were affected. USDA, FAS, *Brazil: Citrus Annual*, December 7, 2011, 4.

[62] IBGE, *Municipal Agricultural Production 2009*, October 2010.

[63] Ibid.

[64] Industry representatives, interviews by USITC staff, Florida, November 16–17, 2011.

[65] GTIS, Global Trade Atlas database (accessed February 8, 2012).

Edible Dry Beans

Brazil is the world's largest producer of dry beans, accounting for 17 percent of global production in 2009.[66] While area planted fluctuated over the past five years, annual production stabilized between 3.3 and 3.5 million mt annually.[67] In contrast to other commodity crops grown in Brazil, family farmers produce roughly 70 percent of the dry bean crop.[68] However, although small-scale producers dominate bean production, medium-sized and large producers are becoming increasingly successful, especially in the *cerrado* which has benefited from research, good land quality, and the use of irrigation.[69] The adoption of modern planting techniques in the Northeast has also raised productivity there and shifted some bean production from the South.[70] Because beans can be planted in three seasons (dry, wet, and winter), they are grown in most states. This causes great variation in yields, as each region employs different planting techniques that are suited to the climate.[71] Unlike most other major crops, beans are produced mostly for the local market; exports are limited.[72]

Agricultural Consumption

Brazil is one of the world's leading consumers of meats, grains, and oilseeds. It ranks third in global consumption of beef, broilers, turkey, and soybean oil.[73] Average Brazilian per capita consumption is in excess of 3,100 calories per day, one of the highest levels among South and Central American countries.[74] As noted earlier, over the past several years, Brazil's rapidly rising per capita income has not only led to sharp increases in domestic consumption of almost all agricultural products, but also to a shift in consumption away from traditional staple foods such as grains, pulses, and tubers, toward non-staple food products such as vegetables, fruits, oils, and especially meats and dairy products (table 2.2).[75] For example, although the per capita daily consumption of calories increased by only 15 percent between 1987 and 2009, consumption of meat increased by 62 percent over this period.[76]

Rising domestic food consumption is leading agricultural producers to shift their marketing strategies toward the growing domestic market, as higher demand by both restaurants and retail consumers is raising domestic prices above those in export

[66] USDA, FAS, PSD Online (accessed October 5, 2011).
[67] USDA, FAS, *Brazilian Dry Bean Production*, December 8, 2010, 1.
[68] Ibid., 2.
[69] Ibid., 4.
[70] In 2011, a new GM seed for dry edible beans was approved which was developed in Brazil. Korves, "Brazil Approves Biotech Dry Beans," September 22, 2011; industry representative, interview by USITC staff, Paraná, Brazil, August 31, 2011; USDA, FAS, *Brazilian Dry Bean Production*, December 8, 2010, 2, 4.
[71] USDA, FAS, *Brazilian Dry Bean Production*, December 8, 2010, 4.
[72] Korves, "Brazil Approves Biotech Dry Beans," September 22, 2011.
[73] Brazil accounts for 14 percent of global consumption of beef, 12 percent of global consumption of broilers, 7 percent of global consumption of turkey, and 13 percent of global consumption of soybean oil. USDA, FAS, PSD Online (accessed June 21, 2011, and October 6, 2011).
[74] Of Central and South American countries, only Mexico (3,266 per capita per day) has a higher caloric intake than Brazil. In comparison, daily caloric intake in the United States is 3,748 calories. FAO, FAOSTAT (accessed May 7, 2011).
[75] Valdes, Lopes, and Lopes, "Brazil's Changing Food Demand Challenges the Farm Sector," Second Quarter, 2009; FAO, FAOSTAT (accessed May 7, 2011).
[76] FAO, FAOSTAT (accessed February 15, 2012).

TABLE 2.2 Brazil: Agricultural consumption of selected products, MY 2006/07–2010/11

	2006/07	2007/08	2008/09	2009/10	2010/11	Average annual change 2006/07–2010/11
	Million mt (except as noted)					Percent
Grains						
Corn	41.0	42.5	45.5	47.0	49.5	4.8
Wheat	10.3	10.3	10.7	11.0	10.8	1.2
Rice	8.4	8.4	8.4	8.5	8.4	0.0
Sorghum	1.5	1.4	1.9	1.9	2.3	11.4
All grains	62.0	63.3	67.3	69.2	71.9	3.8
Oilseeds						
Soybeans	34.0	35.1	34.7	36.8	39.2	3.6
Cottonseed	2.5	2.7	2.1	2.0	3.2	6.1
All oilseeds	36.8	38.1	37.0	39.1	42.7	3.8
Meals						
Soybean meal	11.1	12.3	12.4	12.8	13.4	4.9
Cottonseed meal	1.0	1.1	0.9	1.0	1.4	7.2
All meals	12.3	13.5	13.5	13.9	14.9	5.0
Edible oils						
Soybean oil	3.4	4.0	4.3	5.1	5.3	11.6
All edible oils	4.2	4.8	5.2	6.1	6.4	11.2
Meats						
Poultry (broiler)	6.9	7.4	7.8	8.0	9.1	7.4
Beef and veal[a]	7.0	7.1	7.3	7.4	7.6	2.2
Pork[a]	2.2	2.3	2.4	2.4	2.6	4.1
All meats	16.2	17.1	17.7	18.1	19.6	4.9
Other						
Coffee, green[b]	15.9	16.7	17.4	18.0	18.8	4.2
Sugar	10.8	11.4	11.7	11.8	12.0	2.7
Fluid milk	25.2	26.8	27.8	28.8	30.0	4.4
Oranges	4.6	5	5.3	4.8	6.4	8.7
Cotton[c]	4.4	4.5	4.1	4.3	4.2	–1.6

Source: USDA, FAS, PSD Online (accessed June 21, 2011).

[a]Carcass weight equivalent.
[b]1,000 60-kg bags.
[c]Million 480-lb. bales.

markets.[77] For instance, one Brazilian poultry producer cut exports significantly, from 45 percent of total production in 2009 to 30 percent in 2011, in order to take advantage of relatively higher domestic prices.[78] In the livestock sector, one company reported that products offered in the domestic market brought higher prices than in export markets, in part owing to high demand for meat by Brazilian restaurants.[79] JBS, another major livestock producer, increased its domestic slaughter and packaging capacities considerably in 2009, indicating a longer-term commitment to the Brazilian market.[80] As Brazil's food consumption continues to rise, agricultural production will have to increase significantly if it is also to continue to supply a growing number of consumers in global export markets.

[77] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.
[78] Industry representative, interview by USITC staff, Paraná, Brazil, September 1, 2011.
[79] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.
[80] JBS, *JBS Annual Report 2009,* August 12, 2010, 5.

Recent Consumption Trends

Between 2006/07 and 2010/11, Brazilian consumption of almost all agricultural products grew in volume, although rates of growth differed among commodity groups (table 2.2). During this period, consumption of edible oils rose significantly (11 percent average annual increase), but started from a small base. Domestic soybean oil consumption grew both for biodiesel production and for use in cooking.[81] Consumption of oilseeds and oilseed products rose over the past five years, with consumption of soybeans, cottonseed, soybean meal, and cottonseed meal all registering overall increases of 15 percent or more. Stronger demand for meat by Brazilian consumers fueled rising consumption of soybeans and meals, which are ingredients for livestock feed. Among the grains, the volume of corn consumption increased the most, rising by almost 10 million mt between 2006/07 and 2010/11. Corn is a major component of feed for the thriving poultry and pork sectors. While consumption of all meats rose during the period, poultry in particular surged, rising by more than 7 percent annually.

The trend toward higher overall food consumption and increased diversification of diets is driven by population growth, higher income levels, and growth of the middle class. Brazil is the world's fifth most populous country, with over 203 million people; with annual population growth of about 1 percent over the past decade, it is adding nearly 2 million new residents each year.[82] In 2010, average per capita gross national income (GNI) in Brazil was $10,511, an increase of 26 percent over the level in 2000, and 39 percent greater than the 1990 average GNI per capita, in real terms.[83]

While Brazil maintains one of the most unequal income distributions in the world, recent economic stability and prosperity have promoted the growth of the middle class. Over the past five years, an estimated 30 million people moved from the lower class to the middle class,[84] a large-scale transition that has altered consumption patterns.[85] In general, higher incomes have enabled Brazilians to shift from staple foods to a more diversified diet throughout the country.[86] Rising incomes have also led to a higher percentage of Brazilian households owning refrigerators (over 91 percent in 2007) and microwaves (32 percent of households in 2007). This has led to steadily increasing demand for processed and ready-to-eat foods.[87] In addition, as incomes continue to rise, the proportion of an average Brazilian family's total food expenditure on products consumed outside the home has continued to grow; it reached nearly one-third of total food expenditures in 2008/09, up from one-quarter in 2002/03.[88] The Brazilian population is young, with 25 percent under 14 years old, compared with 15 percent in Organisation for

[81] Government official, interview by USITC staff, Brasilia, Brazil, August 24, 2011; industry representative, interview by USITC staff, São Paulo, Brazil, August 22, 2011.

[82] CIA, *The World Factbook: Brazil*, updated July 5, 2011.

[83] World Bank, Data: Brazil (accessed May 9, 2011).

[84] The middle class is defined in Brazil as families with monthly income ranging from $600 to $2,600. Valdes, Lopes, and Lopes, "Brazil's Changing Food Demand Challenges the Farm Sector," n.d., 2.

[85] USDA, FAS, *Brazil: Poultry and Products; Semi-Annual*, February 3, 2011, 2.

[86] A recent study found that a 10 percent increase in household income in Brazil would lead to a 7 percent increase in meat expenditures, while an equivalent income rise in the United States would increase meat expenditures by only 1 percent. USDA, ERS, *Convergence in Global Food Demand and Delivery*, March 2008, 3.

[87] Agriculture and Agrifood Canada, "The Brazilian Consumer," August 2009, 4.

[88] Average monthly food expenditures for a Brazilian family in 2008/09 amounted to R$421.72 ($212.20), of which R$290.39 ($146.12) was spent on food consumed at home, and R$131.33 ($66.08) on food consumed outside the home. IBGE, *Consumer Expenditure Survey*, 2010, 7–8.

Economic Co-operation and Development (OECD) countries. The youth of Brazil's population will ensure continued growth of fast food restaurant chains and the products they sell, such as chicken, hamburgers, and potato products.[89]

In addition to economic growth, one factor that has contributed to rising income levels and consumption, especially in the Northeast, is targeted government programs.[90] The conditional cash transfer[91] arm of the "Zero Hunger" program, known as the Bolsa Família, supplies food to 37 million children while they are at school and provides a monthly sum to poor families who keep their children in school and vaccinated. According to the World Bank, Bolsa Família helped raise almost 20 million Brazilians out of poverty between 2003 and 2009.[92]

Agricultural Trade

Brazil was the world's third-largest exporter of agricultural products by value during 2006–10, trailing only the EU-27 and the United States, and accounted for 9 percent of agricultural exports worldwide during that period.[93] In 2010, Brazilian agricultural exports represented 3 percent of Brazil's GDP (compared with 1 percent for the United States). Agricultural exports represented a large and steadily increasing portion of total Brazilian exports, rising from 27 percent in 2006 to 32 percent in 2011. Brazil's stature as a major exporter of agricultural products contrasted with its position as a global exporter in general, where Brazil ranked 16th in the world and trailed such countries as Switzerland and Australia.[94]

Brazil was the world's 17th-largest importer of agricultural products during 2006–11. Between 2006 and 2011, Brazilian agricultural imports expanded at an annual average rate of 22 percent, reaching a record $11.0 billion in 2011 (table 2.3). Agricultural imports represented a consistently small portion of total Brazilian imports during 2006–11 (between 4 and 5 percent). In addition, the increase in Brazilian agricultural imports, although larger in percentage terms than Brazil's total exports, was small in absolute terms.

[89] *Economist, Brazil: Consumer Goods and Retail Report,* February 8, 2011, 6.

[90] One industry source reported that consumption of poultry in the Northeast was rising by as much as 14 percent annually due to the significant government resources being dedicated to social development. Industry representative, interview by USITC staff, São Paulo, Brazil, August 22, 2011.

[91] The cash provided through these types of programs is conditional because the recipients must fulfill a social condition (for example, keeping a child enrolled in school and vaccinated) in order to receive the cash. The intent is to provide benefits to the recipient that are both short term (cash) and long term (increased human capital). FAO, http://www.fao.org./DOCREP/005/AC829E/ac829e00.htm (accessed February 14, 2012).

[92] The World Bank, "Lifting Families Out of Poverty in Brazil" (accessed October 18, 2011).

[93] By comparison, the EU-27 and the United States each accounted for 17 percent.

[94] For all products, Brazil exported $198 billion in 2008, $153 billion in 2009, $202 billion in 2010, and $256 billion in 2011. GTIS, Global Trade Atlas database (accessed February 8, 2012).

TABLE 2.3 Brazil and the United States: Agricultural trade balance, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
Brazil							
Exports	36,564	44,584	58,060	54,643	63,578	81,652	17
Imports	4,140	5,617	7,547	6,554	8,105	11,001	22
Balance	32,424	38,967	50,513	48,089	55,473	70,652	17
United States							
Exports	76,090	95,737	121,400	103,710	122,463	146,321	14
Imports	71,043	77,571	85,754	77,106	86,151	102,695	8
Balance	5,047	18,166	35,646	26,604	36,312	43,626	54

Source: GTIS, Global Trade Atlas database (accessed February 16, 2012).

During 2006–11, Brazil's trade surplus in agricultural products more than doubled, reaching $70.7 billion. Much of this growth occurred between 2007 and 2008 and between 2010 and 2011, mostly reflecting significantly higher global commodity prices. Brazil had a larger trade surplus in agricultural products than the United States every year during 2006–11, but the gap narrowed as the U.S. surplus increased at a faster annual rate.

Exports

Exports by Product

Between 2006 and 2011, Brazilian agricultural exports to the world grew 123 percent, increasing from $36.6 billion in 2006 to $81.7 billion in 2011. Brazilian global agricultural exports are concentrated in a few major commodities (figure 2.3). During 2006–11, exports of soybeans, soybean meal and oil, sugar, and coffee represented more than 50 percent of Brazilian global agricultural exports, with poultry and beef accounting for an additional 19 percent. Tobacco products, corn, and fruit juice are also important Brazilian exports (table 2.4).

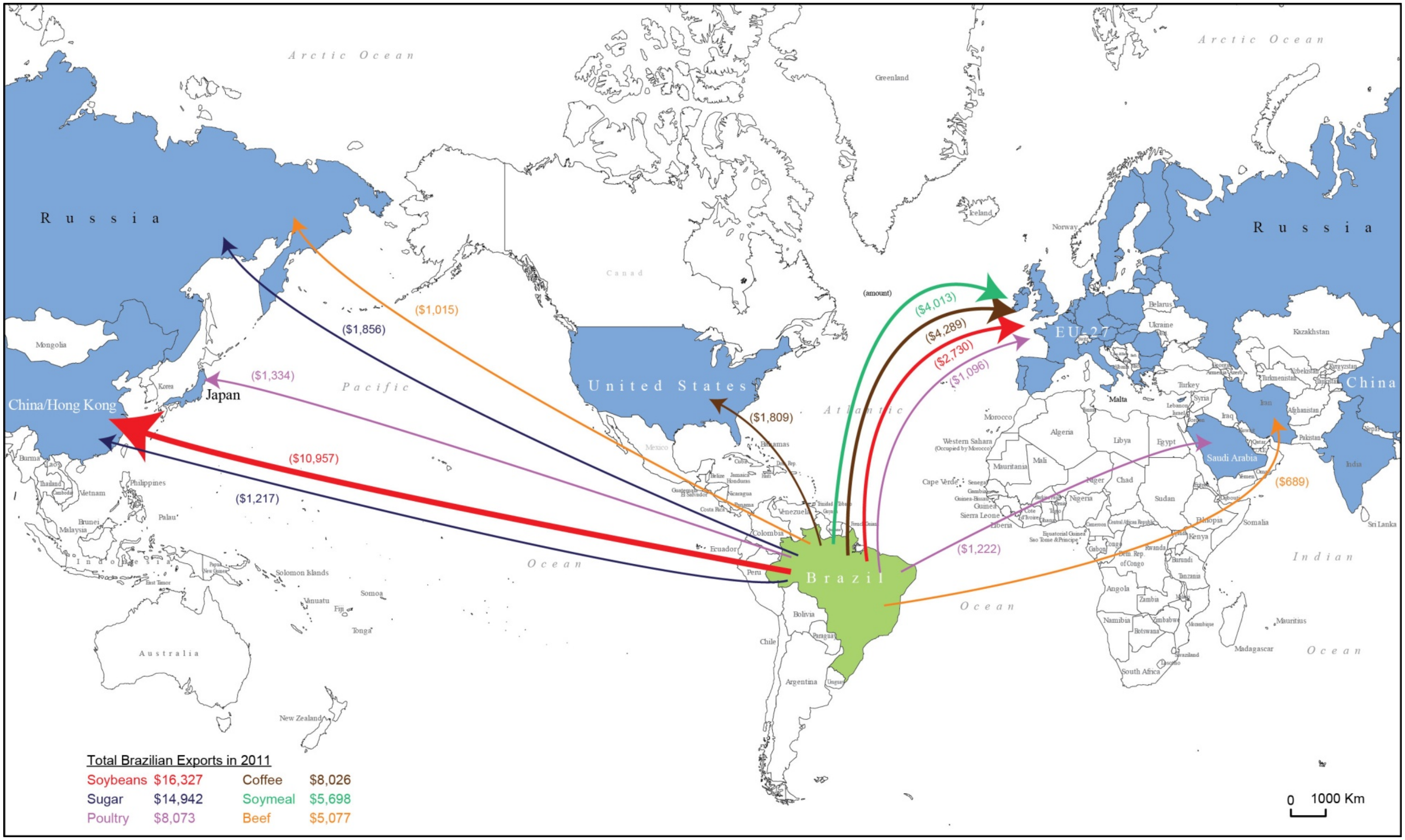
Soybeans

Between 2006 and 2010, Brazil was the world's second-largest soybean-exporting country, accounting for about one-third of global exports.[95] From 2006 to 2011, the value of Brazilian soybean exports grew 24 percent annually. While exports by volume increased about 6 percent annually during 2006–11, most of the growth in value can be attributed to a sharp increase in global soybean prices—especially between 2006 and 2008, when prices almost doubled, and again between 2010 and 2011.[96] By far the most important market for Brazilian soybeans is China, which accounted for half of Brazilian

[95] The United States was the world's leading soybean-exporting country, accounting for almost half of global exports during 2006–10. GTIS, Global Trade Atlas database (accessed October 12, 2011).

[96] The unit price for Brazilian soybean exports increased from $226/mt in 2006 to $447/mt in 2008. GTIS, Global Trade Atlas database (accessed October 12, 2011).

FIGURE 2.3 Brazil's agricultural exports are concentrated in a few major products, 2011 (million $)



Source: Compiled from USITC staff using data from GTIS, Global Trade Atlas database (accessed February 13, 2012).

TABLE 2.4 Brazil: Agricultural exports by product group, 2006–11

	2006	2007	2008	2009	2010	2011	Annual average change 2006–11
	Million $						Percent
	Animal products						
Live animals	89	285	418	471	697	492	41
Beef	3,890	4,354	5,081	3,890	4,564	5,077	5
Pork	1,022	1,209	1,448	1,204	1,321	1,416	7
Poultry	3,472	5,019	6,921	5,700	6,691	8,073	18
Dairy	139	274	510	148	132	98	–7
Eggs	30	53	95	86	115	110	30
Meats, processed	71	105	152	142	151	161	18
	Grains						
Wheat	64	30	204	63	227	699	61
Rice	60	53	312	268	163	613	59
Corn	482	1,919	1,405	1,302	2,216	2,716	41
	Oilseeds and products						
Soybeans	5,663	6,709	10,952	11,424	11,043	16,327	24
Soybean oil	1,229	1,720	2,671	1,234	1,352	2,129	12
Soybean meal	2,420	2,959	4,364	4,593	4,719	5,698	19
Oils, miscellaneous	157	200	315	227	296	450	24
	Horticultural products						
Vegetables, fresh	4	20	6	4	4	7	13
Vegetables, processed	30	58	46	58	43	65	17
Nuts	247	294	289	304	307	345	7
Fruit, fresh	472	643	724	559	610	633	6
Fruit, processed	52	71	85	65	49	50	–1
Fruit juice	1,570	2,374	2,152	1,752	1,925	2,566	10
	Beverages						
Coffee	2,953	3,405	4,168	3,791	5,204	8,026	22
Alcoholic beverages	60	63	79	82	88	100	11
Nonalcoholic beverages	14	16	21	16	16	13	–1
	Sugar, sweeteners, confectionery						
Sugar	6,167	5,101	5,483	8,378	12,762	14,942	19
Other sweeteners	204	205	256	256	248	283	7
Cocoa	362	365	401	352	419	421	3
	Processed foods						
Processed food, miscellaneous	814	1,060	1,383	1,092	1,301	1,330	10
Grains, milled	36	52	60	57	51	72	15
Animal feeds	168	230	319	285	317	289	11
	Nonfood products						
Cotton	343	511	701	690	822	1,591	36
Wool	9	10	10	16	20	23	22
Ethanol	1,605	1,478	2,390	1,338	1,014	1,492	–1
Hides	3	2	3	2	7	2	–11
Tobacco products	1,752	2,262	2,752	3,046	2,762	2,935	11
	Other						
All other	913	1,475	1,885	1,745	1,922	2,409	21
Total	36,564	44,584	58,060	54,643	63,578	81,652	17

Source: GTIS, Global Trade Atlas database (accessed February 7, 2012).

soybean exports in 2006–11.[97] The EU-27 is the second largest market for Brazilian soybeans, accounting for about one-third of sales during 2006–11. Other important markets for Brazilian soybeans are mostly in Asia, including Thailand, Taiwan, Japan, and Korea. Further information on Brazil's trade and competitiveness in soybeans and soybean products is provided in chapter 6.

Sugar and Ethanol

Sugar was Brazil's second-largest agricultural export during 2006–11, accounting for almost 16 percent of all Brazilian agricultural exports.[98] Brazil is the world's lowest-cost producer and by far its largest exporter of sugar, accounting for about half of global exports in 2010. Between 2006 and 2011, Brazilian sugar exports grew on average 19 percent by value and 6 percent by volume annually. This expansion reflected strong global demand for sugar and record high global prices during 2009–11 that resulted from supply disruptions in other major producing countries, particularly in Asia. Sugar exports were highly diversified, with Brazil supplying over 100 countries on all continents. Russia and India were the most important export destinations, together accounting for more than 20 percent in 2011.

Sugar cane can be used to produce either sugar or ethanol. Brazil was the second-largest ethanol producer in the world behind the United States in 2011, with Brazil and the United States together producing 88 percent of the global supply.[99] The top export markets for Brazilian ethanol were the EU-27, Korea, the United States, and Japan (together representing 72 percent of Brazilian exports). Because ethanol is derived from sugar cane in Brazil, the balance between the global prices of sugar and ethanol determines how much sugar is available for ethanol production. In recent years, as global sugar prices have surged ahead of global ethanol prices, the sugar cane available for ethanol production in Brazil has declined. Between 2006 and 2011, Brazilian sugar exports more than doubled by value; correspondingly, ethanol exports declined by 7 percent.

Poultry

Poultry was Brazil's third-largest agricultural export during 2006–11, accounting for almost 11 percent of all agricultural exports. Brazil is the world's leading poultry-exporting country. Between 2006 and 2011, the value and volume of Brazilian poultry exports grew by 18 percent and 6 percent, respectively, while its share of the global market remained fairly stable at about 40 percent. Brazil's leading markets include several Middle Eastern countries—e.g., Saudi Arabia and the United Arab Emirates (UAE)—where Brazil supplies mainly whole birds and halal-certified poultry products that the United States typically does not export.[100] Further information on Brazil's poultry trade and competitiveness is provided in chapter 8.

[97] In 2010, China accounted for almost 60 percent of global soybean imports. GTIS, Global Trade Atlas database (accessed October 12, 2011).

[98] GTIS, Global Trade Atlas database (accessed February 8, 2012).

[99] Renewable Fuels Association, "World Fuel Ethanol Production," (accessed October 19, 2011).

[100] Halal poultry is produced in accordance with Islamic law. To be certified as halal, poultry imports must comply with the unique requirements of each Islamic country. For further details, see chapter 8.

Coffee

Coffee is one of Brazil's trademark products. Brazil is the world's largest coffee producer, and coffee was Brazil's fourth-leading agricultural export during 2006–11, accounting for 8 percent of all agricultural exports.[101] Brazil is by far the world's largest exporter of coffee, accounting for about 30 percent of global exports during this period. Between 2006 and 2011, the value of Brazilian coffee exports grew each year, averaging about 22 percent growth annually; this figure, however, was highly volatile, reflecting unstable world coffee prices during the period. Improved export logistics and transportation methods, rising foreign investment, and initiatives by the Brazilian Coffee Association to improve roasting and processing bolstered production and demand both domestically and in export markets.[102] In 2011, close to one-half of Brazilian coffee exports were sent to the EU-27 and one-quarter to the United States.

Beef

Beef accounted for 8 percent of Brazilian agricultural exports between 2006 and 2011. In 2007, Brazil overtook Australia to become the world's largest beef-exporting country, although it dropped to third behind the United States and Australia in 2011. In 2010, Brazil's beef exports of $4.6 billion accounted for 19 percent of the value of global beef trade. Between 2006 and 2011, the EU-27 and Russia were consistently the top markets for Brazilian beef; however, as export volumes fell, their share dropped from about one-half in 2006 and 2007 to about 32 percent in 2011. Since 2006, several Middle Eastern markets have developed a demand for Brazilian beef, in particular Iran; in 2010 Iran overtook the EU-27 to become Brazil's second leading market, with an 18 percent share of total Brazilian beef exports. Further information on Brazil's beef trade and competitiveness is provided in chapter 9.

Corn

Brazil is the world's third-largest exporter of corn, behind the United States and Argentina. During 2006–11, the value of Brazilian corn exports rose from $482 million to $2.7 billion, reflecting increases in both the global price of corn and the volume of exports. Brazilian corn exports are dispersed among a fairly large number of recipient countries, with the EU-27, the largest importer, accounting for 10 percent in 2011. Other important markets for Brazilian corn in 2010 were Iran, Taiwan, Japan, Algeria, Morocco, and Malaysia. Further information on Brazil's corn trade and competitiveness is provided in chapter 7.

Tobacco

Brazil is a major global exporter of tobacco products, primarily unmanufactured (raw) tobacco. In 2010, Brazil was by far the leading global exporter of tobacco, accounting for almost 30 percent of global exports, with the United States, the second leading exporter, at 13 percent. Between 2006 and 2011, 42 percent of Brazilian raw tobacco exports were sent for manufacturing in the EU-27, a leading global producer and exporter of cigarettes. Brazil is also the largest supplier to the U.S. market, accounting for almost 40 percent of

[101] GTIS, Global Trade Atlas database (accessed February 8, 2012).
[102] Commodity Online, "Barclays: Brazil Coffee Exports May Grow," June 30, 2011.

total U.S. raw tobacco imports. China and Russia are major importers of Brazilian tobacco as well.

Exports to Major Trading Partners

Overall, Brazilian agricultural exports are spread out among a large number of destination markets. During 2006–11, the EU-27 was Brazil's largest agricultural export market, accounting for 29 percent of the total (table 2.5).[103] Although the EU-27's share declined each year after 2007, in 2011 it remained Brazil's largest export market. In 2011, China (18 percent), the United States (6 percent) and Russia (5 percent) were the next largest markets by value share for Brazilian agricultural exports, but China's share almost doubled from 2006 to 2011, while the United States' share remained at between 5 and 8 percent.[104] Other important markets included Japan, Venezuela, and several markets in the Middle East (Iran, Saudi Arabia, and Egypt). Brazilian agricultural exports to Argentina, Paraguay, and Uruguay, which are fellow current member countries in the Mercado Comum do Sul (Mercosul), accounted for less than 2 percent of the total in 2011. Brazilian exports to Brazil's three Mercosul partners combined were roughly on a par with those to the UAE or Korea, but increased slightly faster from 2006 to 2011 (18 percent annually) than Brazilian agricultural exports overall (17 percent).

TABLE 2.5 Brazil: Agricultural exports to major trading partners, 2006–11

	2006	2007	2008	2009	2010	2011	Annual average change 2006–11
	Million $						Percent
EU-27	11,856	15,916	18,651	15,600	15,765	19,203	10
China	2,802	3,576	6,688	7,423	9,332	14,614	39
United States	3,063	2,931	3,336	2,560	2,957	4,517	8
Russia	3,125	3,362	4,156	2,769	4,039	4,016	5
Japan	1,161	1,461	2,128	1,596	2,108	3,227	23
Saudi Arabia	817	954	1,393	1,479	1,926	2,391	24
Venezuela	519	948	2,219	1,444	2,006	2,193	33
Iran	1,374	1,546	910	1,091	2,061	2,120	9
Egypt	794	643	728	734	1,302	1,879	19
Hong Kong	552	925	1,367	1,526	1,302	1,716	25
All other	10,502	12,322	16,484	18,422	20,779	25,775	20
Total	36,564	44,584	58,060	54,643	63,578	81,652	17
Mercosul members	640	817	1,041	932	1,199	1,451	18

Source: GTIS, Global Trade Atlas database (accessed February 7, 2012).

Note: Current Mercosul members are Argentina, Paraguay, and Uruguay.

[103] Brazil is also the EU-27's largest source of agricultural product imports. GTIS, Global Trade Atlas database (accessed February 8, 2012).

[104] GTIS, Global Trade Atlas database (accessed February 8, 2012).

Imports

Imports by Product

Between 2006 and 2011, Brazilian agricultural imports increased from $4.1 billion to $11.0 billion, a rate of about 22 percent annually (table 2.6). Brazilian agricultural imports are fairly concentrated in a few major products in which domestic supply falls short of domestic demand. The main agricultural imports include wheat and milled grains, miscellaneous oils, ethanol, processed vegetables, and fresh fruit. Combined, these products accounted for about one-half of all agricultural imports during 2006–11.[105]

Grains

Brazil is not a major wheat-producing country and, as a result, imports about half of its domestic wheat consumption annually.[106] In 2010, Brazil was the world's third-largest wheat-importing country, behind Egypt and Japan.[107] Unmilled wheat was by far Brazil's largest agricultural import category, accounting for almost 21 percent of total Brazilian agricultural imports during 2006–11. In 2011, Mercosul countries supplied 98 percent of Brazil's wheat imports, with Argentina contributing about 80 percent. Either the United States or Canada supplied almost all of the remaining 2 percent. In exporting wheat to Brazil, Mercosul countries benefit from proximity, duty-free access, and an exemption from the merchant marine tax.[108]

After wheat, Brazil's largest agricultural product import category is milled grains, which accounted for about 9 percent of all agricultural imports during 2006–11.[109] These imports consisted mostly of malt which is used as an ingredient in Brazil's brewing industry, and wheat flour used for making bread and other baked goods.[110] In 2011, Mercosul countries supplied about 80 percent of Brazil's milled grain imports, shared fairly evenly between Argentina and Uruguay. The EU-27 is also an important global source of malted barley used for brewing.[111]

Miscellaneous Oils

The third-largest agricultural product import category is miscellaneous oils, which accounted for just over 8 percent of Brazil's agricultural imports during 2006–11.[112] Imports of this product group consisted mostly of olive oil, coconut oil, and palm oil used for cooking and for manufacturing cosmetics and toiletries. The EU-27 (mostly Portugal and Spain) supplied most of Brazilian olive oil imports, while Indonesia and Malaysia were by far the leading suppliers of coconut and palm oil.

[105] Imports of miscellaneous, not otherwise classified agricultural products accounted for 11 percent of Brazilian imports during 2006–11. GTIS, Global Trade Atlas database (accessed February 8, 2012).
[106] USDA, FAS, PSD Online (accessed February 4, 2012).
[107] GTIS, Global Trade Atlas database (accessed February 8, 2012).
[108] For more detailed information on the merchant marine tax, see chapter 3.
[109] Milled grains are included in chapter 11 of the HS.
[110] Malt and wheat flour are covered under the global Harmonized Schedule (HS) tariff codes 1107 and 1101, respectively.
[111] Boland, Brester, and Taylor, "Barley Profile," August 2011.
[112] Miscellaneous oils are included in HS 1508–1521.

TABLE 2.6 Brazil: Agricultural imports by product group, 2006–11

	2006	2007	2008	2009	2010	2011	Annual average change 2006–11
	Million $						Percent
	Animal products						
Live animals	4	11	32	26	13	16	35
Beef	67	98	127	125	169	243	29
Pork	2	2	3	4	6	9	36
Poultry	1	1	2	1	3	7	63
Dairy	172	179	249	289	387	678	32
Eggs	16	22	20	11	21	18	2
Meats, processed	0	0	1	1	1	2	32
	Grains						
Wheat	989	1,392	1,874	1,209	1,528	1,832	13
Rice	175	237	226	272	377	273	9
Corn	81	133	150	162	76	141	12
	Oilseeds and products						
Soybeans	10	29	40	38	44	16	11
Soybean oil	12	43	29	21	14	0	-53
Soybean meal	25	21	38	15	13	8	-20
Oils, miscellaneous	277	409	691	555	705	1,015	30
	Horticulture						
Vegetables, fresh	116	141	167	169	373	326	23
Vegetables, processed	214	306	567	408	649	692	26
Nuts	59	66	88	70	96	167	23
Fruit, fresh	206	240	281	322	421	550	22
Fruit, processed	54	65	76	68	92	120	17
Fruit juice	8	11	15	17	28	28	28
	Beverages						
Coffee	1	2	8	14	22	41	96
Beverages, alcoholic	229	276	286	302	387	489	16
Beverages, nonalcoholic	15	20	32	38	48	85	41
	Sugar, sweeteners, and confectionery						
Sugar	0	0	0	0	0	0	34
Other sweeteners	30	40	57	44	61	79	22
Cocoa	130	212	216	274	278	259	15
	Processed food						
Processed food, misc.	234	219	290	312	370	480	15
Grains, milled	269	487	847	770	723	872	27
Animal feeds	104	141	167	149	179	213	15
	Nonfood products						
Cotton	101	127	56	20	70	396	31
Wool	2	2	2	1	1	2	3
Ethanol	0	2	1	2	39	841	408
Hides	7	7	7	5	7	9	5
Tobacco products	30	42	49	67	74	38	5
	Other						
All other	501	631	854	771	828	1,051	16
Total	4,140	5,617	7,547	6,554	8,105	11,001	22

Source: GTIS, Global Trade Atlas database (accessed February 7, 2012).

Ethanol

Ethanol ranked fourth, in terms of value, among Brazilian imports of agricultural products in 2011 (table 2.6).[113] Brazilian ethanol imports were nil or very small during 2006–10, but increased dramatically in 2011 to $841 million. The United States was by far the leading exporter, accounting for 94 percent of the total in 2011. The bulk of Brazilian imports of ethanol, 91 percent of the value in 2011, was accounted for by denatured ethanol, most of which is used for fuel. Brazil is the second-largest global fuel ethanol market and historically has been self-sufficient in domestic supply. However, a number of factors contributed to the rise in imports in 2011. First, adverse financial and weather conditions led to a decline in the production of sugar cane, the feedstock used for ethanol in Brazil. Second, developments in the global sugar market resulted in high sugar prices and caused Brazilian producers to shift a larger share of their production from ethanol to sugar for export markets.[114] Third, developments in the U.S. ethanol market, driven largely by mandates linked to environmental requirements, created price premiums for Brazilian sugar cane ethanol that attracted Brazilian exports to the United States. Brazil then imported U.S. corn ethanol to backfill supply imbalances.

Horticultural Products

Between 2006 and 2011, Brazil more than tripled its imports of processed vegetables, which ranked as its fifth-largest agricultural product import category in 2011.[115] Among the leading processed vegetables imported by Brazil were frozen potatoes (from Argentina and the EU-27), preserved olives (also from Argentina and the EU-27), and dried beans (from Argentina and Canada). Brazil also imported a variety of fresh fruits, including fresh apples, grapes, and various stone fruit (apricots, cherries, plums, and peaches), with the majority sourced from Argentina.

Imports from Major Trading Partners

During 2006–11, Brazil's top five import sources provided 80 percent of Brazilian imports, with Mercosul partner Argentina, the largest agricultural import source, supplying just under 40 percent of the total; the EU-27 second with 16 percent, and the United States third with 15 percent (table 2.7). When Uruguay (the fourth-largest) and Paraguay (the fifth-largest import source) are included, Mercosul accounted for about one-half of Brazil's agricultural imports.[116] During this period, Argentina was a major supplier of wheat and milled grains, while Paraguay supplied wheat, rice, and corn, and Uruguay supplied wheat, rice, and milled grains. During 2006–11, the EU-27 and the United States supplied a wide range of products, led by alcoholic beverages and miscellaneous oils for the EU-27 and wheat and miscellaneous processed foods for the United States.

[113] Data are for HS subheading 2207, which includes ethanol for beverage, fuel, and industrial use.
[114] Most Brazilian ethanol production occurs at facilities that can produce both sugar and ethanol.
[115] Processed vegetables include products in HS 0710–0714 and HS 2001–05.
[116] GTIS, Global Trade Atlas database (accessed February 8, 2012).

TABLE 2.7 Brazil: Agricultural imports from major trading partners, 2006–11

	2006	2007	2008	2009	2010	2011	Annual average change 2006–11
	Million $						Percent
Argentina	1,856	2,468	3,067	2,373	2,911	4,004	17
EU-27	767	921	1,220	1,183	1,405	1,769	18
United States	283	407	688	382	572	1,601	41
Uruguay	310	403	491	753	919	957	25
Paraguay	219	323	477	461	429	453	16
China	88	111	273	211	384	410	36
Indonesia	129	190	264	256	332	410	26
Chile	132	169	195	226	314	348	21
Malaysia	46	90	118	87	118	199	34
Côte d' Ivoire	34	59	92	74	46	87	21
All other	276	476	662	547	674	761	22
Total	4,140	5,617	7,547	6,554	8,105	11,001	22
Mercosul members	2,385	3,194	4,035	3,587	4,260	5,415	18

Source: GTIS, Global Trade Atlas database (accessed February 7, 2012).

Note: Current Mercosul members are Argentina, Paraguay, and Uruguay.

Brazil's Participation in Preferential Trade Arrangements

Mercosul

Brazil's most significant trade agreement is Mercosul, which entered into force in 1991. Mercosul is a customs union joining Brazil, Argentina, Paraguay, and Uruguay.[117] As a customs union, Mercosul comprises both a free trade area (FTA) among its members and a common external tariff (CET) that is applied to imports from nonmembers. The agreement eliminated most tariffs between members and created committees to resolve nontariff barriers and other technical issues. Mercosul also seeks regional integration in promoting common approaches to agricultural policy, labor issues, and intellectual property among the four countries.[118] Nevertheless, the trade priorities of the members often differ, primarily because of the disparity in the size of the member economies.

Duty-free status for Mercosul members provides an important incentive for intra-Mercosul agricultural trade. Mercosul countries are important agricultural trading partners for Brazil, accounting for approximately 7 percent of total Brazilian agricultural trade (imports plus exports) in 2011. For many agricultural products, the CET ranges between 10 and 20 percent.[119] Therefore, Brazil has a considerable advantage over the United States in exporting agricultural products to Argentina, Paraguay, and Uruguay, and U.S. products are put at a cost disadvantage compared to these countries in exporting products to Brazil. For example, given duty-free access within Mercosul and a common

[117] Bolivia, Chile, Colombia, Ecuador, Peru, and Venezuela are associate members of Mercosul and receive tariff reductions, but they do not participate in the CET.
[118] Laird, "Mercosur: Objectives and Achievements," May 23, 2011, 6.
[119] However, for some products, such as dairy goods, the rate is close to 30 percent.

external tariff of 10 percent, Argentina, a major wheat producer, gains a significant advantage over the United States in exporting wheat to Brazil.

Other Preferential Trade Arrangements

Brazil's government has become increasingly open to trade liberalization since its economic stabilization in the early 1990s. However, in order to maintain the common external tariff, under the Mercosul agreement its member states cannot sign FTAs bilaterally with nonmember states.[120] As a result, only Mercosul's Common Market Council has the power to negotiate and sign agreements on behalf of the trading bloc.[121]

Mercosul signed a 1998 framework agreement with the Andean Community (Bolivia, Ecuador, Colombia, and Peru) to begin negotiations toward creating a free trade agreement between the two customs unions. The Mercosul-Andean Community agreement was signed as a cooperation agreement under which Andean countries later negotiated bilateral tariff reductions between countries in the two trade blocs.[122] Mercosul has since signed a series of economic complementation agreements (ECAs) with members of the Andean Community, widening market access for Mercosul agricultural exports. As a result of the various ECAs, exports from Brazil and the other Mercosul members have a tariff advantage in the Andean Community markets, which has undercut U.S. agricultural exporters' price competitiveness there. For example, Mercosul corn exports to Colombia receive a 60 percent duty reduction. This is a primary driver behind the drop in the share of U.S. corn in the Colombian import market, from 80 percent in 2008 to 18 percent in 2010.[123] However, the entry into force in 2012 of the U.S.-Colombia Free Trade Agreement is expected to improve the competitiveness of U.S. corn by providing greater duty-free access through the phaseout of duties over the next 12 years.[124]

Mercosul has signed FTAs or preferential trade agreements (PTAs) with other non-member countries, but these agreements generally only provide preferential tariff rates for a few products (table 2.8). Because of the paucity of agricultural products covered, the small preferences provided, and the relatively low per capita income in these markets, the impacts of these agreements on Brazilian agricultural exports has been small. Mercosul has signed trade agreements with the Southern African Customs Union (SACU) and Egypt, but these have not yet entered into force.

[120] Brazilian Ministério das Relações Exteriores, "Treaty Establishing a Common Market, chapter 1," March 26, 1991.

[121] When the council signs a new trade agreement, each member state must individually ratify the agreement for it to enter into force.

[122] The Andean Community countries and Chile are also associate members of Mercosul. Venezuela was previously an associate member, but in 2006 applied for full membership and was accepted. However, at the time of this report's publication, full membership for Venezuela was still pending ratification by the Paraguayan congress. While the ECA agreements provide tariff preferences, associate member countries are not given duty-free access to the Mercosul common market and are not required to impose the common external tariff as a result of their associate member status. USDA, FAS, "U.S.-Colombia Trade Promotion Agreement Benefits for Agriculture," May 2011, 1.

[123] USDA, FAS, *Colombia: Grain and Feed Annual*, March 15, 2011, 1.

[124] The White House, "U.S.-Colombia Trade Promotion Agreement," April 6, 2011.

TABLE 2.8 Overview of selected Mercosul trade agreements, completed and in negotiation

Participants	Type of agreement	Effective date	Comments
India	Preferential trade agreement (fixed preference agreement)	Signed in 2003-04; entered into force June 1, 2009.	First trade agreement to enter into force between Mercosul and an extra-regional country. Limited impact on bilateral trade because preferences are small (10–20 percent tariff reductions) and cover only 450 products for Mercosul exports to India.
Israel	Free trade agreement (FTA)	Negotiations started in 2005; signed in December 2007; entered into force March–April 2011.	The agreement covers 90 percent of bilateral trade, including many agricultural products, with a schedule of progressive tariff reductions in four phases: immediate, 4 years, 8 years, and 10 years.
Morocco	Framework agreement on trade	Negotiations concluded November 2004; entered into force April 2010.	Text of the agreement is not publicly available at this time. Limited impact on bilateral trade because small tariff reductions on major Moroccan imports from Brazil (e.g., sugar).
Venezuela	Associate member; has applied for full membership	Membership petition accepted in 2006, but it has not been ratified by all four member legislatures.	Membership has been approved by the Argentinian, Brazilian, and Uruguayan legislatures. Venezuela will receive full membership status when the accession is ratified by the Paraguayan legislature.
Bolivia, Colombia, Ecuador, Peru, and Chile	Various economic complementation agreements (ECA)	The first ECA that entered into force was signed in 1996, and the most recent became effective in April 2005.	All five countries are associate members of Mercosul, but both Bolivia and Ecuador are in talks to become full members. Certain ECAs were signed bilaterally with Mercosul, while others were signed with multiple countries participating, such as certain Mercosur-Andean Community Agreements. The ECAs provide gradual tariff reductions for many sectors, including some agricultural products, and state the parties' intent to sign an FTA.
Southern African Customs Union (SACU)	Fixed preferences agreement	Negotiations concluded in April 2008 and the agreement was signed in April 2009; not yet entered into force.	SACU consists of Botswana, Lesotho, Namibia, South Africa, and Swaziland.
Cuba	Partial complementation agreement	Agreement signed in July 2006.	Text of the agreement is not publicly available at this time. Limited impact on bilateral trade because mostly nontariff factors drive agricultural trade between Brazil and Cuba (e.g., the availability of credit).
Egypt	FTA	Concluded August 2010; not yet entered into force.	Text of the agreement is not publicly available at this time. Limited impact on bilateral trade because small tariff reductions on major Egyptian imports from Brazil (e.g., sugar).
European Union	FTA	Negotiations began in 1995. Suspended without an agreement in 2004. Negotiations were relaunched in May 2010.	EU farm subsidies and uncertainty about the removal of agricultural nontariff barriers, as well as Brazil's reluctance to increase market access for sensitive manufacturing industries, have slowed negotiations.

Sources: Government officials, interview by USITC staff, Brasilia, Brazil, August 25, 2011; Israeli Ministry of Industry, Trade, and Labor, "Free Trade Agreement between Mercosur and the State of Israel: Annex 2, List of Concessions Made by Israel"; Government of India, Ministry of Commerce, *Preferential Trade Agreement between Mercosur and the Republic of India*, March 19, 2005; Sasman, "Sacu-Mercosur Pta Gets Cautionary Thumbs-up," November 1, 2011; Organization of American States, SICE Foreign Trade Information System Web site, http://www.sice.oas.org/agreements_e.asp.

As the largest economy in Mercosul, Brazil has often held discussions with other countries and trading blocs regarding the formation of PTAs or FTAs. These include, among others, the EU-27, the Gulf Cooperation Council, and the Dominican Republic. Negotiations have generally stalled because counterparts are reluctant to provide additional market access for Brazil's agricultural exports, while Brazil has hesitated to widen market access in sensitive manufacturing industries.[125]

[125] Government officials, interview by USITC staff, Brasilia, Brazil, August 25, 2011.

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CHAPTER 3
Brazil's Transportation Infrastructure and Government Policies

Transportation infrastructure and government policies in Brazil are the two factors that most broadly affect Brazilian agricultural competitiveness. In terms of the three categories of factors discussed in chapter 1 used to measure competitiveness, poor transportation infrastructure impacts delivered cost and reliability of supply, while government policies impact all three, including product differentiation. Government policies have also driven infrastructure development; therefore, these two factors are discussed together in this chapter. Further analysis of other competitive factors that affect Brazil's agriculture sector is presented in chapter 4 of the report.

Inadequate transportation infrastructure is one of the primary factors undermining Brazil's agricultural export competitiveness in third-country markets. The problem has been exacerbated by the shift of production growth to the Center-West region, which has considerably increased the distance between certain important production areas and export ports. The effect of government policies on Brazilian exporters' competitiveness in third-country markets is less direct and in many ways more limited than that of transportation infrastructure. Nevertheless, such policies tend to have positive effects as they address structural inefficiencies and enable producers to lower delivered costs, differentiate products, and support production to ensure reliable supply.

Transportation Infrastructure

Overview

Transportation infrastructure development increases the ability of industries to produce, move, store, and market goods and services competitively in both domestic and export markets. Improvements in transportation infrastructure will likely have the largest impact on Brazil's ability to compete in foreign markets by significantly reducing Brazil's comparatively high transportation costs and inefficiencies—constraints that undercut Brazil's position as a global agricultural producer and reduce its competitiveness in world markets.[1]

[1] In addition to transportation infrastructure, a number of other types of infrastructure affect the ability of Brazil's agricultural producers to export competitively. The electricity sector, for instance, contributes to agricultural processing. Information and communications technology facilitates communication among buyers and sellers and reduces logistics costs. Financial services help mobilize funds for investment in productive capacity. Marketing infrastructure helps establish market prices for globally traded commodities like soybeans. Water and sanitation infrastructure is a critical input in the production of many goods and services and is crucial to maintaining a healthy workforce. These types of infrastructure will not be a focus of this chapter.

Despite being one of the world's largest producers and exporters of agricultural goods, Brazil suffers from inadequate transportation infrastructure. Limited connectivity among transport modes, as well as inadequate railways and viable waterways to transport goods for export, contribute to an overreliance on more expensive road transport. Further, the vast agricultural production in Brazil's *cerrado* region is far from the coastal ports, leading to long and costly transport routes for exports. High transportation costs erode many of the competitive cost advantages enjoyed by Brazilian agricultural producers. Estimates put logistics costs in Brazil at 29 percent of total costs, on average across all agricultural sectors, versus 5.5 percent in the United States.[2] Limited storage capacity for agricultural production further adds to the cost burden.

To a large degree, the experiences of Brazilian agricultural producers contrast with those of their U.S. counterparts. In the United States, established, highly developed rail networks link agricultural producing areas to major trading hubs and to major waterways such as the Missouri and Mississippi rivers for export. U.S. farmers benefit from more efficient transport, and as a result, inland transportation costs in the United States are considerably lower than those in Brazil. The contrast is particularly striking for Mato Grosso, one of Brazil's largest and most promising agricultural producing regions.[3]

The Brazilian government recognizes the need to improve its transportation infrastructure, and has undertaken initiatives, including privatization efforts, to increase both public and private investment in infrastructure projects. Through its National Plan for Transportation and Logistics (NPTL) and the Growth and Acceleration Program (PAC), in the coming years the government intends to invest significantly in infrastructure development to improve and expand railways, waterways, road networks, and ports. Although progress has generally been characterized as uneven thus far, improvements have occurred.[4]

Private investment will be instrumental to meeting the government's infrastructure development objectives, and it is expected to represent a significant share of overall infrastructure investment. The government has privatized the operation of some public assets—notably ports and railways and, to a lesser extent, roadways—and this has stimulated increased private investment in these sectors, often with the help of loans provided by Brazil's national development bank, BNDES. In addition, many of Brazil's agricultural producers have invested directly in local road networks, storage and warehousing facilities, and port terminals to improve their logistics and supply chains and reduce transportation inefficiencies and costs.

In the long term, investments in Brazil's transportation infrastructure will have a lasting positive effect on the country's agricultural competitiveness. But the impact will be complete only if these improvements can keep pace with the expected growth in agricultural production. In the short term, a variety of challenges—the need to coordinate policies and budgeting among different government units, allegations of mismanagement

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[2] Logistics costs include not only transportation costs but also other costs, such as storage and materials handling. Government official, interview by USITC staff, Brasília, Brazil, August 24, 2011.

[3] Domestic transportation costs of soybeans harvested in Mato Grosso, for instance, account for 25–30 percent of the soybeans' total cost at the port, compared with only 8–10 percent for U.S. soybeans.

[4] Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 27–September 1, 2011; industry representatives, interview by USITC staff, Rio de Janeiro, Brazil, September 2, 2011.

at agencies overseeing infrastructure projects, and Brazil's immediate focus on upgrading infrastructure for the 2014 World Cup and the 2016 Olympics—will continue to hamper the government's ability to act decisively to improve Brazil's transportation infrastructure.

Transportation Infrastructure Conditions in Brazil

Brazil's overall transportation infrastructure is generally considered inadequate, especially compared to other regions in the world. According to a World Economic Forum (WEF) survey that asked firms to rank countries' competitiveness among a number of factors, Brazil ranked in the bottom half with respect to the quality of transportation infrastructure, including the quality of roads (118th out of 142 countries), railways (91st out of 122), and ports (130th out of 142),[5] well below other large agricultural producers such as the United States and China.[6] Similarly, the World Bank's Logistics Performance Index (LPI) ranks the quality of Brazil's infrastructure ahead of that of neighboring Argentina and Chile, yet significantly below that of the United States and China.[7]

Compared to countries of comparable geographic size, such as the United States, China, and Russia, Brazil relies more heavily on road transport. Road transport accounts for roughly 60 percent of cargo transported in Brazil, compared with 32 percent in the United States, 50 percent in China, and only 8 percent in Russia. In contrast, less expensive rail transport accounts for 25 percent of cargo transported in Brazil, compared with 43 percent in the United States, 37 percent in China, and 81 percent in Russia.[8] Brazil's historical underinvestment in railways and waterways contributes to its reliance on road transport. Brazil's vast geography, long distances between remote inland agricultural producing areas and ports, and a lack of expansive rail networks or viable waterways often make alternative means of transport impractical. In addition, transportation infrastructure varies regionally within Brazil, which affects agricultural export routes (box 3.1).

The transport of goods involving different modes of transport such as road and rail (intermodal transport) is limited in Brazil. A lack of interfaces between inland road networks and railways, and railways and ports, limits the use of more efficient intermodal transport to haul most of Brazil's bulk agricultural goods.[9] With the exception of a few specialized and highly efficient private intermodal ocean terminals, such as Vale's

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[5] WEF, The Global Competitiveness Report 2011–2012, 412–415.

[6] The United States ranked 20th in the quality of roads and rail infrastructure, and 23rd in the quality of port infrastructure. China ranked 54th in the quality of roads, 21st in the quality of rail infrastructure, and 56th in the quality of port infrastructure. WEF, *The Global Competitiveness Report 2011–12*, 412–15.

[7] World Bank, Logistics Performance Index (LPI). The LPI assigns a weighted average score to each country rated based on the efficiency of the customs clearance process; the quality of trade and transport-related infrastructure, including ports, railroads, roads, and information technology; the ease of arranging competitively priced shipments; the competence and quality of logistics services (e.g., transport operators or customs brokers); the ability to track and trace consignments; and the timeliness of shipments in reaching a destination within the scheduled or expected delivery time.

[8] Brazil Ministry of Transport, "Logistic Infrastructure Scenario in Brazil," September 21, 2010.

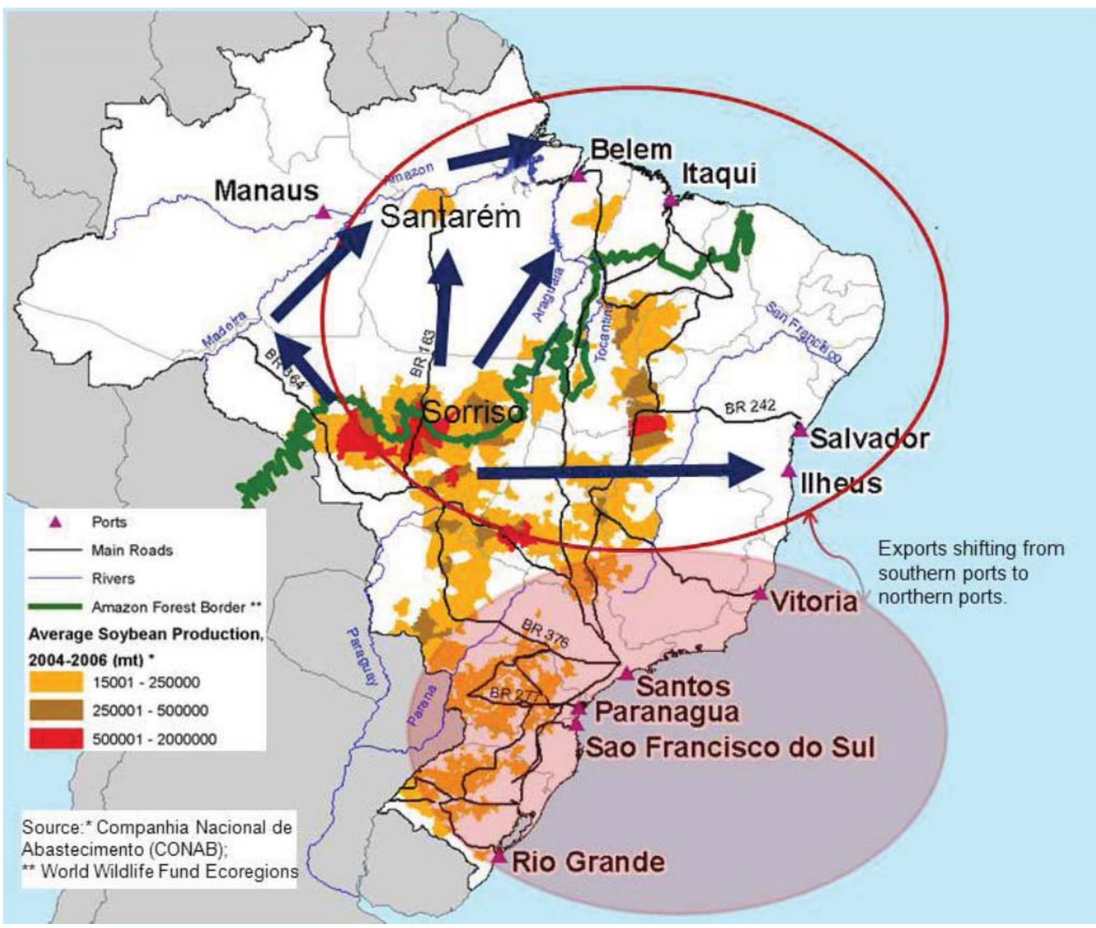
[9] Estevadeordal et al., *Bridging Integration Gaps*, 2010, 11.

BOX 3.1 Overview of Agricultural Export Routes in Brazil

The southern states of Paraná, São Paulo, and Rio Grande do Sul have traditionally accounted for the majority of Brazil's agricultural production. These states are served by established road and rail networks and are close to domestic markets and ports for export. Even though agricultural production is now booming in the Center-West, this region still exports most of its agricultural goods via southern and southeastern ports rather than through the geographically closer river ports in the North because of the underdeveloped transportation infrastructure linking the North with the Center-West.[a] For example, although soybean production in the Center-West has eclipsed that in the southern states, more than 80 percent of soybean exports are shipped through the south and southeastern ports of Vitória, Santos, Paranaguá, São Francisco do Sul, and Rio Grande.[b] Similarly, trucks transport over 70 percent of Brazil's cotton exports over vast distances from inland growing areas to the ports of Santos and Paranaguá.[c] Longer distances to port and the reliance on road transport lead to transportation bottlenecks and high transportation costs.[d]

Government efforts, notably through Brazil's Growth and Acceleration Program (PAC), have focused on developing viable road, rail, and waterways to help shift export routes, including those for soybeans, toward northern and northeastern ports to reduce transportation costs and relieve congestion at southern ports (figure 3.1). The use of northern ports for exporting soybeans and corn is becoming more common, but despite government efforts, its growth may be restricted in the future by a lack of port capacity.

FIGURE 3.1 Soybean export routes are beginning to shift towards northern Brazil



Source: USDA, AMS, *Brazil Soybean Transportation*, August 10, 2011, 1.

[a] Industry representative, interview by USITC staff, Brasilia, Brazil, August 25, 2011.
[b] USDA, AMS, *Brazil Soybean Transportation*, August 10, 2011, 2.
[c] USDA, FAS, *Cotton Transport and Handling Overview*, March 25, 2008, 5.
[d] USDA, FAS, *Soybean Transport and Handling Overview*, 2008, 5.

terminal to export iron ore or Cargill's terminal to export bulk agricultural products at the port of Santos, most ports lack intermodal transfer facilities other than those that transfer goods from trucks to ocean vessels.[10] More often, freight transporters must access ports by narrow and congested roads, leading to transportation bottlenecks, delays, and higher costs. According to a World Bank study, avoidable logistics and transportation spending related to inefficient intermodal transport in Brazil add more than $1.2 billion per year to the cost of trade in goods.[11] The study also found that increasing the use of rail in areas with existing rail services to transport goods could reduce domestic logistics and transportation costs by over $1.3 billion.[12]

Roads

Although Brazil has the world's fourth-largest road network in the world (1.8 million km),[13] only 12 percent of its roads are paved.[14] Moreover, this network is concentrated along southeastern population centers, far from the inland agricultural producing regions in the Center-West. Road conditions vary among federal, state, and municipal road networks. For instance, although 82 percent of Brazil's federal road network is paved, federal roads account for only 5 percent of Brazil's total road network. In contrast, the municipal roads that dot Brazil's interior account for 80 percent of Brazil's road network, but only 2 percent of these are paved.[15] Furthermore, due to a lack of sustained investment in road maintenance, only 25 percent of Brazil's overall road network has been rated in good or very good condition.[16] Some farms have pooled resources to build feeder roads that connect farms to national road networks. For example, some farmers in Mato Grosso paid for 90 percent of the initial costs to build local feeder roads, and established a toll to offset the costs.[17] In other cases, larger farms have built their own internal feeder roads to provide access to various locations on their farms.[18]

Brazil's trucking industry is fragmented and highly competitive, as self-employed truck drivers reportedly account for over half of Brazil's fleet of 1.8 million cargo vehicles.[19] Self-employed truckers are largely unregulated, and fierce competition among them often

[10] ILOS, Logistics Overview in Brazil 2008, 2; Estevadeordal et al., Bridging Integration Gaps, 2010, 11.

[11] World Bank, *Brazil Multimodal Freight Transport*, 1997, 1, 36. Although somewhat dated, the report identifies the costs associated with importing and exporting, including port handling, inland transport, warehousing, customs, and administrative costs, and compares these costs with potential cost savings based on policy reforms recommended in the study. Policy reforms were expected to improve port productivity and costs by reducing ship turnaround times, and trucking costs by reducing the waiting time to load and unload containers.

[12] Estevadeordal et al., *Bridging Integration Gaps*, 2010, 11.

[13] The United States has the largest road network (6.5 million km), followed by China (3.9 million km) and India (3.3 million km). CIA, *World Factbook*, December 1, 2011.

[14] WEF, *The Brazil Competitiveness Report 2009*, 2009, 34.

[15] Brazil Ministry of Transport, "Logistic Infrastructure Scenario in Brazil," September 21, 2010.

[16] Guasch et al., "Logistics, Transport, and Food Prices in LAC," 2009, 18. A 2009 survey conducted by Brazil's Confederation of National Transport (CNT), a trade union, found that the condition of 69 percent of all roads (both paved and unpaved) ranged from acceptable to inadequate, and that the condition of over half of even the paved roads in Brazil ranged from acceptable to very bad. USDA, AMS, *Soybean Transportation Guide: Brazil 2009*, 2010, 40.

[17] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.

[18] Ibid.

[19] Industry representative, interview by USITC staff, Rio de Janeiro, Brazil, September 2, 2011; ILOS, *Logistics Overview in Brazil 2008*, 2008, 7.

drives down the price of trucking services below the total cost of freight hauled.[20] Although lower prices make road transport a more attractive and economical transport option from the point of view of the buyer, some self-employed truck drivers will cut corners to recover a portion of the total cost.[21] Overall, this practice may contribute to vehicle overloading, excessive speed, overlong workdays, poor vehicle maintenance, and a decrease in the quality and safety of road transportation services.[22]

Trucking services and fleets are also unevenly distributed throughout Brazil, which can create transportation bottlenecks for agricultural producers at harvest time. For example, according to Brazil's National Agency for Land Transportation (ANTT), a government regulatory body that oversees the country's road and rail networks, although Mato Grosso is the largest soybean-producing state and the second-largest grain producing state in Brazil, only 3 percent of Brazil's transport fleet is registered in the state.[23] As a result, during peak harvest periods, trucking companies must send additional trucks to Mato Grosso from other parts of Brazil, which drives up transport costs. In addition, road congestion during peak harvest periods also raises transportation costs.[24]

Many poultry producers reportedly maintain their own cold-storage transportation fleet to transport poultry to ports for export, although port delays often lead to spoilage and waste.[25] Other farmers have small trucking fleets to transport produce locally or between farms; several, however, have shed these assets because of a low or negative return on investment, often owing to competition from lower-cost, largely unregulated independent truck drivers.[26] Other producers may use both internal trucking fleets and third-party logistics providers to transport goods to port for export.[27]

A lack of backhauling opportunities for agricultural producers that possess trucking fleets can also contribute to higher transportation costs. For example, a majority of swine slaughterhouses have their own trucking fleets. However, many trucks returning from delivering product to the port are unable to reduce per unit transportation costs by backhauling goods like fertilizer because incompatible shipment schedules limit the availability of goods.[28]

Poor road conditions, compounded by road congestion during peak harvest periods, can result in a substantial loss in grains or oilseeds. A farm organization (Famato) in Mato Grosso estimated that approximately 0.3 percent (51,000 tons) of the state's soybean crop is lost because it dribbles out the back of trucks while the crop is being transported over bumpy roads to Brazilian ports.[29] Severely potholed or under-maintained roads also lead to frequent delays, excessive repair and maintenance costs for trucks, and road accidents,

[20] ILOS, Logistics Overview in Brazil 2008, 2008, 14.
[21] Ibid.
[22] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011; industry representative, interview by USITC staff, Rio de Janeiro, Brazil, September 2, 2011; ILOS, *Logistics Overview in Brazil 2008*, 2008, 14.
[23] *Soybean and Corn Advisor*, "A Record Soybean Crop in Brazil," January 13, 2009.
[24] Ibid.
[25] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011.
[26] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.
[27] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011; industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011.
[28] Industry representative, interview by USITC staff, Cuiaba, Mato Grosso, Brazil, August 31, 2011.
[29] *Soybean and Corn Advisor*, "Poor Roads Causing Transportation Losses in Brazil," n.d.

which are reportedly common for trucks.[30] A recent survey by the CNT found that poor conditions in paved roads in Brazil increase the operating costs of trucks by 28 percent compared with trucks operating on paved roads in optimal condition.[31]

Poor infrastructure conditions and transportation inefficiencies not only increase the cost of transporting agricultural goods for export, but also increase the cost of domestically produced inputs, such as feed grains (e.g., corn and soybeans) that are transported to pork and poultry feed mills located in southern Brazil.[32] For example, the price of corn at the port of Fortaleza in Ceará state in northeastern Brazil is reportedly more than double that in the corn-producing area of Sorriso in Mato Grosso.[33] As a result, meat processors increasingly view it as more cost-effective to locate their operations near grain-producing areas.[34] For instance, the fast-growing production of grains in the Center-West has led to a rapid expansion of poultry and swine operations there, as unit costs to transport poultry or pork products for export are less than the unit costs of transporting feed grain inputs (see chapter 8 for poultry and chapter 10 for pork).

Public and private sector investments are improving and expanding road networks in Brazil. For example, road projects funded by public investments through the PAC, discussed later in this chapter, include rehabilitating over 53,000 km of Brazil's existing road network, expanding almost 2,000 km of existing road capacity, and constructing 3,000 km of new highways.[35] One notable road project includes the paving of highway BR-163, a vital transportation corridor linking northern Mato Grosso with the port of Santarém in Pará state. Forecast to be completed by 2012, the paved highway is expected to reduce transit times and to lower the cost of transporting soybeans by up to $20 per metric ton (mt).[36] However, heavy road congestion along the highway complicates efforts to complete paving along the 1,400 km route. For example, although 800 km of the northern portion of the highway linking Sinop to Santarém have yet to be paved,[37] efforts are already being made to widen paved portions of the highway located south of Sinop to reduce heavy traffic congestion (figure 3.2). The recently completed Transoceanic Highway linking Brazil's fertile agricultural regions in the Center-West through the western state of Acre to the port San Juan de Marcona along Peru's south-eastern coast is expected to boost bilateral trade and promote integration between Brazil and Peru. However, it is unlikely that the mountainous route will serve as a viable transport alternative to export Brazilian commodities such as soybeans to Asian markets, as it remains more cost effective to transport product in barges along Brazil's river system to the Atlantic coast.[38]

[30] USDA, FAS, *Brazil: Grain Transportation and Storage Infrastructure*, November 16, 2005, 5.
[31] USDA, AMS, Soybean Transportation Guide: Brazil 2009, July 2010, 40.
[32] USDA, FAS, *Brazil: Grain Transportation and Storage Infrastructure*, November 16, 2005, 5.
[33] Ibid., 4.
[34] Desouzart, "Structural Changes in the Brazilian Poultry Sector 1995 to 2005," 2007, 39–45.
[35] Brazil Ministry of Transport, "Logistic Infrastructure Scenario in Brazil," 2010.
[36] Costa and Rosson, "Improving Transportation Infrastructure in Brazil," 2007, 10.
[37] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011.
[38] Bodzin, Steven,"Peru's New Highway to the Future," *The Christian Science Monitor*, June 25, 2011; Bank Information Center, "Southern Interoceanic Highway (Peru-Brazil)," (accessed March 8, 2012).

FIGURE 3.2 Expansion of the BR-163 highway is intended to reduce congestion

Source: USITC staff.

In order to spur greater private investment in and management of public road networks, the government launched a federal highway concession program in the 1990s. Under the program, private entities operate road concessions, generally for periods of 25 years.[39]

Most concessions were initially concentrated in the southern economic centers of Rio de Janeiro and São Paulo, and have expanded along the southeastern coast to include the states of Rio Grande do Sul, Santa Catarina, and Paraná to the south, and Minas Gerais and Bahia to the north.[40] According to a recent survey, almost 90 percent of highways under private concession are in good or very good shape, compared with only 32 percent of publicly managed highways.[41] However, the number of concessions is not large. As of 2009 about 50 concessionaires were managing only 15,000 km, or about 7 percent of Brazil's paved road network and less than 1 percent of Brazil's total road network (paved

[39] Mourougane and Pisu, "Promoting Infrastructure Development in Brazil," 2011, 24.
[40] Brazil Ministry of Transport, "Logistic Infrastructure Scenario in Brazil," 2010.
[41] Mourougane and Pisu, "Promoting Infrastructure Development in Brazil," 2011, 24.

and unpaved).[42] Nevertheless, public sector investment will likely remain a principal driver of improvements to Brazil's road network.

Rail

Rail transport accounts for 25 percent of Brazil's total freight volume.[43] Brazil's rail network is relatively small given the country's size, covering about 30,000 km, or one-seventh the size of the rail network in the United States.[44] About 50 percent of Brazil's rail network is concentrated in the south and southeastern states of São Paulo, Minas Gerais, Rio de Janeiro, and Rio Grande do Sul.[45] These areas are rich in mineral deposits, including iron ore, which accounts for the majority of rail freight.[46] In contrast, there is low geographic rail coverage in the larger grain-producing Center-West region.

After years of underinvestment and low maintenance, Brazil's rail network was privatized in the mid-1990s to spur investment and improve productivity in the sector. As a result of privatization, 95 percent of Brazil's rail network is now reportedly operated by five private groups and two state-owned companies under 12 different concessions.[47] Valec Engenharia Construções e Ferrovias (Valec), a state-owned company operating under the auspices of the Ministry of Transport, is responsible for managing new railway construction, developing feasibility studies for new rail lines, and signing contracts and agreements with rail operators to implement investment projects.[48]

The concentration of rail operators, the limited competition, the relatively disconnected networks under concession, and the system's limited capacity to transport agricultural bulk products rather than iron ore have reportedly led to rent-seeking and monopoly pricing.[49] As a result, some agricultural producers believe costs for rail transport are only marginally less than for truck transport, if at all.[50] In addition, although recent changes to concession agreements reportedly require rail operators to allocate a certain percentage of

[42] Mourougane and Pisu, "Promoting Infrastructure Development in Brazil," 2011, 24; Brazil Ministry of Transport, "Logistic Infrastructure Scenario in Brazil," 2010.
[43] WEF, *The Brazil Competitiveness Report 2009*, 2009, 35.
[44] The United States has the largest rail network in the world (225,000 km), followed by Russia (87,000 km), China (86,000 km), and India (64,000 km). In comparison, Brazil's rail network ranks 10th in the world. Brazil Ministry of Transport, "Logistic Infrastructure Scenario in Brazil," 2010; EIU, *The Global Power of Brazilian Agribusiness*, 2010, 10; CIA, *World Factbook*, December 1, 2011.
[45] ILOS, Logistics Overview in Brazil 2008, 1.
[46] Brazil is one of the world's leading producers and exporters of iron ore, which has traditionally accounted for the majority of rail freight in Brazil.
[47] Brazil Ministry of Transport, "Logistic Infrastructure Scenario in Brazil," 2010; Mourougane and Pisu, "Promoting Infrastructure Development in Brazil," 2011, 23. A concession generally refers to an agreement under which a private entity is granted the right to operate a public asset.
[48] Valec Web site, http://www.valec.gov.br (accessed November 17, 2011); Mourougane and Pisu, "Promoting Infrastructure Development in Brazil," 2011, 23.
[49] Industry representative, interview by USITC staff, Mato Grosso and São Paulo, Brazil, August 23 and 28, 2011; Mourougane and Pisu, "Promoting Infrastructure Development in Brazil," 2011, 23.
[50] Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 28, 2011; industry representatives, interviews by USITC staff, São Paulo, Brazil, August 23, 2011.

rail capacity to products other than iron ore, rail prices are reportedly pegged to trucking prices as a result of limited competition and cartel-like pricing behavior.[51]

The high costs associated with expanding and maintaining rail lines, as well as the limited geographic connectivity among networks operating under different concessions, reportedly deter private investment in developing and upgrading Brazil's rail network.[52] As a result, expansion of the country's rail infrastructure will still depend in large part on public investment through Valec and the PAC. For example, in 2011 alone, Valec's investment budget of R$2.4 billion ($1.4 billion) reportedly accounted for 10 percent of all Brazilian government and private investments made in the national railway network since 2000.[53] In addition, 30 percent of the R$43.9 billion ($25.7 billion) of PAC funds earmarked for the development of Brazil's railways during 2011–14 will reportedly be financed by the public sector.[54] However, Valec has in some cases subcontracted the operation, maintenance, and improvements of certain segments of rail lines under construction to private operators (i.e., subconcessionnaires) in order to help fund other segments either under construction or planned for construction.[55]

Significant efforts are underway to expand and integrate Brazil's rail network to better connect agricultural producing regions to ports, reduce transportation costs, and increase the share of freight transported by rail. Once completed, the North-South rail line will link the states of Maranhão, Tocantins, and Goiás to the port of Belém in the northern state of Pará (figure 3.3). About 570 km are already in use, and another 720 km were expected to be completed in 2011.[56] The West-East rail line will link agricultural areas in Tocantins state to the port of Ilhéus in Bahia state. Construction of the first section of the 1,490-km rail line has reportedly begun.[57] The Center-West rail line, currently under construction, would link eastern Mato Grosso to the port of Santos, and eventually form the backbone of a transcontinental railway connecting eastern and western Brazil.[58] Some agricultural producers believe that although the proposed rail line would increase capacity to transport agricultural products by rail, a lack of competition among rail operators will mitigate any cost advantages of the line. The impact of the proposed rail line on costs remains uncertain.[59]

[51] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011. According to one industry representative, in order to comply with the law, rail operators can either allow other locomotives rail access and charge a user fee, or charge a fee for pulling other companies' rolling stock.

[52] Mourougane and Pisu, "Promoting Infrastructure Development in Brazil," 2011, 23. Differences in rail gauge also limit connectivity.

[53] Valec Web site, http://www.valec.gov.br (accessed November 17, 2011).

[54] Mourougane and Pisu, "Promoting Infrastructure Development in Brazil," 2011, 23.

[55] Valec Web site, http://www.valec.gov.br (accessed November 17, 2011). Most notably, in 2007 Valec awarded a R$1.4 billion ($717 million) 30-year subconcession to Brazil iron ore miner Vale (formerly *Companhia Vale do Rio Doce* or CVRD) to operate a portion of the North-South railway that will eventually link the states of Maranhão, Tocantins, and Goiás. The capital provided by CVRD is used by Valec to fund other portions of the line under construction.

[56] Felsberg e Associados, "Perspectives for the Brazilian Railway Sector for 2011," February 2011.

[57] Ibid.

[58] Ibid.

[59] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

FIGURE 3.3 Current and future railroad development may lower transport costs

Source: APROSOJA, "Outlook for Internal and Port Infrastructure Growth in Brazil," January 2010.

Note: For the full name of each Brazilian state, see figure 1.1 in chapter 1.

River Transport

Inland waterways account for about 13 percent of cargo transported in Brazil.[60] Despite having a river network longer than that in the United States, Brazil underuses its inland waterways. For instance, there are 28,000 km of navigable inland waterways in Brazil, with a potential to develop an additional 15,000 km; however, only about 13,500 km, or

[60] Brazil Ministry of Transport, "Logistic Infrastructure Scenario in Brazil," 2010.

FIGURE 3.4 Primary Brazilian waterway export routes

Source: USITC staff.

Note: The arrows illustrate the direction of flow on the primary navigable waterways used to transport agricultural exports. While other waterways are often used to transport goods within the country, such as the Sao Francisco and Tocantins Rivers, most are not fully navigable and/or are not commonly used for agricultural exports.

less than half of all navigable inland waterways, are used commercially to transport cargo.[61]

Inland waterways transport an estimated 45 million tons of cargo annually via eight waterways,[62] including agricultural and mineral products, construction material, and fertilizers.[63] With the exception of the Tietê-Paraná waterway, Brazil's inland waterways do not connect population or economic centers, and as a result, transshipment operations are necessary to transport goods to their final destination.[64] For instance, grains from Mato Grosso transported by barge from the port of Velho, Rondônia, north along the Madeira River are transferred to oceangoing vessels at the port city of Itacoatiara along the Amazon River for export. Likewise, grains from Mato Grosso transported by barge along the Teles Pires-Tapajós waterway are transferred to oceangoing vessels at the port of Santarém along the Amazon River for export.[65] Other major waterways, such as the Tocantins River, cannot be used for export because they are not fully navigable due to the presence of dams (figure 3.4). Other factors limiting the use of inland waterways as a viable transport alternative include a lack of investment in facilities and in improvements to navigable rivers, a lack of locks to allow the passage of barges at hydroelectric plants, and pressures against developing waterways in environmentally sensitive areas.[66]

The government recognizes the need to further develop Brazil's waterways as a less costly alternative to road transport, pointing to low levels of investment in the sector in the past.[67] Future public investment in waterways will reportedly include R$2.7 billion ($1.6 billion) in PAC funds for the construction of seven waterways and 34 terminals.[68] Brazil's National Agency for Waterway Transportation (ANTAQ), a government regulatory body that oversees Brazil's inland waterways and ports, and the Ministry of Transport are preparing studies on the development and expansion of Brazil's inland waterways.[69]

Storage and Warehouse Capacity

Storage capacity for grains has not kept pace with increased agricultural production in Brazil, and as a result the country has experienced a shortage of warehousing capacity for agricultural goods, estimated at around 40 million tons per year.[70] In contrast to the

[61] Brazil Ministry of Transport, "Logistic Infrastructure Scenario in Brazil," 2010.

[62] There are a total of about 13,650 km of inland waterways in use in Brazil, including the following: Amazonas-Madeira (4,160 km), Tocantins-Araguaia (3,040 km), Tietê-Paraná (1,660 km), São Francisco (1,370 km), Paraguai (1,320 km), and the Tapajós (1,050 km). Brazil Ministry of Transport, "Logistic Infrastructure Scenario in Brazil," 2010.

[63] Brazil Ministry of External Relations, *Brazilian Ports*, 2008, 24.

[64] Caixeta-Filho, "Transportation and Logistics in Brazilian Agriculture," 2003, 11; Caixeta-Filho, "The Determinants of Transport Costs in Brazil's Agribusiness," 2008, 5.

[65] Caixeta-Filho, "The Determinants of Transport Costs in Brazil's Agribusiness," 2008, 5.

[66] EIU, *The Global Power of Brazilian Agribusiness*, 2010, 11; WEF, *The Brazil Competitiveness Report 2009*, 2009, 35.

[67] Pires, "Brazil: Waterways Gain Prominence in 2011," March 1, 2011.

[68] Ibid.

[69] Pires, "Brazil: Waterways Gain Prominence in 2011," March 1, 2011; ANTAQ, *Waterway Panaroma*, 2010, 90.

[70] EIU, *The Global Power of Brazilian Agribusiness*, 2010, 11; Guasch et al., "Logistics, Transport, and Food Prices in LAC," 2009, 20.

United States, on-farm storage at small farms is relatively uncommon in Brazil. Only about 11 percent of storage capacity is located on farms,[71] and as a result, most small landholding farmers must outsource storage and logistics functions.[72] Because volumes produced by many smaller farmers in the southern states are limited, the per unit cost of financing and insuring inventories over time are high, which reduces the incentive to store product. The high cost of capital and limited access to financing also reportedly hamper the ability of farmers to build on-site storage.[73]

In addition, regional storage capacity is uneven. Although the inland agricultural producing regions of Mato Grosso and other states within the Center-West account for 70 percent of the country's agricultural production, storage capacity is still concentrated in southern Brazil, creating distribution problems during harvest season.[74] Despite the need to build additional storage capacity in the Center-West, where agricultural land expansion is occurring, construction of these facilities is reportedly slow.[75] Storage capacity may also be uneven seasonally, leading to increased storage costs between harvest seasons. For example, although adequate storage space for corn may be available during the first growing season, storage costs may be 50 percent higher during the second growing season because of a lack of adequate capacity to store the additional corn that is harvested after the second planting.[76]

The lack of on-farm storage capacity can reduce farmer incomes. For example, farmers reportedly lose an average of $1 per bushel of soybeans because they are forced to sell at the time of harvest when prices are the lowest instead of storing inventory and waiting to sell when prices are higher. The price differential can be significant: in 2010, the price of soybeans at harvest time (April) in Mato Grosso was reportedly $8 per bushel, whereas it was $11 per bushel in September.[77] Insufficient storage space also results in the loss of grains and other agricultural products due to spoilage. For example, one study found that almost 9 percent of grains harvested in Brazil were lost during post-harvest storage and transportation as a result of insufficient storage space and long transportation distances to ports for export. Poor storage conditions and improperly sealed trucks contribute to an estimated loss of one million mt of rice each year.[78] In addition, Brazil reportedly lacks enough intermodal transfer terminals, which connect storage and warehousing infrastructure to rail networks. According to one estimate, a doubling of intermodal transfer terminals in Brazil could reduce inventory and warehousing costs by as much as $1 billion annually.[79] The development of efficient transport infrastructure connecting warehousing and storage facilities to ports has been cited by at least one large agricultural trader as the most critical component of the supply chain for future development.[80]

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[71] EIU, *The Global Power of Brazilian Agribusiness*, 2010, 11.

[72] Guasch et al., "Logistics, Transport, and Food Prices in LAC," 2009, 20.

[73] Industry representative, interview by USITC staff, Paraná, Brazil, August 29, 2011.

[74] EIU, *The Global Power of Brazilian Agribusiness*, 2010, 11. However, the proximity of storage facilities to production areas varies. For example, some larger agricultural traders reportedly store crops from Mato Grosso in facilities located in Paraná for export through southern ports such as Paranaguá and Santos. Industry representative, interview by USITC staff, Paraná, Brazil, August 30, 2012.

[75] Industry representative, interview by USITC staff, Paraná, Brazil, August 29, 2011.

[76] Industry representative, interview by USITC staff, São Paulo, Brazil, August 22, 2011.

[77] EIU, *The Global Power of Brazilian Agribusiness*, 2010, 11.

[78] USDA, FAS, *Brazil: Grain Transportation and Storage Infrastructure*, November 16, 2005, 9.

[79] Guasch et al., "Logistics, Transport, and Food Prices in LAC," 2009, 20.

[80] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

In some cases, smaller farmers have found creative ways to overcome the lack of on-farm storage capacity. For example, some producers in Paraná, Mato Grosso, and Bahia have used on-site plastic storage bags as a practical alternative.[81] However, most producers reportedly do not follow this practice, as the warm, moist climate can lead to mold and spoilage.[82] Larger producers that have the means to do so invest more in their own storage and warehousing, often relying on loans provided by BNDES, Brazil's national development bank.[83] Likewise, cooperatives that pool together the resources and harvests of small farmers have invested in their own storage and warehousing.[84]

Ports

Brazil has one of the longest coastlines in the world, and seaports play a critical role in the country's ability to trade. Brazil's port system comprises 50 ports (including sea and river ports) located in almost all of the coastal states (figure 3.5). All ports but one are owned and controlled either by federal port companies or by states or local municipalities.[85] Despite public ownership of ports, most public ports are operated by private terminals based on long-term lease agreements of 25 years or more,[86] a product of government regulatory reform and privatization efforts in the 1990s (box 3.2). According to ANTAQ, private terminals account for roughly two-thirds of the cargo transported through Brazil's port system. If public terminals that are rented and operated by private companies are included, the private sector is responsible for transporting over 90 percent of the cargo that goes through Brazil's port system.[87]

Despite Brazil's status as a major commodity exporter, the country's port system is generally characterized as relatively small, inefficient, and expensive. For instance, Brazil's seven largest ports combined handled only 475 million mt of cargo in 2009, significantly less than the 516 million mt of cargo volume that the three largest U.S. ports handled combined.[88] A lack of harbor capacity and insufficient dredging depths limit the number and size of ships that can access the ports.[89] For example, while most Brazilian ports can handle Panamax-sized ships,[90] only seven ports are capable of handling larger

[81] USDA, FAS, Brazil Grain Transportation and Storage Infrastructure, November 16, 2005, 9; EIU, *The Global Power of Brazilian Agribusiness*, 2010, 12.

[82] USDA, FAS, *Brazil: Grain Transportation and Storage Infrastructure*, November 16, 2005, 9.

[83] Industry representative, interview by USITC staff, São Paulo, Brazil, August 22, 2011.

[84] Industry representative, interview by USITC staff, Paraná, Brazil, August 29, 2011.

[85] Brazil Ministry of Transport, "Logistic Infrastructure Scenario in Brazil," 2010. There are 26 federal port companies, 23 state- and municipality-run ports, and one private port. The port of Imbituba, located in Santa Catarina state, is the only privately operated port in Brazil. A 1941 governmental decree authorized Companhia Docas de Imbituba, a Brazilian company, to operate the port for a period of 70 years. The agreement expires in 2012. Port of Imbituba Web site, http://www.cdiport.com.br (accessed November 4, 2011).

[86] Industry representative, interview by USITC staff, Santos, Brazil, August 24, 2011.

[87] Brazil Ministry of External Relations, *Brazilian Ports*, 2008, 14.

[88] AAPA, *World Port Rankings 2009*. Typically, the three largest ports in the United States in terms of volume handled are New Orleans, Galveston (Houston), and New York–New Jersey. In Brazil, the seven largest are the ports of Itaqui, Sepetiba, Tubarão, Santos, São Sebastião, Angra dos Reis, and Paranaguá.

[89] EIU, *Brazil Risk*, 2010.

[90] "Panamax" refers to the size limits and requirements of ships traveling through the Panama Canal; "Capesize" vessels are considerably larger.

FIGURE 3.5 Ports in Brazil

Source: USDA, AMS, *Soybean Transportation Guide: Brazil 2010*, July 2011, 30.

Note: A survey port is a Brazilian port where cargo data are collected. These ports are responsible for more than 98 percent of Brazilian cargo movement.

BOX 3.2 Port Reforms and Investments in Brazil

Beginning in the early 1990s, the Brazilian government enacted several reforms to improve the country's ports. Efforts to privatize public-sector infrastructure began with the Port Modernization Enactment of 1993, which opened public sector port operations to private companies under long-term concession contracts. In 2007, the government created the Special Secretariat for Ports (SEP), a presidential agency responsible for oversight of investments in Brazil's ports. The SEP, working alongside ANTAQ, established the National Dredging Plan to oversee an investment of R$1.2 billion ($615 million) in dredging operations to increase channel depths and mooring berths at 16 ports.[b] The program will allow larger ships to berth for loading, increase cargo-handling capacity, and help relieve port congestion. The government has allowed foreign companies to participate to spur investment and competition in order to reduce costs.[c]

Recent government reforms have enabled greater private participation and investments in Brazil's ports, and have helped to reduce handling costs for containers and goods at Brazil's ports.[d] In 2008, a government decree allowed both Brazilian and foreign companies to build and operate terminals and new public ports under concession. The decree also eliminated the requirement that private terminal operators handle private- or mixed-use cargoes.[e] As a result, private companies will be able to operate terminals without the need to own or handle cargo. The first ports offered under this model will be Manaus, Amazonas, and Ilhéus, Bahia.[f] These reforms are expected to attract R$19 billion ($11.3 billion) in private sector investments in the coming years.[g]

[a] ILOS, *Logistics Overview in Brazil 2008*, 2008, 4; Brazil Ministry of External Relations, *Brazilian Ports*, 2008, 14; WEF, *The Brazil Competitiveness Report 2009*, 2009, 35.
[b] Brazil Ministry of External Relations, *Brazilian Ports*, 2008, 10.
[c] Ibid.
[d] Ibid., 14.
[e] Brazil Ministry of External Relations, *Brazilian Ports*, 2008, 13, 16. Private cargoes are owned by the terminal operators. Mixed-use cargoes are private cargoes combined with cargoes owned by third parties.
[f] Brazil Ministry of External Relations, *Brazilian Ports*, 2008, 16.
[g] Brazil Ministry of External Relations, *Brazilian Ports*, 2008, 4.

Capesize-generation ships, which typically operate at lower per-ton freight costs.[91] Lack of physical space at ports can also hamper efforts to expand terminal capacity, as greenfield construction often takes several years and is subject to significant environmental assessment and impact studies.[92]

Inland port access and capacity for trucks carrying goods for export are often limited, leading to major delays during peak harvest periods. For example, lines of trucks waiting to unload grain at major grain terminals can stretch up to 30 miles, and trucks can wait up to 20 days to unload;[93] these backups contribute to high demurrage costs for ships waiting to be loaded. In 2010, long delays caused by a backlog of vessels waiting to load sugar cargoes at Brazil's ports reportedly helped to push the price of global sugar futures contracts to seven-month highs, above $0.25 per pound.[94] Outdated equipment, labor-

[91] WEF, *The Brazil Competitiveness Report 2009*, 2009, 34. All things being equal, Capesize-generation ships can reportedly operate at a cost of $12 per ton, while Panamax-sized ships operate at $36 per ton.
[92] Industry representative, interview by USITC staff, Santos, Brazil, August 24, 2011.
[93] EIU, *The Global Power of Brazilian Agribusiness*, 2010, 11.
[94] Brough and Saul, "Brazil Port Sugar Delays Seen Easing Next Season," September 23, 2010.

intensive port processes, and inadequate port administration also reportedly contribute to port inefficiencies.[95]

Although Brazil's port infrastructure is generally considered inadequate, some large agricultural producers and traders, along with other private terminal operators such as oil and iron ore producers, have invested in larger, more efficient terminals. For example, one terminal at Santos leased as a joint venture between two large agricultural traders is capable of handling 4 million mt per year of soybeans and corn, and is considered the most productive terminal at the port.[96] However, additional investments in this terminal to allow ship loadings during rainy weather have reportedly been hampered by capital constraints and some uncertainties related to renewing the lease on the terminal.[97]

Private-sector investments in port terminals are improving overall port capacity and efficiency. For example, in 2008 Brazilian iron-ore miner Vale announced investments of R$4 billion ($2.2 billion) to expand six port terminals in Brazil.[98] Three companies that operate terminals at the port of Santos, including Cosan, Brazil's top sugar exporter, are reportedly investing in covers at berths to enable the loading of bulk sugar when it rains.[99] Cosan is also reportedly investing R$280 million ($167 million) to increase capacity at two terminals to 18 million mt per year, and has contracted with rail concessionaire America Latina Logistica (ALL) to make investments in locomotives, rolling stock, and track to increase the volume of sugar shipments to Santos.[100] In 2011, Brazilian private terminal operator Empresa Brasiliera de Terminais Portuários (Embraport) began construction of a new mixed-use container terminal at Santos port. The terminal, financed in part through the Inter-American Development Bank and BNDES, will have an annual capacity of 2 million 20-foot equivalent units and be able to handle bulk liquids such as ethanol. The terminal is expected to be completed by 2013.[101]

Government Programs to Improve Transportation Infrastructure

As noted earlier, the government recognizes the need to improve Brazil's transportation infrastructure and has developed federal plans to increase both public and private investment in infrastructure projects. Through its National Plan for Transportation and Logistics (NPTL) and the Growth and Acceleration Program (PAC), the government intends to undertake significant levels of public investment in infrastructure development in coming years to improve and expand railways, waterways, road networks, and ports. Loans provided by Brazil's national development bank, BNDES, often underpin private investment in infrastructure projects.

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[95] EIU, *The Global Power of Brazilian Agribusiness*, 2010, 11; WEF, *The Brazil Competitiveness Report 2009*, 2009, 34.

[96] Industry representative, interview by USITC staff, Santos, Brazil, August 24, 2011.

[97] Ibid.

[98] Brazil Ministry of External Relations, *Brazilian Ports*, 2008, 14.

[99] Brough and Saul, "Brazil Port Sugar Delays Seen Easing Next Season," Reuters, September 23, 2010.

[100] Murphy, "Cosan Invests to Boost Brazil Port Sugar Capacity," Reuters, November 3, 2010.

[101] IDB, "IDB Closes $430 Million Syndicate Loan to Brazil's Embraport Project," November 25, 2011; Grupo Coimex Web site, http://www.coimex.com.br (accessed December 20, 2011).

National Plan for Transportation and Logistics (NPTL)

In 2003, the Ministry of Transport undertook a review of infrastructure conditions, which resulted in the formation in 2006 of the NPTL, a longer-term strategic plan covering 2008–23 to improve transportation infrastructure in Brazil and reduce the country's overreliance on road transport.[102] The plan calls for a reduction in the use of road transport from 58 to 30 percent of cargo transported, an increase in the use of railways from 25 percent to 35 percent, and an increase in the use of waterways from 13 percent to 29 percent.[103]

To do so, the NPTL has identified hundreds of potential or viable infrastructure projects in railways, waterways, ports, and airports. However, while many NPTL projects are funded through the PAC (discussed in more detail below) as well as through other sources, the NPTL lacks dedicated sources of funding for specific projects. As a result, the NPTL has been characterized by some as more of a wish list of projects lacking strategic direction, rather than a coherent plan to improve transport infrastructure in Brazil.[104]

The plan allocates targeted investments totaling R$291 billion ($146 billion) over three periods (table 3.1). Investments in railways account for 52 percent of allocated funds during 2008–23, followed by highways (24 percent), ports (13 percent), and inland waterways (5 percent) (table 3.2). Over two-thirds of NPTL investments are allocated to the Center-South, East, and South regions ("vectors"), which include, among others, the states of Mato Grosso, Mato Grosso do Sul, Rio Grande do Sul, Paraná, Minas Gerais, Goiás, and Bahia (table 3.3).[105]

TABLE 3.1 NPTL investments by phase, 2008–23

Phase	Total investment		Share of total
	Billion R$	Billion $	Percent
I: 2008–2011	109.2	54.7	37.6
II: 2012–2015	84.3	42.2	29.0
III: 2015–2023	97.3	48.7	33.4
Total	290.8	145.6	100.0

Source: USDA, AMS, *Soybean Transportation Guide: Brazil 2009*, July 2010, 11–12.

[102] Howell, *Building Brazil*, 2008, 4, 16.
[103] Brazil Ministry of Transport, "Logistic Infrastructure Scenario in Brazil," September 21, 2010.
[104] Industry representative, interview by USITC staff, Rio de Janeiro, Brazil, September 2, 2011.
[105] Investments are allocated to logistics "vectors," or regions, that have been designated by the Ministry of Transport. Logistics vectors include the Amazon, the Center-North, the Upper Northeast, the Center-Northeast, the East, the Center-South, and the South. Logistics vectors do not correspond directly to the macroregions of Brazil classified by the Brazilian Institute of Geography and Statistics, the agency responsible for geographic and cartographic information in Brazil. In addition, states may be covered by more than one vector. For example, Mato Grosso state is covered under portions of the Amazon, Center-North, and Center-South logistics vectors. See Brazil Ministries of Transport and Defense, *National Plan for Transportation and Logistics Annual Report*, 2009, 14.

TABLE 3.2 NPTL allocations by transport mode, 2008–23

Transport mode	Total investment		Share of total
	Billion R$	Billion $	Percent
Air	13.0	6.5	4.5
Railways	150.1	75.2	51.6
Inland waterways	15.8	7.9	5.4
Ports	38.9	19.5	13.4
Highways	69.7	34.9	24.0
All other	3.2	1.6	1.1
Total	290.8	145.6	100.0

Source: USDA, AMS, *Soybean Transportation Guide: Brazil 2009*, July 2010, 11–12.

TABLE 3.3 NPTL investments by logistics vector and transport mode (%)

Transport mode	Amazon	Center-North	Center-South	East	Center-Northwest	Upper-Northeast	South
Air	5.3	6.6	28.2	20.8	2.8	25.0	11.4
Railways	6.8	6.2	37.4	24.2	5.9	4.5	14.9
Inland waterways	31.3	29.7	13.0	9.6	1.7	1.0	13.7
Ports	2.6	8.7	20.8	41.5	4.0	5.3	17.0
Highways	16.5	9.1	15.5	14.6	12.0	14.4	18.0
All other	0	49.3	24.3	7.2	0.5	16.5	2.5
% of total NPTL investments in Brazil	9.8	9.0	28.1	23.1	6.7	7.9	15.6

Source: Brazil Ministries of Transport and Defense, *National Plan for Transportation and Logistics, Annual Report*, 2009, 19.

Note: Totals may not add due to rounding.

Investments by infrastructure mode are relatively concentrated within specific regions. For example, over 60 percent of rail investments are allocated to the Center-South and East, and will help improve rail access from the soy-producing areas of Mato Grosso to the main ports of Santos and Paranaguá. Likewise, over 60 percent of investments slated for waterways are concentrated in the Amazon and Center-North regions, including the states of Mato Grosso, Amazonas, and Pará, where the potential to develop viable waterways is greatest. Improvements in roads, railways, and waterways will help reduce transportation costs and improve the area's agricultural cost-competitiveness.

Growth and Acceleration Program (PAC)

In 2007, the government introduced the PAC, a short-term plan covering the 2007–10 period. The PAC's goal was to promote social and economic development, primarily by improving employment and income opportunities, reducing regional disparities within Brazil, and increasing investment in infrastructure.[106] The plan provides tax cuts, investment incentives, and short- and long-term financing for energy-related, social, and infrastructure projects. Of the R$504 billion ($258 billion) planned for the PAC, funds devoted to transportation infrastructure (R$58 billion, or $30 billion) account for 11.5 percent of the total.[107] Some infrastructure projects identified through the NPTL were subsequently incorporated into PAC projects. For example, PAC funds allocated to investments in transportation infrastructure account for 80 percent of the first phase

[106] USDA, AMS, Soybean Transportation Guide: Brazil 2009, July 2010, 11.

[107] Howell, *Building Brazil*, 2008, 16. Energy-related projects account for the largest portion of PAC funds (55 percent, or R$275 billion [$149 billion]), followed by social programs (34 percent or R$171 billion [$93 billion]).

(2008–11) of the NPTL.[108] The private sector reportedly accounts for 30 percent of PAC funding overall,[109] while federal government budgets account for the remainder of funds envisioned for PAC projects.[110]

The PAC has not come without criticism, and assessments of the effectiveness of the program are mixed. For example, out of total PAC funding allocated, estimates of the amount spent on completed PAC projects or works in progress reportedly ranged from a high of 63 percent to a low of 14 percent.[111] Factors contributing to project delays reportedly include excessive bureaucracy, environmental concerns, and a delay in the release of funds.[112] In addition, the plan has been criticized as misleading, as infrastructure projects from past government efforts reportedly account for the majority of PAC projects.[113] Nevertheless, in March 2010, the government announced the creation of the PAC 2, a continuation of the PAC to further boost spending during the 2011–14 period, particularly in preparation for the 2014 World Cup and the 2016 Olympics to be held in Brazil. Funding for transportation infrastructure projects will account for about 11 percent (R$105 billion, or $63 billion) of total funds allocated to the PAC 2.[114]

However, problems are said to persist. Allegations of corruption and bribery at the Ministry of Transport and the National Department of Transportation and Infrastructure (DNIT), a regulatory agency, have reportedly led to mass resignations, causing funding and construction delays and project cancellations for many PAC 2 projects overseen by the ministry and the DNIT.[115] The DNIT expects that only 74 percent of transportation goals outlined in the PAC 2 will be met by 2014.[116] As of August 2011, only 1 percent of planned projects were reported to be finished, with 27 percent underway and 4 percent still in the bidding stage.[117]

The Role of BNDES in Transportation Infrastructure Development

BNDES, Brazil's national development bank, is the main financing agent for long-term investments in infrastructure in Brazil. BNDES supports infrastructure development and financing primarily through three functions: financing technical studies, research, and project development in potential or specific infrastructure projects;[118] conducting technical assessments of projects and structuring of concessions or public-private partnerships (PPPs);[119] and lending directly to private companies or through financial

[108] Howell, *Building Brazil*, 2008, 17.
[109] Mourougane and Pisu, "Promoting Infrastructure Development in Brazil," 2011, 11.
[110] Howell, *Building Brazil*, 2008, 4; "Brazil PAC 2 Spending Plans," Rio Times, January 4, 2011.
[111] Skalmusky, "Brazil PAC 2 Spending Plans," Rio Times, January 4, 2011.
[112] Skalmusky, "Brazil PAC 2 Spending Plans," Rio Times, January 4, 2011.
[113] WEF, *The Brazil Competitiveness Report 2009*, 2009, 32.
[114] "Brazil PAC 2 Spending Plans," Rio Times, January 4, 2011.
[115] Industry representative, interview by USITC staff, Cuiabá, Brazil, August 31, 2011; Skalmusky, "PAC 2 Stumbles on Scandals in DNIT," Rio Times, August 2, 2011.
[116] Skalmusky, "PAC 2 Stumbles on Scandals in DNIT," Rio Times, August 2, 2011.
[117] Ibid.
[118] BNDES, *Annual Report 2009*, 2009, 106; "BNDES Creates New $US12mn Infra Fund—Brazil," Business News Americas, March 11, 2008.
[119] BNDES, *Annual Report 2009*, 2009, 106; Estruturadora Brasileira de Projetos (EBP) Web site, http://www.ebpbrasil.com (accessed September 28, 2011).

intermediaries for projects for which the private company has bid and won a project concession or PPP.[120]

BNDES undertakes these three functions for projects considered strategic by the government, and as a result, has provided significant technical expertise and financing for PAC-related projects. By 2009, total BNDES funds contracted or approved for PAC-related logistics infrastructure projects reached R$6.4 billion ($3.2 billion), or 10 percent of total funds contracted or approved for the PAC.[121] Between 2005 and 2008, BNDES provided R$199 billion ($108 billion) in loans, either directly to private companies or through financial intermediaries, for infrastructure projects in the electricity generation, telecommunications, sanitation, railways, highway transport, and ports sectors (table 3.4). BNDES investments in these infrastructure sectors are projected to increase by 37 percent to R$274 billion ($155 billion) during 2010–13.[122] A description of projects in the road, rail, waterways, and ports sectors are shown in table 3.5. While many of these investments are not directly targeted at improving transportation efficiency for agricultural exports alone, many of the projects, such as the rail line between Alto Araguaia and Rondonópolis in Mato Grosso, will lower producers' transportation costs to port and improve their reliability of supply.

TABLE 3.4 BNDES investments in infrastructure projects, 2010–13

Sector	2005–08 (actual disbursements)	2010–13	% change
	R$ billion		
Electric energy	68	92	35
Telecommunications	66	67	2
Sanitation	22	39	77
Railways	16	29	81
Highway transports	23	33	44
Ports	5	14	180
Total	200	274	37

Source: Borca and Guaresma, "Investment Perspectives in the Infrastructure Sector in 2010–13," February 22, 2010.

[120] Demian Fiocca, "BNDES," January 2006; government official, interview by USITC staff, Brasilia, Brazil, September 2, 2011. Brazilian law distinguishes between concessions and PPPs. Concessions are awarded for projects that are financially viable without any payment from public authorities to a private operator. In contrast, projects requiring a direct payment from public authorities to be finally viable are classified as PPPs. See Mourougane and Pisu, "Promoting Infrastructure Development in Brazil," 2011, 14.

[121] BNDES, *Annual Report 2009*, 2009, 51.

[122] Borca and Guaresma, "Investment Perspectives in the Infrastructure Sector in 2010–13," February 22, 2010, 5.

TABLE 3.5 Examples of BNDES investments in transport projects

Infrastructure sector	Description
Road transport	Loans to add 5,000 km of privatized highway concessions to the existing network of 15,000 km of highway concessions.
Rail	Expansion of the ALL-operated rail line in Mato Grosso connecting the cities of Alto Araguaia and Rondonópolis, a distance of roughly 260 km. The project was contracted in August 2009, in the amount of R$692 million ($345 million), and total investment (including other investment sources) was R$780 million ($388 million).
	Construction of the Transnordestina railway connecting a railway terminal in Eliseu Martins, Piauí to the ports of Pecém, Ceará and Suape, Pernambuco. The project was contracted in February 2009 in the amount of R$901 million ($449 million), and total investment was R$5.4 billion ($2.7 billion).
	High-speed train line to connect Campinas, São Paulo, to Rio de Janeiro, a distance of approximately 500 km.
Ports	$14 billion in loans to the ports sector for 2010–13, nearly triple that invested in 2005–08. Main investment factors include regulatory reforms undertaken in 2008 to allow private administration of ports and allow container companies to lease port terminals.

Source: BNDES, *Annual Report 2009*, 53 (accessed July 20, 2011); Borca and Guaresma, "Investment Perspectives in the Infrastructure Sector in 2010–13," February 22, 2010, 5–6.

Other Government Policies Affecting Brazil's Agricultural Production and Trade

Overview

Brazilian government policies have been instrumental in shaping the evolution of Brazil's agricultural sector, as well as its current size and structure. Brazil's agricultural policies comprise a wide array of instruments that provide support in areas such as farm prices, research and development, market and income assistance, rural credit and agricultural financing, rural insurance, and export financing, as well as special programs that target small family farms. By and large, these policies have served to support the international competitiveness of Brazil's agricultural goods. In contrast, tax and environmental policies, as well as restrictions on foreign ownership of land, impose costs on agricultural producers and erode their competitiveness in export markets.

Driven by considerations such as food security, inflation, and social inclusion, the goals and scope of Brazilian government policies have changed over time and been shaped by a general shift away from government intervention to a more market-driven approach that emphasizes global competition and private sector involvement (table 3.6).[123] From the mid-1960s up until the 2000s, agricultural policies were focused on market intervention measures such as government purchases, price controls, high import duties, and export controls. But they are now more likely to be leveraged with private sector participation in measures such as preferential credit and project financing, as well as agricultural research

[123] Chaddad and Jank, "The Evolution of Agricultural Policies," 2006, 86–88; Chadha and Davenport, "Agricultural Policy Reform in the BRIC Countries," February 2011, 7.

TABLE 3.6 Brazilian agricultural policy development, 1965–2005

	Period and developments			
Item	1965–1985	1985–1995	1995–2005	2005 onward
Macroeconomic environment	• High inflation • Exchange rate controls • Fast growth • Increased government expenditures	• Stagflation • Debt crisis • Decreased government expenditures	• Controlled inflation • Exchange rate volatility • Modest growth rate • Privatization	• Lower inflation • Structural reforms • Stabilize exchange rate • Lower interest rates • Sustained growth • Infrastructure
Policy goals	• Food security	• Deregulation • Liberalization	• Land reform • Family farms • Social inclusion	• Competitiveness • Sustainability • Globalization
Price support	• Increase in food purchases and storage, price controls and support	• Decline in intervention • Market deregulation	• Targeted intervention	• Moderate, selective intervention
Rural credit	• Financed by Treasury • Negative real interest rates	• Decline in governmental rural credit supply and subsidies	• Family farms (PRONAF) • Specific investment credit (BNDES) • Debt restructuring	• Crop insurance • Private credit instruments • Special credit lines for family farms • Credit for development of cooperatives
Trade policy	• Import substitution • Export taxes	• Unilateral trade liberalization • Regional integration (Mercosul) • Elimination of export taxes	• Prosecution of agricultural trade barriers in WTO • Regional free trade agreement negotiations (FTAA, EU–Mercosul)	• Aggressive trade policy (negotiation, litigation) • Address NTMs (technical, sanitary, social) • Pursue FTAs
Research and extension	• Increased investment; Embrapa created • Extension network developed	• Public investment leveling	• Public investment declines	• Boost funding • Increase PPPs • Intellectual property protection
Family farms	• Minimal support	• Support begins (Extraordinary Ministry of Land Reform)	• Ministry of Agrarian Development created • Land reform, PRONAF programs developed	• Policy evaluation and monitoring • Redirect resources • Develop and modernize cooperatives

Source: Adapted from Chaddad and Jank, “The Evolution of Agricultural Policies,” 2006, 86, table 1.

Note: Mercosul refers to the Mercado Comum do Sul [Common Market of the South]. Full members are Argentina, Brazil, Paraguay, and Uruguay. FTAA refers to the proposed Free Trade Agreement of the Americas.

and development.[124] Government emphasis is now focused on the expansion and modernization of the Brazilian agricultural sector.[125] In addition, newer policies address growing concerns about family farmers and environmental issues, both domestically and in export markets.[126] Specifically, some programs address the growing domestic and international concerns regarding deforestation and the environmental impact of Brazilian agricultural growth.

Despite the broad scope of Brazilian government agricultural support programs, the level of support is relatively low compared with other major global agricultural exporters and markets, such as China, the European Union (EU-27), and the United States. In Brazil, the impact of government agricultural support as a factor of competition in global export markets has been overshadowed by other factors, such as natural endowments and climate. In addition, constraints such as infrastructure and capital are raising costs and are areas of concern for the development of future Brazilian agricultural policy. A summary of the impact of selected Brazilian government agricultural policies on export competitiveness is presented in table 3.7.

Brazil's Support for Agriculture Relative to Other Countries

Each year, the Organisation for Economic Co-operation and Development (OECD) calculates the amount of support given by governments to agricultural producers and consumers in their respective countries. The measure of the support given to individual producers is referred to as the producer support estimate (PSE), and the measure of domestic support given to producers collectively is referred to as the general services support estimate (GSSE).[127] Each of these types of support affects a producer's competitive position in export markets, typically by reducing their cost of production and delivery either directly or indirectly.

The OECD PSE chiefly measures support based on input use (mainly preferential interest rates on working-capital loans) and commodity outputs (in Brazil, mainly preferential interest rates on marketing loans and market price supports). The PSE does not estimate impact on farm production or competitiveness in itself. However, because farmer revenues are increased or farm expenditures reduced by the amount of support measured in the PSE, it does represent policies that directly improve a producer's position in export markets.[128] The OECD measures Brazil's PSE as relatively low compared with other major agricultural producers and exporters, both in absolute terms and as a share of agricultural output (table 3.8). In 2010, OECD measured Brazil's PSE as totaling $7.1 billion (table 3.8). Brazil's PSE represented about 4.5 percent of the value of agricultural production, compared with 7.0 percent in the United States, 17.4 percent in China, 19.8 percent in the EU-27, and 21.4 percent in Russia. Brazil's PSE increased by 68 percent during 2006–09 before falling 18 percent in 2010 (table 3.8).

[124] Chaddad and Jank, "The Evolution of Agricultural Policies," 2006, 86.

[125] Matthey, Fabiosa, and Fuller, "Brazil: The Future of Modern Agriculture?" May 2004, 8–14.

[126] Chadha and Davenport, "Agricultural Policy Reform in the BRIC Countries," February 2011, 7, 10.

[127] For a fuller explanation of PSE, GSSE, and other support estimates, see OECD, "Introduction to the OECD Producer Support Estimate," n.d.

[128] OECD, "Introduction to the OECD Producer Support Estimate," n.d., 2, (accessed February 13, 2012).

TABLE 3.7 Effects of selected Brazilian government agricultural policies on export competitiveness

Policy	Policy description	Policy objective	Impact on export competitiveness
Rural credit and agricultural financing	A wide variety of programs provide credit to farmers, cooperatives, and agribusinesses for working capital, marketing, and investment at below-market interest rates.	The policies aim to improve productivity, increase output, and lower costs of investment, production and marketing.	Brazilian exports of eligible products are more cost competitive in third-country markets. Examples include soybean exports to China and broiler exports to the Middle East.
Market and income support	A range of programs, including minimum price guarantees, federal government purchases, federal government loans, and special financial instruments, stabilize fluctuations in market prices and provide income support.	The policies are intended to smooth the effects of price fluctuations on farm income and to alleviate regional food supply and demand imbalances.	The impact on export competitiveness is minor compared with other policies, as they are directed mainly at domestic food supply issues. Also, the impact on exports has been tempered by recent high global commodity prices.
Tax	Brazil's tax system is complex and multilayered. Taxes are applied at the federal, state, and municipal levels and include foreign trade taxes, taxes on assets and income, taxes on production and circulation, and social contribution taxes.	Revenue generation.	The Brazilian tax structure results in relatively high administrative costs and corporate tax rates compared with the United States, thus placing Brazilian exports at a competitive disadvantage.
Rural insurance	The rural insurance program subsidizes premiums farmers pay for agricultural risk insurance.	The policy's objective is to stabilize farm incomes, protect against unforeseen losses, and help farmers retain their production capacity.	Brazilian export competitiveness is enhanced by stability of production capacity. However, the impact is minor owing to the limited scope of the program.
Research and development	Agricultural research and development is conducted by a range of federal, state, and academic agencies throughout Brazil.	The policies assist in the development and utilization of new agricultural technologies in order to improve productivity, lower costs, and expand production areas and levels.	The impact on the competitiveness of Brazilian agricultural exports likely has been substantial over the long run, owing to improvements in genetics and production processes which have improved productivity, lowered costs, and expanded the supply of export commodities, such as soybeans and meat.
Environmental	A variety of policies restrict and use and define methods of sustainable agricultural production.	These policies aim to preserve water and forest resources and protect biodiversity.	Environmental policies generally increase production costs and have a negative effect on export competitiveness.
Export	A number of policies have specific provisions for or may apply to exports as well as domestic production. These include export financing, tax rebates, and minimum price guarantees.	Policies applied to agricultural exports generally are designed to facilitate the export process and lower costs.	These policies lower the cost of Brazilian exports and enhance competitiveness in world markets.
Foreign land ownership	Legislation and decrees restrict the amount of land that can be owned by foreign entities.	The restrictions were imposed in response to concerns about national sovereignty and food security.	This policy restricts foreign investment in agricultural land that could lower production costs, thus negatively impacting the competitiveness of Brazilian exports.

Source: Compiled by USITC staff based on data and information from BNDES, MAPA, MDA, Secretariat of Federal Revenue, and interviews.

TABLE 3.8 OECD agricultural support estimates, by type and by selected countries, 2006–10

Country	2006	2007	2008	2009	2010
	PSE (million $)				
China	54,717	57,957	24,282	103,742	147,028
EU	124,401	124,354	132,115	119,405	101,365
United States	30,496	33,174	30,477	31,423	25,551
Russia	9,028	12,759	20,813	16,225	15,521
Brazil	5,173	5,365	5,787	8,688	7,118
Australia	1,278	1,860	1,623	991	952
	PSE as a share of agricultural production (percent)				
Russia	17.2	18.2	21.9	22.1	21.4
EU	29.1	23.4	22.0	23.5	19.8
China	12.3	10.1	3.3	13.2	17.4
United States	11.2	10.0	8.8	10.1	7.0
Brazil	6.1	4.9	4.1	6.5	4.5
Australia	4.5	5.1	4.4	3.0	2.2
	GSSE (million $)				
United States	38,399	37,809	45,088	56,651	69,849
China	16,287	18,505	23,529	28,412	30,195
EU	15,081	15,375	18,532	13,678	13,319
Russia	2,359	2,867	4,676	5,044	2,773
Brazil	1,750	1,546	1,917	1,903	2,400
Australia	870	1,012	767	688	796

Source: OECD, Producer and Consumer Support Estimates database (accessed February 13, 2012).

The GSSE measures the value of services provided collectively to agricultural producers, including research and development, inspection services, market promotion, and general infrastructure development. As measured by the OECD, Brazil's GSSE totaled $2.4 billion in 2010, again substantially less than most other major agricultural producers (table 3.8). This level fluctuated during 2006–10 from a low of $1.5 billion in 2007 to a peak of $2.4 billion in 2010.

Selected Brazilian Government Programs Supporting Agriculture

The principal Brazilian government agricultural support mechanisms include price support programs, rural credit programs, BNDES credit programs, tax policies, research and development activities, environmental programs, and insurance programs. Most of these mechanisms positively affect the competitiveness of Brazilian agricultural exports, but to varying degrees. Some of them, such as taxes and environmental policies, are so complex and burdensome that they damage competitiveness. Brazil's agricultural agencies, policy objectives, and budgets are summarized in box 3.3.

Price Support Programs

The Brazilian government maintains various price support programs. Although the focus of these programs is on managing domestic food supply, they can enhance the export competitiveness of Brazilian producers by assuring minimum prices and covering transportation costs to ports. However, the impact of the various price support programs on the competitiveness of Brazilian exports is limited, given the policy's domestic emphasis. Also, the effect on exports has been tempered in recent years by relatively high global commodity prices. Participation generally has been sporadic and has represented a small share of output for most commodities during 2006–10 (table 3.9).

BOX 3.3 Agricultural Agencies, Policy Objectives, and Budgets

Brazilian agricultural policy is administered mainly by the Ministry of Agriculture, Livestock, and Food Supply (MAPA) and the Ministry of Agrarian Development (MDA). In addition, the Brazilian Development Bank (BNDES) and the Central Bank of Brazil (BCB) administer rural credit programs funded through MAPA and MDA, as well as their own programs that affect agricultural operations.

MAPA is the primary government agency responsible for implementing agricultural policy for most large-scale, commercial agricultural operations.[a] MAPA's first strategic plan for assessing and implementing agricultural policy, created in 2006, considered the long-term outlook for Brazilian agriculture during 2006–15.[b] The plan established provisions for regular assessments, including multiyear plans (PPAs) and annual agriculture and livestock plans (PAPs) informed by 10-year agricultural projections that are updated annually.[c] The PPA indicates medium-term policy objectives for MAPA's agricultural programs.[d] To date, there have been two PPAs, one for the period 2008–11 and another for 2012–15. The main objectives set forth in the PPA for 2008–11 included sustainable development through agribusiness, increasing nonfood and nonenergy agricultural production, supporting food security, and increasing biofuel.[e] PAPs specify MAPA's priorities and funding for specific programs and commodities for each crop year. Major priorities during 2005–10 included production growth, rural insurance, and rural credit.[f] More recently, emphasis has been placed on the development of agroenergy, infrastructure, and logistics, as well as on sustainability.

MAPA comprises several agencies that are responsible for administering various agricultural programs. The principal MAPA agencies that administer such programs include MAPA itself, the National Food Supply Company (CONAB), and the Brazilian Agricultural Research Corporation (Embrapa). MAPA primarily administers rural credit and risk insurance programs as well as a coffee program (FUNCAFÉ); CONAB administers price support and government purchase programs; and Embrapa conducts agricultural research.

MDA was created to develop and administer policies that affect small-scale family farms.[g] Responding to concerns about the disproportionate share of support given to large-scale agribusiness, MDA has developed programs since 2003 to specifically support small farms, provide them with resources and services, and address rural development and environmental concerns.[h] MDA's main activities include land reform and the promotion of sustainable development for small-scale family farmers.[i] MDA comprises several agencies, including the Department of Family Farming (SFA) and the National Institute for Colonization and Land Reform (INCRA). The SFA administers programs that provide rural credit (PRONAF), infrastructure and municipal services, technical assistance, extension services, agricultural research, training, and market integration.[j] INCRA's main responsibilities include land reform and the management of public lands.[k] MDA, like MAPA, develops PPAs and annual crop plans for family agriculture (PSAFs) that set forth policy objectives and priorities.[l] Recent MDA priorities include rural extension and technical assistance services, biofuels, agricultural zoning, rural microcredit and long-term credit, mechanization, debt restructuring, and sustainability.[m]

In Brazil, the budgets for the primary agricultural agencies are established by the annual budget law *(lei orçamentária).* The budgets for the primary agricultural agencies increased at a substantially higher rate than the total budget during the period. MAPA's budget rose by 56.3 percent, to R$9.0 billion ($5.1 billion), while MDA's budget increased by 49.0 percent, to R$4.5 billion ($2.5 billion), during 2006–10. MAPA and MDA accounted for 0.8 percent of Brazil's total budget in 2010, up from 0.5 percent in 2006. This growth reflects a renewed focus on agriculture by the Brazilian government.

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[a] MDA is responsible for smaller-scale and family farms.
[b] MAPA, SAP, "Strategic Plan," 2010, 5.
[c] Ibid., 17.
[d] Ibid., 45.
[e] Ibid., 45–46.
[f] MAPA, SMO, "Strategic Plan," 2010, 30–31.
[g] Chaddad and Jank, "The Evolution of Agricultural Policies and Agribusiness Development in Brazil," 2006, 88.
[h] MDA, INCRA, *A New Rural Brazil*, June 2010, 9–10.
[i] Presidência da República, Casa Civil, Subchefia para Assuntos Jurídicos, *Decreto No. 7.255, de 4 de Agosto de 2010*, August 4, 2010.
[j] MDA, SAF, "Missão" [Mission], accessed February 13, 2012, n.d.
[k] MDA, INCRA, "Missão e Visão" [Mission and vision], February 13, 2012, n.d.
[l] MDA, "Relatório de Avaliação do Plano Plurianual 2008–11" [Multiyear plan assessment report], 2009, 21, 30, 35, 40, 48, 55, 63, 69, 74, 78.
[m] MAPA, "Agricultural and Livestock Plan 2009/2010," 2009.

TABLE 3.9 CONAB price support programs for corn, rice, and wheat, 2006–10

Commodity and program	2006	2007	2008	2009	2010
			1,000 mt		
Corn					
Acquisition (AGF)	2,224	273	150	588	103
PEP	3,088	1,183	599	4,875	11,229
PROP	2,258	0	531	0	0
PEPRO	100	3,753	0	1,296	875
Total, corn	7,670	5,210	1,280	6,759	12,207
Production	42,515	51,370	58,864	51,004	56,100
Participation	18%	10%	2%	13%	22%
Rice					
Acquisition (AGF)	([a])	62	0	0.3	0
PEP	([a])	158	0	0	143
PROP	([a])	0	0	0	0
Total, rice	([a])	220	0	0.3	143
Production	([a])	11,316	12,060	12,603	12,060
Participation	([a])	2%	0%	0%	1%
Wheat					
Acquisition (AGF)	([a])	0	236	21	49
PEP	([a])	0	426	1,395	567
PROP	([a])	0	0	0	0
Total, wheat	([a])	0	662	1,417	616
Production	([a])	0	2,234	4,082	5,026
Participation	([a])	0	30%	35%	12%

Source: USDA, FAS, *Brazil: Grain and Feed Annual Report,* March 16, 2011, 21–22.

Note: Totals may not add due to rounding.

[a]Not applicable.

The various price support programs are administered mainly by the National Food Supply Company (CONAB). CONAB manages and executes all activities involving government stocks and policies related to programs that manage food supply and distribution.[129] All the government programs that CONAB operates are based on a guaranteed minimum price policy (PGPM). Minimum price levels are determined for each program crop centrally by CONAB on an annual basis, but with approval of the Ministries of Agriculture and Treasury.[130] The price levels are set for different states. For export products, CONAB will often use world prices as a reference point to set the minimum price. For products primarily destined for the domestic market, the minimum price typically is calculated to cover variable costs of production. Minimum prices can be used as a tool to support production of particular products in particular regions as well. However, according to Brazilian government officials, they are not intended to be used to increase agricultural production overall, but rather to correct regional supply and demand imbalances by incentivizing production in areas with supply shortages as well as shifting the location of stocks from surplus to deficit areas.[131]

[129] Government official, interview by USITC staff, Brasília, Brazil, August 24, 2011.

[130] CONAB has published minimum prices for cotton, peanuts, rice, rubber, brazil nuts, beans, jute, cassava, corn, soybeans, sorghum, garlic, coffee, canola, carnauba, cashews, silk, oats, barley, wheat, triticale, sunflower, guaraná, milk, castor beans, and sisal. Government officials, interview by USITC staff, Brasilia, Brazil, August 24, 2011.

[131] Government officials, interview by USITC staff, Brasilia, Brazil, August 24, 2011.

CONAB can purchase program commodities at the minimum price through a direct purchase or an options contract. The agency can only make purchases directly from producers or cooperatives.[132] This is the method that is used to build public stocks. The government does have the ability to sell these stocks, either at market rates or at subsidized below-market rates, which can indirectly affect both the supply available for export and export prices.[133]

The PGPM includes two mechanisms to administer minimum prices. These mechanisms involve either direct government purchases at minimum prices under the Federal Government Acquisition Program (AGF), or loans under the Federal Government Loan Program (EGF).[134] The focus of the AGF has shifted from food security to income support for family farmers. The EGF provides short-term preferential credit to farmers and cooperatives, enabling them to withhold sales in anticipation of higher prices in the future. The participation rate varies significantly by category and year (table 3.9).

Specific sales contract programs include the Premium for the Flow of Products Program (PEP), the Outflow of Product Value Program (VEP), the Producer Price Equalization Program (PEPRO), and the Private Sale Option Contract (PROP). Of the various price support programs, the PEP program is the most commonly used and has had the strongest effect on domestic marketing and export prices. The PEP program provides an equalization payment, determined by auction, to wholesalers that pay a minimum price to producers.[135] The payment is meant to minimize the difference between the minimum price paid and the market price. Under the program, an agent pays a producer the minimum price and then ships the product to a buyer in a different region, paying for the transport costs. Products that are exported are eligible as well. The government then reimburses the buyer for the difference by auctioning premiums that are in place to compensate for the transportation costs. As a result, the program facilitates and incentivizes the efficient movement of product.[136] Invoices are required to show proof of sale, and because bids in auction cannot be guaranteed, agreements between the agent and buyer are often conditional upon winning the auction. This program has been used extensively for the large volumes of corn being grown in Mato Grosso as a second crop after soybeans. Because of the extremely high transportation costs from the Center-West to the port of Santos outside of São Paulo—about R$180 ($107) per mt—farmers report that without the PEP program, they would not likely export corn.[137] The VEP program is similar to the PEP; the only difference is that it applies to government-owned stocks.[138]

The PEPRO program provides an equalization payment directly to the farmer, like a deficiency payment,[139] which represents the difference between the market price and the minimum guaranteed price.[140] The PEPRO program is similar to PEP, although it uses

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[132] MAPA, SAP, *Brazil Agricultural Policies*, 2008, 14; government official, interview by USITC staff, Brasilia, Brazil, August 24, 2011.

[133] Government officials, interview by USITC staff, Brasilia, August 24, 2011.

[134] WTO, *Trade Policy Review: Brazil*, February 2, 2009, 105.

[135] MAPA, CONAB, Regulamento para Oferta de Prêmio para Escoamento de Produto–PEP N. º 001/02.

[136] Government officials, interviews by USITC staff, Brasília, Brazil, August 24, 2011.

[137] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

[138] WTO, *Trade Policy Review: Brazil*, February 2, 2009, 105.

[139] OECD, Agricultural Policy Monitoring and Evaluation 2011, 2011, 217.

[140] MAPA, CONAB, "Regulamento Para Operacionalização Da Oferta de Prêmio Equalizador Pago Ao Produtor Rural E/OU Sua Cooperativa–Pepro N. º 001/06," n.d.

different agents.[141] Producers sell qualifying product into the market, and buyers bid for it in an exchange that CONAB facilitates. The government then provides the difference between the minimum price and the winning auction bids to the producer. This program is not as commonly used for corn as PEP, but has had substantial amounts of product move through it in some years.[142]

The PROP program provides a hedge to farmers, who sell to buyers under an option contract for future delivery.[143] The PROP program entails two auctions: the first to determine the premium paid, and the second to determine the actual exchange once the premium has been set.[144] This program has not been widely used for grains in recent years.[145]

Although minimum price guarantee programs account for more than half of all government transfers to farmers, the effect, according to the OECD, is small. The OECD estimates that the minimum price guarantees increased the average price received by Brazilian farmers, including payments, during 2008–10 by slightly more than 1 percent above the prevailing border price.[146]

Government Credit Programs

Credit programs historically have been an important component of Brazilian government agricultural support. In making capital available at below-market rates, rural and other credit programs have benefited the agricultural sector by helping to boost agricultural productivity and production.[147] This, in turn, enhances export competitiveness. The Brazilian government has reformed rural credit programs in recent years in order to increase the participation of private resources. Agricultural financing is provided mainly through private channels—only about 40 percent of the sector's working capital and investment capital combined is provided at preferential rates through government rural credit programs.[148] The remainder is provided by input suppliers, purchasers, and commercial banks at market rates. Current domestic financial lending rates are substantially higher than those available in international capital markets, a situation that

[141] Government official, interview by USITC staff, Brasília, Brazil, August 24, 2011.
[142] USDA, FAS, *Brazil: Grain and Feed Annual Report*, March 16, 2011, 21.
[143] OECD, Agricultural Policy Monitoring and Evaluation 2011, 2011, 217.
[144] Government official, interview by USITC staff, Brasília, Brazil, August 24, 2011.
[145] USDA, FAS, *Brazil: Grain and Feed Annual Report*, March 16, 2011, 21–22.
[146] OECD, *Agricultural Policy Monitoring and Evaluation 2011*, 2011, 216. The nominal protection coefficient measures the ratio between the average price received by farmers, including payments, and the border price.
[147] MAPA, SAP, *Brazil Agricultural Policies*, 2008, 6.
[148] Ibid., 6–7.

places Brazilian agricultural producers at a competitive disadvantage in export markets.[149]

The agricultural credit programs administered by MAPA and MDA are channeled through financial institutions that comprise the National Rural Credit System (SCNR). These institutions include the Central Bank of Brazil (BCB), large commercial banks, and various regional and local banks and cooperatives that disburse credit funds.[150] In addition, BNDES provides additional credit under its own programs, as well as giving specific lines of credit to various agricultural sectors.

Rural credit programs

Brazilian rural credit programs provide working capital, investment credit, and marketing credit for commercial agriculture as well as credit for family farming. The total rural credit allocated increased from R$53.4 billion ($24.5 billion) in 2005/06 to R$101.5 ($57.4 billion) in 2009/10. Commercial agriculture received 86 percent (R$92.5 billion, or $52.3 billion) of total rural credit allocated in 2009/10. Working capital and marketing accounted for 72 percent of rural credit provided to commercial agriculture. The bulk of working capital and marketing credit provided to commercial agriculture through government programs is at controlled (below-market) interest rates. In 2009–10, two-thirds of such credit was provided at below-market rates.

Working capital and investment credit is provided for production, processing, storage, and distribution of agricultural products. The preferential interest rates for working capital and marketing are 6.75 percent for most activities, although the interest rate under the PROGER Rural (medium-sized farms) and FUNCAFÉ programs are 6.25 percent and 7.5 percent, respectively.[151] Credit limits vary by product and program, but generally are limited to a maximum of R$650,000 ($388,000) annually for working capital and marketing, and R$1 million ($597,000) annually for investment per beneficiary.[152]

Rural credit for investment is provided to finance rural facility improvements, acquisition and maintenance of vehicles, irrigation and drainage, land clearing, reforestation, rural electricity and telephones, acquisition of breeding and working animals, and small

[149] The SELIC rate represents the BCB's overnight lending rate and is comparable to the U.S. federal funds rate. BCB, "Descrição da Taxa Selic" [Description of the SELIC rate] (accessed November 14, 2011). The Brazilian target SELIC rate was 9.75 percent as of March 13, 2012, compared with a U.S. prime rate of 3.25 percent and an Eurozone prime rate of 1.00 percent. Commercial rates are often higher, but generally are based on these rates. Since January 2010, Brazil has also had the highest real interest rate of the 40 major economies in the world, estimated at 5.1 percent in the fourth quarter of 2011. The next closest country on the list was Hungary at 2.5 percent, and the United States' real interest rate was estimated to be -3.4 percent. *MercoPress*, "Brazil has the highest real interest rate among 40 leading economies," December 1, 2011. The Brazilian SELIC rate is taken from http://www.bcb.gov.br/?english (accessed March 13, 2012); U.S. and Eurozone prime rates, from http://online.wsj.com/mdc/public/page/2_3020-moneyrate.html (accessed March 13, 2012).

[150] In 2011, there were 412 institutions participating in the SCNR. A list of these institutions is available at http://www.bcb.gov.br/htms/creditorural/2011/rel61.pdf.

[151] PROGER Rural refers to Programa de Geração de Emprego e Renda (Program for Income and Employment Generation), which was replaced by PRONAMP, the National Program of Support for Medium-sized Farmers, in 2010–11.

[152] Credit conditions and terms are given in BCB, *Manual de Crédit Rural* (accessed November 10, 2011).

household land allotments.[153] Interest rates vary by program, ranging between 6.75 percent and 9.5 percent per annum. This compares with the Brazilian SELIC interest rate of 9.75 percent per annum in March 2012.[154] Commercial lending rates are higher and generally are based on the SELIC.[155]

A special line of rural credit for family farmers and agrarian reform settlers is offered through the Program for Strengthening of Family Agriculture (PRONAF).[156] Under the PRONAF, family farmers are differentiated into five groups according to criteria that include the ratio of agricultural income to total income, the number of hired laborers, and annual family income. Lines of credit are provided under specific programs that cover a wide range of purposes and activities, such as working capital, investments in farm infrastructure, marketing, handicrafts, rural tourism, organic farming, environmental technologies, renewable energy, storage, and transportation.[157] Interest rates under PRONAF programs are considerably lower than those provided by other rural credit programs and range between 0.5 percent and 4.5 percent per annum.[158]

Rural credit is extended through several instruments.[159] Banks that issue various credit instruments to farmers and agribusinesses may also issue agribusiness credit notes pegged to these instruments and trade them in financial markets. This provides for additional liquidity by tapping larger capital markets.[160]

The Brazilian government has restructured agricultural debt on several occasions.[161] Debt renegotiation allows farmers to avoid default and possible bankruptcy, lower their costs, and continue their access to credit, all of which have a positive effect on export competitiveness. Most recently, the Brazilian government provided for the renegotiation of the terms of investment credit loans in 2010. The typical mechanisms used in rural debt restructuring include the transfer of debt to the treasury as active union debt (whereby the treasury assumes the loan default risk), the renegotiation of repayment terms on outstanding balances backed by government equalization payments, and outright debt forgiveness (mainly directed to small family farms). The 2010 debt restructuring was limited to 8 percent of the total value of the outstanding loans maturing on an annual basis. Producers could renegotiate two rural investment loans with maturity dates starting in 2009, and previously renegotiated loans were eligible for restructuring. The estimated value of agricultural debt eligible for renegotiation totaled R$25–30 billion ($14–17 billion), compared with an estimated R$75–85 billion ($42–48 billion) of total

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[153] MAPA, SAP, *Brazil Agricultural Policies*, 2008, 7.

[154] BCB, "Juros" [Interest rates], n.d. (accessed March 13, 2012).

[155] See BCB, *Relatório de Economia Bancária e Crédito 2010* [Bank savings and credit report], 2010.

[156] MDA, SAF, "Programas: Crédito Rural," n.d. (accessed July 13, 2011).

[157] BCB, "FAQ: Programa Nacional de Fortalecimento da Agricultura Familiar–Pronaf," September 2010.

[158] For further details on the conditions and terms for rural credit under the PRONAF, see BCB, *Manual de Crédito Rural*.

[159] These instruments include the Cédula Rural Pignoratícia (CRP), the Cédula Rural Hipotecária (CRH), the Cédula Rural Pignoratícia e Hipotecária (CRPH), and the Nota de Crédito Rural (NCR). BCB, "FAQ: Crédito Rural," March 2010. Financing for agribusiness may be obtained through the Letra de Crédito do Agronegócio (LCA); the Certificado de Direitos Creditórios do Agronegócio (CDCA); and the Certificado de Recebíveis do Agronegócio (CRA). Herscovici et al., "Securitisation of Agribusiness Financial Instruments in Brazil," 2008, 33. See acronyms list for English translations.

[160] MAPA, *Brazil Agricultural Policies*, 2008, 9–11.

[161] OECD, Agricultural Policy Monitoring and Evaluation 2011: OECD Countries and Emerging Economies, 2011, 218.

outstanding agricultural debt.[162] The OECD estimates that the value of Brazil's agricultural debt rescheduling declined from R$2.4 billion ($1.1 billion) in 2006 to R$1.5 billion ($849 billion) in 2010.[163]

BNDES credit programs

BNDES, the Brazilian Development Bank that finances investments in all of Brazil's economic sectors, provides credit lines to agricultural producers and exporters in addition to the agricultural credit programs it administers on behalf of other agencies. In 2010, 56 percent of BNDES's disbursements were channeled through third-party financial institutions, including the BCB, large commercial banks, smaller local and regional banks, and local credit unions.[164] Commercial banks assess the validity of the investment, the credit of the company, and the project. Although BNDES offers financing to some small firms and microenterprises, its loans generally require high ratios of equity to debt and detailed business plans, requirements which are difficult for smaller operations to meet.[165]

Two general credit lines with programs dedicated to agriculture include BNDES Finame Agricultural and BNDES Automatic. BNDES Finame Agricultural provides annual financing in excess of R$10 million, mainly for the acquisition of machinery and equipment. Financing is provided by BNDES up to 60 percent of the value of the investment at interest rates determined by a formula.[166] The loans have a maximum maturity of 90 months from the time of the application to BNDES. Under the program, suppliers of machinery and equipment must agree to pay BNDES 4 percent of the value of the transaction. The machinery and equipment must be on an approved list.[167] BNDES Automatic provides financing to agricultural producers in amounts up to R$20 million ($12 million) for micro, small, and medium-sized enterprises and up to R$10 million ($6 million) for large enterprises. These limits are on an annual basis. The credit terms are similar to those for BNDES Finame Agricultural.

BNDES also provides programs targeted to specific agricultural activities. For example, BNDES has programs targeted to modernize grain processing and storage, finance land acquisition and practices related to legal forest reserve requirements, help farmers recover

[162] USDA, FAS, *Brazil Agricultural Situation: Brazil Offers Agricultural Debt Renegotiation*, August 5, 2010, 1.

[163] OECD, Producer and Consumer Support Estimates database.

[164] Government official, interview by USITC staff, Rio de Janeiro, Brazil, September 2, 2011.

[165] Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 26–30, 2011.

[166] BNDES, "Capacidade Produtiva: Demais Indústrias e Agropecuária" [Productive capacity: other industries and farming], n.d. (accessed November 14, 2011); Banco da Amazônia, "FINAME–Agricultural," 2011. The basic interest rate is determined by a combination of market rates and exchange rate adjustments. The maximum BNDES participation can be increased to 90 percent under certain circumstances. Besides the basic interest rate, BNDES receives an additional 0.5 percent per annum for a financial intermediation fee for loans to large enterprises, plus a spread fee of 1.3 percent per annum and a credit risk rate of up to 3.57 percent per annum. There is an additional fee negotiated by other banks if they administer the loan. Large enterprises are those with annual gross operating revenues above R$60 million ($56 million).

[167] BNDES, "Credenciamento de Equipamentos" [Equipment financing]. The agricultural sector accounted for 6 percent of total direct BNDES disbursements in 2010. BNDES, "Financial and Institutional Aspects," March 2011, 38. Data do not include secondary market investments. This share grew from 11 percent in 2001 to 17 percent in 2004 before declining to the level in 2010.

from natural disasters, and finance export preshipments and inventories for fruit and ethanol producers, among others, in response to the international financial crisis.[168]

BNDES has identified priority agricultural sectors and directed support to companies within these sectors. In 2006, BNDES disbursed most of its R$2.1 billion ($963 million) of agricultural funds to the ethanol (R$1.0 billion, or $459 million) and meat (R$879 million, or $403 million) sectors.[169] In 2007 BNDES directed resources to the expansion and modernization of the milk and meat (beef, pork, and poultry) sectors.[170] Specific BNDES activities that year included providing capital to JBS S.A., a major meat producer, in order to acquire Swift and Company, a U.S. meat producer.[171] BNDES also provided funding to Geneal for bovine genetics research and to Sadia S.A., a major frozen food and meat processor, for the implementation of an agribusiness complex.[172] In 2008, BNDES focused resources on the sugar cane, ethanol, meat, and soybean sectors.[173] And in 2009, BNDES continued devoting resources to expand capacity and modernize the production of dairy, meat, grain, and ethanol.[174]

In addition to providing agricultural credit, BNDES has taken equity positions in agricultural entities through BNDES Participações S/A (BNDESPAR), its financing subsidiary. BNDES investments in the food and beverage sector accounted for 9 percent of its total equity investment portfolio as of December 31, 2010.[175] For more information related to BNDES's equity investments in agribusiness, see chapter 5.

BNDES provides export financing through its subsidiary EXIM Brasil. EXIM Brasil offers export financing through two instruments, BNDES Exim Preshipment and BNDES Exim Postshipment. These programs provide export credits for approved products; most agricultural products are approved.[176] Interest rates vary by company size and are determined by formula, with remuneration rates charged by BNDES and accredited financial intermediaries. BNDES Exim Preshipment available to agricultural products

[168] For more information related to these programs see BNDES, "Programa de Incentivo à Armazenagem para Empresas Cerealistas Nacionais—BNDES Cerealistas"; BNDES, "Programa BNDES de Apoio à Compensação Florestal—BNDES Compensação Florestal"; BNDES, "Programa BNDES Emergencial de Reconstrução dos Estados de Alagoas e Pernambuco—BNDES PER Alagoas e Pernambuco"; BNDES, "Programa BNDES de Revitalização de Empresas—BNDES Revitaliza"; BNDES, "Programa de Apoio ao Setor Sucroalcooleiro—PASS" (all accessed November 14, 2011).

[169] BNDES, *Annual Report 2006*, n.d., 53.

[170] BNDES, *Annual Report 2007*, n.d., 74.

[171] Ibid., 84.

[172] BNDES, *Annual Report 2007*, n.d., 84. Sadia S.A. was acquired by Perdigão, now called Brasil Foods, in 2009.

[173] BNDES, *Annual Report 2008*, n.d., 120.

[174] BNDES, *Annual Report 2009*, n.d., 148.

[175] BNDES, "Financial and Institutional Aspects," March, 2011, 34.

[176] BNDES, "List of Financeable Products." Excluded products are primarily listed in Mercosul Classification Nomenclature chapters 01 (Live animals), 10 (Cereals), 11 (Milled products), 12 (Oilseeds), and 14 (Vegetable products not elsewhere specified). A few additional products are listed in other chapters.

comprises four variants—preshipment, “agile” (short-term) preshipment, special preshipment, and preshipment anchor.[177]

Tax Policy

Brazil’s complex tax system imposes significant administrative burdens and economic costs on agricultural producers and exporters.[178] Brazil’s corporate taxes, including taxes on income, assets, production, and wages as well state and local taxes, are also higher than those of some major agricultural export competitors, including the United States. [179] In surveys of Brazilian entrepreneurs on Brazil’s investment climate, the high tax burden is generally the top obstacle cited.[180] Brazilian agribusinesses are not immune to this phenomenon and note that they could gain a significant cost advantage, as much as 10–15 percent, if the tax system were simplified.[181] These taxes also influence production locations within Brazil and distort the allocation of resources, further limiting the competitiveness of Brazilian agricultural products in export markets.

Brazil maintains a three-tiered tax system, with taxes imposed at the federal, state, and municipal levels (table 3.10). [182] In certain instances, the Brazilian government has provided tax exemptions to industries or certain types of producers to boost their competitiveness. Cooperatives are exempt from some elements of COFINS and PIS taxes, as is animal feed, beef, pork, and poultry production.[183] Revenues from exports generally are exempt from taxes, with the exception of the federal income tax.[184] In addition, credits are given on taxes on inputs used to manufacture exported products. These credits may be used to offset other federal tax liabilities. In a general sense, tax exemptions for exported products discourage domestic sales in favor of exports, when prices in Brazil and overseas markets are similar.

[177] WTO, *Trade Policy Review: Brazil*, February 2, 2009, 66. Preshipment provides financing for exporters up to 100 percent of the f.o.b. value for a term between 18–24 months. Short-term preshipment provides financing up to 30 percent of the f.o.b. value for a term of 6–12 months. Special preshipment provides additional financing in the event export values increase, and preshipment anchor is directed to indirect exports by micro, small, and medium-sized companies. BNDES Exim Postshipment provides refinancing up to 100 percent of the export value to foreign buyers of Brazilian exports by discounting credit instruments (promissory notes or bills of exchange) or assigning letters of credit. Refinancing terms are for up to 12 years. BNDES, “Post-shipment” (accessed November 14, 2011).

[178] In 2011, the World Bank ranked Brazil 150th out of 183 countries analyzed for the ease and affordability of its tax system. The United States ranked 72nd. The World Bank calculated Brazil’s corporate tax rate in 2011 at 67.1 percent, compared with 46.7 percent for the United States. The assumptions and methodology used limit the possibility of comparisons among countries and within sectors, such as agriculture. World Bank, “Paying Taxes,” 2011; industry representatives, interviews by USITC staff, Mato Grosso, Paraná, and São Paulo, Brazil, August 22–September 2, 2011.

[179] Including income tax, labor tax, and fees.

[180] Blyde et al., Competitiveness and Growth in Brazil, March 2010, 48.

[181] Industry representative, interview by USITC staff, São Paulo, Brazil, August 25, 2011.

[182] For more information on the complex Brazilian tax system and other taxes not described here, see Brazil Secretariat of the Federal Revenue, “Taxes” (accessed September 13, 2011).

[183] *Brazilian Meat Monitor*, June 23, 2011, 1–2; *Brazilian Meat Monitor*, “Tax Exemption Reaches Producers,” May 25, 2011.

[184] UHY, Doing Business in Brazil 2010, 2010, 27.

TABLE 3.10 Selected Brazilian taxes

Type	Jurisdiction	Rate	Basis
Assets and income			
Income tax (IRPJ)	Federal	15%; 10% surcharge on income in excess of R$240,000 per year or R$20,000 per month	Net profits
Rural land tax (ITR)	Federal	0.3%–20%	Property value
Transmission tax *Inter Vivos* (ITBI)	Municipal	2%	Property value
Production and circulation			
Industrialized Products Tax (IPI)	Federal	0%–365.63%	Aggregate value of goods
Tax on credit operations, exchange, and insurance (IOF)	Federal	6%	Transaction value
Tax on the circulation of merchandise and interstate and intermunicipal transportation services and communications (ICMS)	State	7%–25%, depending on location and product	Aggregate value of goods and services sold
Tax on services of any nature (ISS)	Municipal	0.5%–10%	Value of service
Social contributions			
Contribution to social security financing (COFINS)	Federal	3% or 7.6%	Gross revenues
Contribution to the social integration program and civil service asset formation program (PIS/PASEP)	Federal	0.65% or 1.65% (PIS); 1% (PASEP)	Gross revenues
Social contribution on net corporate profits (CSLL)	Federal	8%	Net profits
Social security (INSS)	Federal	26.8%–28.8%	Payroll
Severance indemnity fund (FGTS)	Federal	8%	Payroll

Source: RF, “Taxes;” UHY, *Doing Business in Brazil 2010*, 2010: Deloitte, “Overview of the Brazilian Tax System,” 2010.

Note: The COFINS and PIS tax rates vary depending on whether or not a firm elects to use a “non-cumulative” system for calculating tax liabilities that allows the use of credit mechanisms.

The ICMS has a significant impact on agricultural supply chains in Brazil, increasing the prices of both products sold domestically and products that are exported. The ICMS is a state value-added tax charged at all stages of the supply chain, from the manufacturer to the end consumer. The tax is assessed on intrastate transactions as well as on all products transported for sale across state lines.[185] The tax rate varies from state to state and ranges from 7 percent to 25 percent;[186] some states impose different rates for different types of goods. Even though exports have been exempted from the ICMS since 1996, the tax still impacts the export supply chain because the tax is collected as a product moves across state lines. Moreover, since the firm receives only a tax credit if the product is exported and not cash directly, the ICMS increases costs for exporters.[187]

The ICMS tax influences a firm’s decisions about the location of their production facilities as well as the type of products they export.[188] While companies receive tax credits for the taxes paid when a product is exported, many firms are unable to use all of their credits to offset other taxes. Consequently, a secondary market has developed for

[185] Deloitte, “Brazil Highlights,” 2011.
[186] Ibid.
[187] Goldsmith and Hirsch, “The Brazilian Soybean Complex,” 2006, 100.
[188] Industry representative, interviews by USITC staff, São Paulo, Brazil, August 21–22, 2011.

them. But because the market for these credits is limited, companies may hold their credits for a long time—often 3–4 years. As a result, in order to avoid paying the ICMS up front, some processors move their facilities to the same state where they source their inputs. For example, Brazilian industry representatives attributed the shift of the center of the soybean processing industry from São Paulo to Mato Grosso, as well as a bias toward exporting whole soybeans, in large part to efforts to avoid the 12 percent ICMS on interstate shipping of soybeans.[189] For more information on the impact of the ICMS on the soybean supply chain, see chapter 6.

In addition to the ICMS, high tax rates are often a prevailing factor in deciding where Brazilian agribusinesses locate their operations. In 2011, JBS, a Brazilian meat processor and the largest global meat producer, closed a slaughter plant in São Paulo and a tannery in Mato Grosso do Sul and moved the operations to Ceará, Minas Gerais, and Goiás, where tax rates were more favorable.[190] The firm projected that this move, as well as additional restructuring of other units, would enable it to raise output from its domestic operations by 5 percent through efficiency gains and enable the company to save approximately R$200 million ($119 million) annually by reducing its tax bill and overheads.[191]

Research and Development

A key element of Brazilian government assistance to the agricultural sector is research and development. Agricultural research and development is carried out mainly by the federal and state governments, as well as by academic institutions, and has been vital in modernizing and expanding Brazil's agricultural sector. For example, technology developed by research and development in critical areas—e.g., breeding and genetics, crop and soil management—has enabled the Brazilian soybean sector to adapt to conditions and expand in various nontraditional agroecological zones, such as the *cerrado*.[192] In addition, it has enabled a wide range of other crops to be adapted to and grown in tropical conditions. Current research in areas such as integrated cropping, biotechnology, and geospatial mapping continues to benefit the Brazilian agricultural sector. These developments have increased productivity, expanded production area and output, and lowered costs, and thus have enhanced the competitiveness of Brazilian agricultural exports.[193]

The Brazilian Agricultural Research Corporation (Embrapa) is a leading component of Brazil's agricultural research and development effort. Created as a public corporation, Embrapa was designed to focus on research and development in areas of national priority.[194] In support of these goals, Embrapa established a national research network

[189] Industry representatives, interview by USITC staff, São Paulo, Brazil, August 22, 2011.
[190] *Brazilian Meat Monitor*, "JBS: Slaughterhouse Lays Off 1,300 to Save Tax," September 30, 2011.
[191] Reuters, "JBS to Shift Ops around Brazil," August 30, 2011.
[192] Lopes and Arcuri, "The Brazilian Agricultural Research and Development (ARD) System," February 8–10, 2010, 2–4.
[193] See the discussion on research and development in chapter 4 for more details on competitiveness.
[194] Beintema, Avila, and Pardey, *Agricultural R&D in Brazil*, August 2001, 9–10.

with diverse, decentralized, and specialized activities.[195] In addition, Embrapa has established a competitive internal project assessment system made up of committees that use four-year projected funding levels and possible financial and industry productivity returns to assess research proposals.[196] Embrapa has also increasingly sought private partnerships. Embrapa's budget has been increasing in recent years and reached approximately R$1.9 billion in 2010.[197]

In its 2008 long-term plan, Embrapa identified several priorities, including sustainability, agroenergy and biofuels, value-added products, and emerging technologies.[198] It also set out long-term strategic guidelines that point to the development of partnerships, including private and international ones, to expand and diversify sources of funding, and to speed innovation and technology transfers. Specific areas of focus for future research include food security; bioenergy; sustainable use of degraded areas and the rain forest; integrated crop, livestock, and forest production; nanotechnology; biotechnology and biosecurity; and satellite monitoring.[199]

Embrapa conducts an annual social and economic impact assessment of its activities, which it publishes in its annual Balanço Social (social balance) report. In 2010, Embrapa reported that each real spent on agricultural research and development returned R$9.35 to Brazilian society, with a total social profit of R$18.2 billion ($10.9 billion).[200] Furthermore, according to Embrapa, the technologies it developed and transferred created 93,442 new jobs in 2010.[201] Embrapa also measures the economic impact of its activities on various elements affecting agricultural production, including productivity, costs, added value, the expansion of production area, and the value of production in expanded areas. In its 2010 assessment, Embrapa stated that the greatest impact has been on productivity increases, which it measured at R$12.1 billion ($6.8 billion) in 2010.[202] According to Embrapa, this measure increased steadily during 2006–10, by 53 percent. Embrapa stated that its overall impact on two other elements—cost reduction and production in new areas—totaled about R$2.1 billion ($1.2 billion) and R$861 million

[195] Embrapa has 46 research centers spread throughout the country. Each research center has either a product (e.g., soybeans or beef cattle) or thematic (e.g., *cerrado* or soils) focus area of research. Lopes and Arcuri, "The Brazilian Agricultural Research and Development (ARD) System," February 8–10, 2010, 5–6; government officials, interview by USITC staff, Beltsville, MD, July 6, 2011; government officials, interview by USITC staff, Brasilia, Brazil, August 25, 2011.

[196] Industry representatives, interviews by USITC staff, São Paulo, Brazil, August 22, 2011; industry representatives, interview by USITC staff, Beltsville, MD, July 6, 2011; Londrina, Brazil, August 31, 2011; government officials, interview by USITC staff, Brasilia, Brazil, August 25, 2011.

[197] Using an average annual exchange rate of 1.68 *reais* per dollar, this equaled about $1.1 billion, compared with a budget of about $1.1 billion in fiscal year 2009 for the U.S. Department of Agriculture's Agricultural Research Service. USDA, ARS, "About ARS," November 7, 2011.

[198] Embrapa, *V Plano Diretor da Embrapa, 2008–23*, April 1, 2008, 34–43. Specific areas of current research include tropical plants and animals (soybeans, fruits, cattle, and poultry); fibers and wood (cotton and eucalyptus); nitrogen fixation (soy, corn, sugar cane); biological control (integrated pest management); no-tillage practices; and sugar cane and ethanol. Embrapa, *Embrapa and Brazilian Agriculture*, April 28, 2010, 11.

[199] Embrapa, *Embrapa and Brazilian Agriculture*, April 28, 2010, 21, 23.

[200] Embrapa, "Balanço Social, 2010," 4, 6 (accessed November 14, 2011).

[201] Embrapa, "Balanço Social, 2010," 30 (accessed November 14, 2011).

[202] Embrapa, "Balanço Social, 2010," 13 (accessed November 14, 2011).

($487 million), respectively, in 2010, which has directly enhanced agricultural export competitiveness. [203]

The importance and effectiveness of Embrapa has been cited by Brazilian agricultural producers. The Agriculture and Livestock Confederation of Brazil (CNA), a major farm group, considers the development of Embrapa to have been a major factor in the change in productive capacity and geographic distribution of Brazilian agriculture. [204] Agribusiness representatives consider Embrapa's research to have had a positive effect on Brazil's export competitiveness for soybeans and grain.[205] However, some industry observers have claimed that Embrapa's research is inadequately disseminated and that most of the benefit accrues to larger farming operations.[206]

In addition to Embrapa, there are several state, other government, nonprofit, and university agricultural research and development institutions. While these institutions receive less funding than Embrapa does, they are an important component of the Brazilian agricultural research and development system. [207]

Environmental Policies

Environmental issues have a long history in Brazil, and they are gaining in importance in response to rising domestic and international concerns regarding the impact of expanding agricultural production on the environment. The longstanding Proambiente program and the more recent low-carbon agriculture program (ABC) are two examples of the link that the government recognizes between agricultural production and the environment. However, Brazil's most far-reaching policy in this domain is its forest code, which places restrictions on land use with the intention of regulating and limiting deforestation. Environmental restrictions and policies generally increase the cost of agricultural production, which reduces Brazilian exporters competitiveness in global markets.

The Proambiente program was designed to assist rural households with the sustainable use of Amazon resources.[208] Under the program, rural households are compensated for providing "environmental services" such as reducing deforestation, carbon sequestration, conserving soil and water, using fewer chemicals, lessening fire risk, and adopting renewable energy. [209] The ABC program was established to promote sustainable agricultural practices, such as the restoration of degraded farm and pasture land, organic and no-till farming, and integrated production systems, by providing investment credit at preferential rates to farmers. While compliance with government environmental policies typically increases costs for agricultural producers, these programs are intended to minimize those costs and reflect the government's interest in promoting long-term sustainable agriculture.

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[203] Embrapa, "Balanço Social," various issues 2006–2010; Embrapa, "Balanço Social, 2010," 17, 22 (all accessed November 14, 2011).

[204] Industry officials, interview by USITC staff, Brasília, Brazil, August 25, 2011.

[205] Industry officials, interview by USITC staff, São Paulo, Brazil, August 22, 2011.

[206] Industry officials, interview by USITC staff, São Paulo, Brazil, August 25–26, 2011.

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The environmental program with the longest history and greatest scope is the forest code. Various revisions of this code have established forest reserves, legal reserves, and permanent preservation areas, and have modified the definitions and coverage of these concepts.[210] Under the current code, a certain percentage of a farm is required to be preserved as forest, but the exact figure varies depending on a farm's location and size. Based on the requirements established by the 1965 law, the regulations require 80 percent of land defined as being in the Amazon to have forest cover. For land in the *cerrado*, the reserve requirement is 20–35 percent.[211] For the Brazilian government, enforcement of the forest code is challenging because documenting land use across Brazil, particularly in remote regions, is difficult; as a result, enforcement of these requirements is generally perceived to be lax.[212]

Revisions to the current code, part of a still-unsigned environmental law that the Brazilian Congress passed in December 2011, have caused considerable uncertainty for landowners. The most recent proposal introduces environmental adjustment programs to facilitate compliance, allows conditional suspension of fines for past deforestation infractions, allows the grandfathering of deforestation under past schemes, and changes provisions regarding permanent preservation areas and legal reserves.[213] Under the version of the new law passed by the Brazilian Senate, farmers would still have to allocate the same percentage of their land to forest reserve compared to agricultural production and will be required to replant as much as 50 percent of forested areas that were illegally cleared prior to 2008.[214] However, different requirements would apply to certain "modules" depending on size and location. Reportedly, there is no standardization for the unit of land on which the regulations are based, and small family farms may be subject to different requirements than large ones.[215]

Despite the possibility of federal assistance in complying with the new regulations, if the government does enforce the new law effectively, the costs of compliance are likely to be high for affected landowners. Even when the new law is adopted, its technical details will take time to become clear. In the meantime, the uncertainty surrounding this issue is affecting land costs and expansion plans in the agricultural sector.[216]

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[210] CNA, Canal do Produtor, "Historical Evolution of the Brazilian Forest Code," (accessed September 1, 2011).

[211] For legal purposes in Brazil, the entire state of Mato Grosso is considered to be part of the Amazon region. However, when defined using biozones, there are transitional areas that fall between the legal Amazon and the real one. A future study by the Brazilian government will determine whether the *cerrado* biozone in Mato Grosso is actually Amazon or savannah. Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 31, 2011.

[212] Industry representative, interview by USITC staff, São Paulo, Brazil, August 28, 2011; Forero and Eilperin, "Brazil's Forest Policy Could Undermine Its Climate Goals," *Washington Post*, December 18, 2011.

[213] CNA, Canal do Produtor, "Historical Evolution of the Brazilian Forest Code" (accessed September 1, 2011).

[214] Forero and Eilperin, "Brazil's Forest Policy Could Undermine Its Climate Goals," December 18, 2011.

[215] Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 28–31, 2011.

[216] Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 20–25, 2011.

Insurance Programs

The lack of adequate agricultural risk insurance for farmers in Brazil is a long-standing problem.[217] The current system is handicapped by relatively low levels of government funding, inaccurate data on productivity and climate on which to base appropriate risk premiums, and risks that vary substantially because of the geographic size and the climatic and product diversity of the Brazilian agricultural market.[218]

The Brazilian government subsidizes agricultural risk insurance for commercial farmers though MAPA's Grant Program for Rural Insurance (PSR).[219] The PSR is offered in 19 states and regions and covers 41 products. Under the PSR, between 40 percent and 70 percent of the premium for most products can be subsidized, depending on the product, up to a maximum of R$96,000 ($57,300); the premium subsidy for livestock is 30 percent, with a maximum of R$32,000 ($19,100).[220]

Small and medium-sized farmers are provided credit risk insurance under the Agricultural Activity Insurance Program (PROAGRO).[221] This program insures farmers against credit obligations rather than against revenue losses. Administered by the BCB through the various financial agents that channel rural credit, PROAGRO was amended to include PROAGRO Mais (PROAGRO Plus), which provides programs tailored to family farmers under the PRONAF. Coverage under PROAGRO and PROAGRO Plus is restricted to projects within the Agricultural Climate Risk Zone. This zone is defined using a set of parameters based on climate, location, soil, and crop cycles; developed by the Embrapa, these parameters are used to determine risk factors for crop losses.[222] Protection is limited under PROAGRO to R$150,000 ($89,500) per beneficiary per approved crop category per season.[223] For livestock operations, the duration of protection begins with the acquisition of the covered debt until the sale of the livestock. Protection under PROAGRO Plus is limited to R$3,500 ($2,100) per participant. During the 2008–09 crop year, the number of contracts totaled 68,200 under PROAGRO and 585,200 under PROAGRO Plus, with an insured value of $1.4 billion under PROAGRO and $2.7 billion under PROAGRO Plus.[224]

Family farmers may obtain agricultural risk insurance under a special program administered by the MDA. The Family Agriculture Insurance program (SEAF) was established under the PROAGRO program and applies to family farmers that participate in PRONAF rural credit programs.[225] The SEAF generally guarantees 65 percent of expected net revenue of insured projects, and the government provides 75 percent of the premium.

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[220] MAPA, SAP, "Seguro Rural," [Rural Insurance], n.d. (accessed September 14, 2011).
[221] MAPA, "Proagro," n.d. (accessed September 14, 2011).
[222] MAPA, "Zoneamento Agrícola de Risco Climático," n.d. (accessed September 14, 2011).
[223] BCB, *Manual de Crédito Rural* (accessed February 13, 2012).
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CHAPTER 4
Competitive Factors Affecting Brazil's Agricultural Sector and Exports

Overview

In the last five years, Brazilian agricultural exports have become extremely cost competitive as the industry has taken advantage of the country's considerable natural endowments. Sizeable land and water resources, as well as the presence of a variety of favorable climates, enable the production of a wide range of agricultural products in Brazil. In addition, broad, flat tracts of land with room for expansion lend themselves to mechanized farming on a large scale. Skilled farmers have capitalized on these natural resources, aided by sophisticated business strategies. As noted in chapter 3, supportive government policies, including government-backed preferential credit, product financing, and research networks, have assisted this development. Larger farms in particular have adopted profitable new technologies and modern production practices, including extensive use of genetically modified (GM) seed, high levels of fertilizer application, double-cropping, and the integration of livestock and crop production.

Nonetheless, several important headwinds create a drag on Brazilian agriculture in general and exports in particular. These trends affect the cost of goods sold domestically and internationally. The appreciation of the *real* has made exports more costly overseas, particularly since 2008. Moreover, rising inflation is pushing up wages and other production costs across many economic sectors, including agriculture, and is offsetting one of Brazil's key advantages: its low cost of farm-level production. Over a longer period, Brazilian infrastructure investment has consistently failed to keep up with demand for services, and this shortfall adds considerably to the final delivered cost of Brazilian agricultural goods.

This chapter uses the analytical framework for competitive factors described in chapter 1 to guide the description and analysis of the primary factors influencing competitive conditions in Brazil's farm sector, breaking out the relevant factors into three categories—delivered cost, product differentiation, and reliability of supply. Two of the main factors that most broadly affect Brazilian competitiveness—Brazil's government policies and transportation infrastructure—are discussed at length in chapter 3 of this report and therefore are not covered in this chapter. Another cross-cutting factor, foreign direct investment (FDI), is discussed briefly in box 4.1, as well as in chapter 5.

Product differentiation decreases competition between the United States and Brazil for food and agricultural products, at least in the short run. The United States, while maintaining bulk exports, increasingly exports high-value, highly profitable agricultural products, such as processed foods and horticulture. By contrast, Brazil continues to primarily supply bulk agricultural commodities. Cheap, unskilled labor fueled Brazilian

BOX 4.1 Foreign Direct Investment (FDI) in Brazil's Agricultural Sector

In the USITC's analytical framework, described in chapter 1, FDI cuts across all three factor categories (delivered cost, product differentiation, and reliability of supply). In the agricultural and food processing sectors, FDI can lower costs by improving production efficiency, as foreign producers introduce new growing techniques or manufacturing processes. FDI may also sharpen product differentiation through upgrades in food quality, branding, access to global managerial skills, and agricultural practices. Finally, FDI can improve reliability of supply as foreign firms invest in distribution and storage facilities such as grain elevators and transportation equipment.

At almost $1.9 billion, FDI in the Brazilian agricultural sector accounted for 3.5 percent of the $52.6 billion total FDI in Brazil in 2010. FDI in agriculture was split between the livestock and related services sector ($308 million) and the food and beverage sectors ($1.6 billion).[a] During 2006–10, FDI in Brazilian agriculture totaled $7.7 billion, averaging $1.7 billion per year. The 2006-10 total is somewhat less than the $8.2 billion total for 2001–04.

Over the last several decades, FDI in the Brazilian food processing and retail sectors had a notable effect on these industries; foreign investment by large global firms displaced medium-sized and small domestic competitors, increasing industry concentration. Of the top 10 leading companies in the Brazilian food processing industry, six are multinational: Ambev (Belgium), Bunge Ltd. (United States), Cargill Inc. (United States), Unilever (United Kingdom/Netherlands), Nestlé S.A. (Switzerland), and ADM (United States).[b] The total market share of these foreign companies in the Brazilian food processing industry in 2009 was approximately 30 percent.[c]

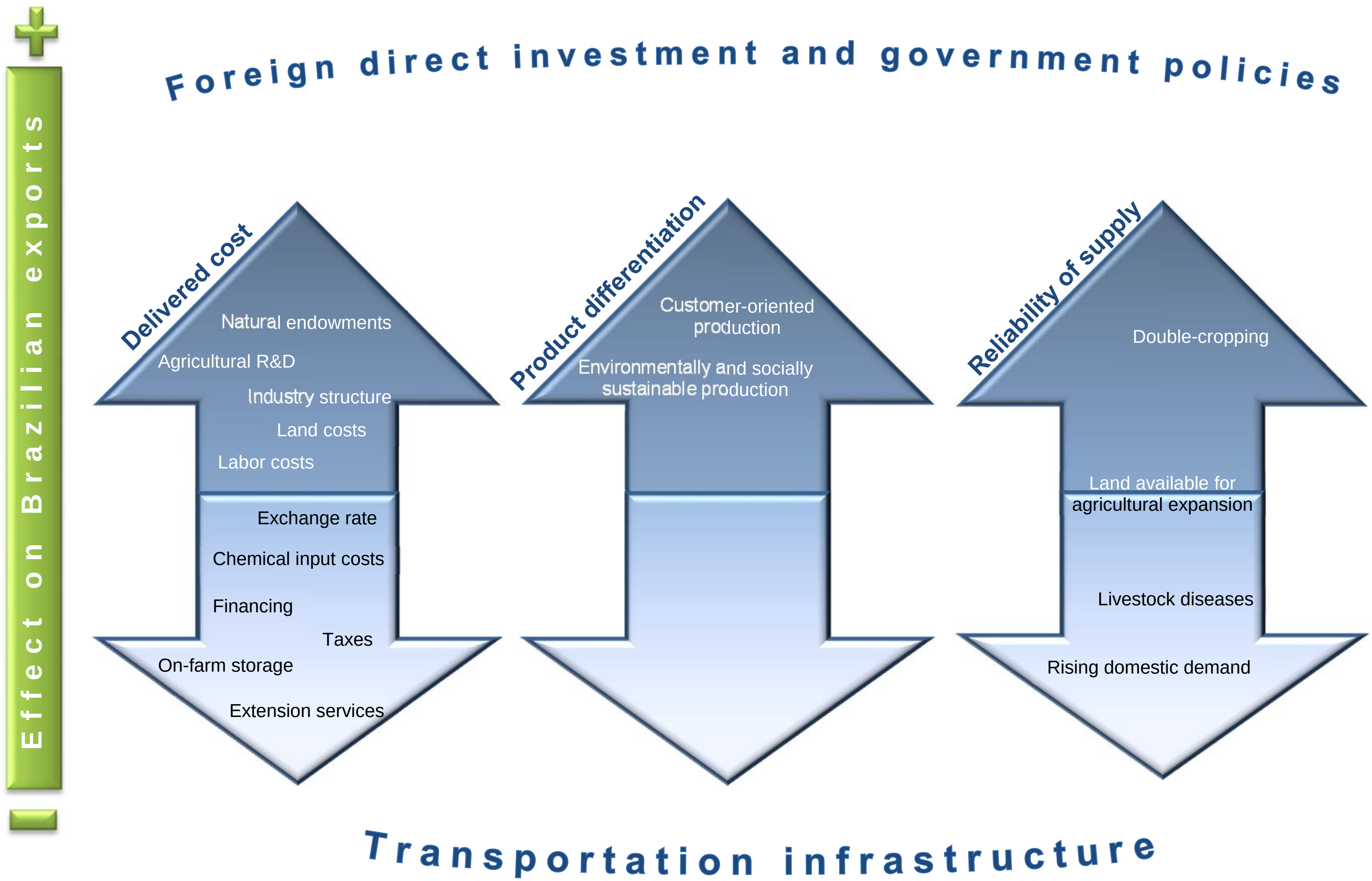
[a] ISI Emerging Markets, CEIC database.
[b] The other four, in 2010, were Brazilian companies Sadia, Brasil Foods, Copersucar S.A., and JBS S.A. (JBS). USDA, FAS, *Brazil: Food Processing Ingredients*, December 14, 2010, 4. In July 2011, Sadia and Brazilian rival Perdigão merged to form a new company called BRF Brasil Foods.
[c] USDA, FAS, *Brazil: Retail Food Sector*, November 10, 2009.

agriculture's early growth, but as Brazil strives to move into valued-added production, the lack of skilled workers may hamper those efforts.

Primary Factors Affecting Brazil's Agricultural Sector

Individual competitive factors can both enhance and weaken the competitiveness of Brazil's agricultural exports. The competitive factors at work in Brazil's agricultural sector and their general effects are depicted in figure 4.1. FDI and government policies have had overall positive effects on the sector and its exports, contributing to lower delivered costs, enabling firms to differentiate products, and stabilizing production. In contrast, poor transportation infrastructure clearly increases delivered costs and undermines the reliability of supply of Brazilian agricultural goods in export markets. Other factors are more directly tied to the specific categories of factors identified in the USITC competitiveness framework presented in chapter 1: delivered cost, product differentiation, and reliability of supply. Brazil's natural endowments, research and development, agricultural industry structure, and land and labor costs have lowered delivered costs for producers. At the same time, other elements—the value of the Brazilian *real*; certain production problems, such as the lack of on-farm storage and technical extension services; and high tax rates—raise delivered costs for Brazilian producers in export markets. Factors that allow Brazilian producers to differentiate their products in export markets are favorable to Brazil's competitiveness, while others, such as the constraints on available land for expansion, livestock diseases in Brazilian herds, and rising domestic demand, are likely to continue to keep some Brazilian supplies of agricultural products off international markets, reducing its competitiveness.

FIGURE 4.1 Competitive factors affecting Brazil's agricultural exports have both positive and negative effects



Source: Compiled by USITC staff.

Factors Affecting Delivered Cost

Until recently, particularly in Center-West Brazil, low land and labor costs and few environmental restrictions contributed to low delivered costs for agricultural goods. Costs for Brazilian grains, soybeans, beef, and poultry, in particular, have typically been below those in the United States. The considerable transportation costs in Brazil, as noted in chapter 3, typically leveled the playing field for U.S. and Brazilian products competing in third-country markets. Brazil also suffers from an overall high cost of doing business, known generally as the "custo brasil" (box 4.2). Appreciation of the Brazilian *real* and rising inflation, particularly since 2008/09, are also pushing up a wide range of production costs, including land and labor.[1] In addition, changing environmental regulations that place conditions on land use create uncertainty for firms and help increase production costs.

Natural Endowments

Brazilian agriculture benefits from the country's low-cost resource base. Weather patterns across much of the country permit intensive land use, including double-cropping in many regions, without irrigation. The presence of tropical, subtropical, and temperate regions enables the country to produce a wide range of agricultural products. Although there are some potential constraints, such as environmental restrictions, generally land has been available for expansion. Skilled Brazilian farmers have been able to capitalize on these strengths, particularly in the state of Mato Grosso, and rapidly boost production volumes. These natural endowments, particularly water availability, reduce the delivered cost of Brazilian agricultural production.

Brazil's mainly tropical climate brings both positives and negatives. Permeable soil and high temperatures permit any excessive rain during harvest to drain and/or evaporate more quickly than in most regions of the United States. This allows farmers to be back in the fields with tractors and harvesters shortly after a heavy rainfall.[2] However, the heat of the tropical climate is not conducive to high herd productivity for livestock, and more fungicide and pesticide use is often required in Brazil than in the United States, as there are no winter frosts to blunt fungus and insect population growth.

Agricultural Research and Development

Research and development was and remains a very significant driver of the competitiveness of the Brazilian agricultural sector. Brazil's agricultural research system is one of the most developed and best funded in the developing world. As discussed in chapter 3, the Brazilian Agricultural Research Corporation (Embrapa) is credited for much of this research, particularly for its work on varieties of soybeans, corn, and cotton adapted to the acidic soils and climate of Brazil's Center-West, North, and Northeast

[1] Brazil's inflationary pressures stemmed mainly from robust consumption and investment demand combined with a tight labor market. When consumer prices increased 5.9 percent in 2010, a rate above the Brazilian central bank's target of 4.5 percent, the bank responded by initiating tight monetary policies in late 2010 and early 2011. A broader discussion of Brazilian inflation is beyond the scope of this report.

[2] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.

BOX 4.2 The "Brazil Cost" in Brazilian Agriculture

The Brazilian business climate is clouded by high port and land transport costs; extensive and inflexible labor laws; an uncertain regulatory environment, particularly in the areas of customs, environmental, and antitrust policies; and a complex tax system. Added to these are the high cost of investment and inefficiencies from production and distribution bottlenecks. These practical constraints on Brazil's economic activity, often referred to as the *custo brasil* or "Brazil cost," can negatively affect the competitiveness of Brazilian firms in all industries. A study issued by the Brazilian Association of Machinery and Equipment Producers found that the *custo brazil* raises the price for eight agricultural and machinery products by 36 percent on average compared to the United States or Germany.[a] In addition, the bureaucratic red tape connected with opening a new business, the labor and software costs required to comply with government regulations and bureaucracy, and the high taxes embedded in the final consumer price of goods (upwards of 50 percent) are damaging to expansion in the agricultural sector.[b]

For producers in the agricultural sector, *custo brasil* takes many forms. Since financing a crop is very expensive, large trading companies engage in a form of barter with farmers in which they exchange fertilizers, pesticides, and other inputs for the farmers' grains as payment after harvest, with any remaining money turned over to the farmer. There are about 30 different kinds of swaps, with an even higher number of contract terms. Doing business in this way is not always more efficient than cash transactions, but has become necessary in light of the high cost and/or unavailability of credit for most small producers. These types of inefficiencies result in high administrative costs that are passed along the production chain. In another example of *custo brasil*, food processors lose time in getting their new products to market because new SKUs for branded or processed products must be approved by the Brazilian government before they can be exported. Large Brazilian food processors have reportedly lost sales to other country suppliers because of the bureaucracy involved in such approvals.[c]

In another example of *custo brasil*, large, well-capitalized Brazilian agribusinesses that might invest in truck fleets to assure timely transport of their goods and control costs are not doing so. Agribusiness owners report that the complicated regulations in the trucking industry are a deterrent. Reportedly, small, independent truck operators often do not adhere to the full set of regulations. Large firms that enter into this line of business do not have the luxury of noncompliance (because of the business and public relations risks associated with it) and, in an industry with very low margins, the cost of compliance can be prohibitive.[d]

[a] James, "Business Basics in Brazil," November 2011.
[b] Industry representative, interview by USITC staff, Paraná, Brazil, August 30, 2011.
[c] Industry representative, interview by USITC staff, São Paolo, Brazil, August 22, 2011.
[d] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.

regions. Embrapa research is credited with increasing the productivity (measured in kilograms per hectare) of, among others, Brazilian cotton, rice, sugar cane, corn, wheat, and soybeans. Increased productivity reduces farmers' overall delivered costs, as their variable costs are reduced and their fixed costs are spread across more units of output.[3]

Along with other benefits, advances in agricultural research and development have reduced delivered costs in specific Brazilian industries. The development of seeds for tropical conditions, techniques for the integrated management of diseases and pests, irrigation management, and the correction and fertilization of the soil were all studied at Embrapa with government funding.[4] This resulted in a large increase in agricultural yields in the late 1990s and expanding production in the *cerrado*. In the beef industry, Embrapa has contributed to genetic enhancements to improve feed conversion and resistance to parasites, as well as improvements in forage crops for grazing, all of which have helped to reduce the time required for cattle to reach slaughter weight from 4 years

[3] Rada, Buccola, and Fuglie, "Brazil's Rising Agricultural Productivity," 2009, 5.
[4] Contini and Reifschneider, "Agribusiness: Innovation and Competitiveness in Brazil," 2009, 92.

to 2.5 years.[5] Soybeans were developed with a shorter growing cycle, allowing the planting of a second crop on the same land. As a result, the production of corn as a second harvest after soybeans has optimized use of land and labor, reduced unit costs of machinery, and provided protective land cover for more of the year, reducing the long-term costs imposed by land degradation. These new technologies have increased production, productivity, and efficiency, often lowering unit costs without requiring increased spending on inputs.[6] Further information on Embrapa and Brazilian agricultural research and development is provided in chapter 3.

Industry Structure

Although small family farms in diffuse growing regions still exist, an increasing amount of Brazilian agricultural output is generated by large commercial farming operations. Farms in the Center-West region can be upwards of 10,000 hectares (ha) (24,700 acres), with some as large as 50,000 ha (124,000 acres).[7] In 2009, large-scale agriculture accounted for over three-quarters of total grain, oilseed, and meat production.[8] In the food and agriculture processing sector, a small number of large firms operate in many industries. In areas outside of the Center-West, small farms are normally defined as those of 30 ha (74 acres) or less, and large farms are those with more than 300 ha (740 acres).

Brazilian agribusinesses are generally run by educated operators with extensive business and investment acumen. They use modern technology and production practices, have access to credit, and see their large-scale operations as integral to their competitiveness. The presence of large farms and agribusinesses in Brazil can be attributed to increased levels of investment, from both Brazilian and foreign sources.[9] The nature of large, integrated production systems, particularly in the *cerrado*, requires considerable investment to prepare large land tracts, which consists of clearing the land and then adding nutrients to the soil to make the land productive. In addition, large-scale operations may be better able to cover the added costs of transporting goods over long distances to ports for export or to populated market centers within Brazil.

Large-scale production allows firms to spread investments in land preparation and higher transport costs over more units. Greater size can reduce input costs by giving firms the ability to make high-volume purchases at a discount. Increasingly, Brazilian agribusinesses use their large volumes to negotiate reduced ocean freight prices out of Brazilian ports.[10] Capital accumulation by these firms has allowed them to reinvest in operations by acquiring technology for further efficiencies and extending infrastructure, and has generated cash flow to reduce financing needs.

Production Methods

Large agribusinesses and agricultural cooperatives in Brazil have adopted modern, technologically sophisticated production practices to maximize profits. They also

[5] Industry representative, interview by USITC staff, Brasilia, Brazil, August 25, 2011.
[6] Contini and Reifschneider, "Agribusiness: Innovation and Competitiveness in Brazil," 2009, 93.
[7] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.
[8] Valdes, Lopes, and Lopes, "Brazil's Changing Food Demand Challenges the Farm Sector," 2009, 54.
[9] Doctor, "Brazil's Rise and the Role of Big Business," December 2010.
[10] *Seatrade Asia*, "Container Giants Locked in Negotiations with Brasil Foods," November 27, 2009.

extensively use GM seed to reduce chemical input costs and boost yields (box 4.3). In addition to having the advantage of scale economies, many large farm operations are able to use land more intensively, employing double- (or triple-) cropping and sometimes integrating livestock production with existing crop operations.[11] Like some producers in the United States, Brazilian farmers practice no-till agriculture to increase yields.[12] In addition, a growing number of farms (including small family farms) are becoming mechanized, creating a boom in farm machinery sales in the last few years.[13]

The integration of both crop and livestock (typically cattle) production, while still relatively uncommon, has been gaining ground in the Center-West region.[14] In this integrated production model, farmers rotate their crops and pasture area by planting brachiaria grass for pasture along with corn.[15] Both are fertilized, and when the corn is harvested, the remaining grass and certain crop residues, such as corn stover, serve as pasture for cattle.[16] The following year, farmers spray to kill the remaining grass and then replant soybeans or corn on the same plot. Careful farm management is the key to using these new production methods, and farmers who have been successful enjoy better economic and financial status because of improved cash flow. The Ministry of Agriculture, Livestock, and Food Supply (MAPA) is encouraging these farming methods and offers specific credit lines for this type of farming.[17]

Modern production practices also contribute to sustainability over the longer term by preserving land so that it remains productive in the future. Practices that preserve soil nutrients contribute to increased crop yields. Integrated crops and livestock production promotes carbon retention in the soil, which makes it more productive. Double-cropping helps to maintain soil quality. The biological fixation of nitrogen as a substitute for fertilizer, particularly in soybean production, also reduces fertilizer costs. The no-till system, an alternative to traditional, intensive mechanical plowing, involves sowing directly through the straw left from the previous harvest; it requires less machinery and equipment, labor, and fossil fuel and favors biological pest, disease, and weed control. It also minimizes erosion and optimizes use of fertilizers. Some of these practices may increase production costs in the short term but result in longer-term gains.

For some industries, such as beef, low market prices and cultural factors hamper improvements to traditional production practices. Cattle could be made more productive if fed grain, especially during dry seasons, or if cattle farmers invested in more productive forage seed. Because of abundant grazing land, research into improved forage seed is not a government priority.[18] Moreover, in Brazil fertilizer is not typically added to

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[11] Industry representatives, interviews with USITC staff, Mato Grosso, Brazil, August 2011.

[12] Contini and Reifschneider, “Agribusiness,” 2009, 87.

[13] Cabral, “Brazil’s Booming Agriculture Sector Eyes Global Markets,” May 25, 2010.

[14] Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 28–September 1, 2011; government officials, interview by USITC staff, Brasilia, Brazil, August 25, 2011.

[15] It is far less common for ranchers to integrate crop production into their pasture because they often lack the capital to invest in machinery, as well as the farming skills and knowledge needed for crop production. Industry representative interview by USITC staff, Mato Grosso, Brazil, September 1, 2011.

[16] Industry representative, interview by USITC staff, Brasilia, Brazil, August 25, 2011; industry representative, interview by USITC staff, Mato Grosso, Brazil, August 31, 2011.

[17] Industry representative, interview by USITC staff, Brasília, Brazil, August 25, 2011.

[18] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

BOX 4.3 Do Longer GM Seed Approval Times in the United States Disadvantage U.S. Firms?

In most countries, in order to market seeds with GM traits, firms must first submit the traits to a governmental regulatory authority for evaluation and approval. The approval process often includes trials and tests conducted under various conditions, and can be lengthy, depending on a regulatory body's resources and the expertise needed to conduct such trials. Considering the lengthy research and development process for GM seeds and the considerable financial investment it entails, it is in a firm's interest that the regulatory approval process be as streamlined as possible, so the firm can move product quickly to market and begin recouping its investment.

For many years, the GM approval process in the United States was relatively streamlined and predictable. This was in contrast to many other countries that lacked clear procedures for GM approval, making the approval processes confused and disorganized. Companies that wanted to export products with GM traits to emerging markets with modernizing agricultural sectors, such as China and Brazil, were adversely affected.

Now, separate developments in the United States and Brazil seem to have reversed the conditions. Reportedly, the Brazilian government has recognized the importance of having a timely and predictable system and, currently, the Brazilian approval process can take less than two years.[a] In contrast, in the past few years, the U.S. approval process has lengthened and can now take three to four years. Not only have the required environmental impact studies grown more complex as GM traits become more complex (e.g., multiple stacking), but some U.S. approvals have been challenged in U.S. courts. As a result, the U.S. approval process requires more detailed documentation from seed companies, and U.S. firms must devote more resources to addressing legal challenges. U.S. firms assert that unpredictability in the process stifles innovation and disproportionately disadvantages smaller companies, university departments, and smaller-market crops.[b]

The 2005 Brazilian Biosafety Law established the National Technical Commission on Biosafety (CTNBio) to evaluate the safety of GM traits for humans, animals, and the environment in Brazil, and the National Biosafety Council (CNBS) to approve GM traits in the broader Brazilian national interest.[c] Until two years ago, there was a virtual ban on new GM organisms (GMOs) by the Brazilian government because of environmental concerns.[d] In the past few years, however, approval times have declined from one to three years to as little as six months.[e] Approval of GM traits that have not been previously approved in other countries may take longer, as they are subject to studies performed in different regions of Brazil before approval is requested; this was the case before the recent 2011 approval of GM seed for dry edible beans, the first GM trait fully developed in Brazil.[f] A March 2007 law requiring a simple majority vote of CTNBio members for approval, instead of the previous two-thirds majority required, has sped up the process.[g] To date, neither CTNBio nor the CNBS have refused a request for commercial release of a GM seed. The rapid approvals, which some have at least in part attributed to the disproportionate participation in CTNBio of politicians and lawyers rather than scientists, has drawn criticism from Brazilian environmental groups and even members of the CTNBio commission itself.[h]

In light of the lengthening U.S. approval process and the shortened approval process in Brazil, the regulations regarding GM approval in important third-country markets, such as China, may put U.S. GM seed developers at a competitive disadvantage relative to Brazil. Chinese regulations, for example, require that approval in the home country be completed before the application can begin in China, and Brazil's speedy approval process may represent a competitive advantage for Brazilian firms in getting products to market in China.

[a] Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 31, 2011; industry representative, interview by USITC staff, St. Louis, MO, September 23, 2011.
[b] Industry representative, interview by USITC staff, St. Louis, MO, September 23, 2011.
[c] Lopez and Sampaio, "Approaching Biotechnology: Perspectives from Brazil and Argentina," 2005.
[d] Industry representatives, interviews by USITC staff, São Paulo, Brazil, August 23, 2011.
[e] Industry representative, interview by USITC staff, Paraná, Brazil, August 31, 2011. Other sources note that average approval times have been reduced to about 14 months. Industry representative, interview by USITC staff, St. Louis, MO, September 26, 2011.
[f] Industry representatives, interviews by USITC staff, Paraná, Brazil, August 31, 2011.
[g] USDA, FAS, *Brazil: Biotechnology*, July 17, 2007.
[h] Industry representatives, interviews by USITC staff, São Paulo, Brazil, August 23, 2011; MSTBrazil, "CTNBio Approves Release of Transgenic Soya," September 15, 2011.

forage because pasture grasses are not viewed as a crop. As a result there are many underutilized pasture areas, and cattle production suffers. Ideally, ranchers would recorrect soils (by reapplying seed, fertilizer, and lime) and improve 20 percent of their pasture per year, but currently most ranchers practice proper pasture management on only 10 percent of their land annually.[19]

Lack of on-farm storage

Despite extensive use of modern production practices and the success of integration, inefficiencies remain on Brazilian farms, particularly limited storage.[20] The lack of on-farm storage creates the need to deliver product soon after harvest or pay for storage elsewhere. Large supplies in the marketplace at harvest time drive commodity prices down and increase already high transportation costs as the demand for transport peaks.[21]

Lack of agricultural extension services

In many areas of Brazil, farmers suffer from a lack of agricultural extension services which provide state-funded technical assistance tailored for their region.[22] In certain areas, government-funded technical assistance is targeted at only very small farmers and is not consistent over time and may not be effective.[23] In other areas, it may benefit large farmers more than small ones. Although Embrapa establishes some partnerships with firms and organizations in the agricultural community to disseminate its research and technology, it has been criticized for targeting large farms and agribusiness.[24]

Often farmer cooperatives or large trading companies fill in the gap by providing such services. Cooperatives give members technical assistance on agronomy, including plant genetics, soil science, and chemical applications. Small farmers outside the cooperative system often can receive technical assistance from the large trading companies they supply. However, this type of assistance can come at a cost to farmers, directly affecting the delivered cost of their goods.[25]

The lack of extension services inhibits adoption of new technologies and methods at the farm level, including some that are relatively low-cost but that yield significant results.[26] For example, the traditional method of grazing beef cattle in Brazil does not include using "salt licks"—mineral salt provided in pastures that the cattle can lick for added nutrients. This is a common practice in the United States and is a relatively simple way to

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[19] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 31, 2011.

[20] See chapter 3 for a description of Brazil's lack of on-farm storage.

[21] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011; industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.

[22] Industry representative, interview by USITC staff, São Paulo, Brazil, August 25, 2011.

[23] Industry representative, interview by USITC staff, Paraná, Brazil, August 29, 2011.

[24] Industry representative, interview by USITC staff, São Paulo, Brazil, August 26, 2011; industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.

[25] Industry representative, interview by USITC staff, Paraná, Brazil, August 29, 2011.

[26] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011; industry representative, interview by USITC staff, Brasília, Brazil, August 25, 2011.

increase the rate of weight gain in grass-fed cattle. Research has indicated that a 50 percent increase in beef yields per hectare could be obtained using salt licks.[27]

Input Costs

Land costs

With its underdeveloped infrastructure, considerable distance from domestic and international markets, relatively poor soils, and environmental concerns, such as deforestation in the important Amazon and *cerrado* biomes, farming in the *cerrado* presents a challenge. However, in its early development, *cerrado* land was inexpensive and could be made productive with targeted investments, such as adding lime to acidic soils. Over time, this land has become some of the most productive agricultural land in the world. For this reason, land values, particularly in Center-West states such as Mato Grosso, have risen considerably and are expected to continue to rise.[28]

Agribusiness operators in the Center-West may own or lease their land or a combination of both. Current purchase prices in Mato Grosso for land for crops range from R$9,000 to R$36,000 ($5,520–$22,085, or 200–800 sacks) per ha depending on soil quality, current condition of the land (i.e., whether or not it has to be cleared), or if the land includes infrastructure, such as silos, warehouses, roads, or equipment.[29] In addition, proximity to logistical services and infrastructure, such as rail or paved interstate roads, has a significant impact on land values. In Mato Grosso, land leases are common, and often are structured to take account of the expectation that land values are likely to continue to rise.[30] Rental rates can range from R$360 to R$540 ($220–$330, or 8–12 sacks) per ha.[31]

In addition to the cost of the land itself, rehabilitation of the soil is required in the Center-West *cerrado* to make the land productive. In 2011, land rehabilitation cost approximately $1,000 per ha. The application of agricultural lime to reduce soil acidity constitutes about 30 percent of that cost.[32] Most of the lime is applied before agricultural production begins, but it must be reapplied periodically. Applications vary based on the farm, but before the first year, 4 metric tons (mt) of lime is applied per ha and 1 mt/ha is typically reapplied every 3–4 years.[33]

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[27] Industry representative, interview by USITC staff, São Paulo, Brazil, August 26, 2011.

[28] Government official, e-mail to USITC staff, November 4, 2011.

[29] The average price of a hectare of land in Iowa, the heart of U.S. corn and soybean production, was $14,080 in 2011. USDA, NASS, "Land Values: 2011 Summary," August 2011. In many agricultural areas of Brazil, particularly for the production of soybeans and corn, farmer revenues and payments for inputs (e.g., seeds and fertilizers), rents, and land purchases are often contracted in terms of 60-kg sacks of a given commodity rather than in *reais*.

[30] Industry official, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011. A typical arrangement is one in which a landowner without the capital or desire to invest in clearing and revitalizing a parcel for production may lease it to a neighbor for this purpose. In a case where rental land needs to be cleared, the lessee may enter into an agreement with the landowner to clear the land and in return use the land rent free for a few years, with increasing rental rates over the ensuing period. This type of arrangement could also be a rent-to-own agreement.

[31] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.

[32] Agricultural lime is a relatively inexpensive input, and most of its cost is in transporting it to the region.

[33] Industry official, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.

In the last five years, U.S. average cropland values have risen rapidly in key growing states. Average values for both irrigated and non-irrigated land increased 20 percent during 2007–11 to $3,030 per acre ($7,480 per ha) in 2011.[34] Rising values can be attributed to tightening global supplies of food and agricultural products and rising prices for these supplies. Cropland values in Brazil during this period have been subject to the same global phenomena. But as recently as the early 2000s, in the early days of the *cerrado* expansion, land values in Center-West Brazil were far lower, averaging R$2,250 ($970 or 50 sacks) per ha.[35] These low costs were a significant driver of low production costs for soybeans for many years. Now, rising land costs in key growing areas in Brazil, and the additional cost of rehabilitating unproductive land, are eroding Brazil's once significant advantage of low land costs (box 4.4).

Labor costs

The agricultural sector is an important source of employment in Brazil. In 2011, 20 percent of the Brazilian labor force was employed by agriculture, or about 20.7 million people. This compares to only about 1 million people employed by production agriculture in the United States, or less than 1 percent of the total labor force.[36] About 37 percent of Brazilian jobs are accounted for by the broader food and agricultural sector, which encompasses farming, food and agricultural processing, transport, and related services.[37]

Traditionally low labor costs were a competitive advantage for Brazilian agriculture, but recent rising inflation and strong economic growth have pushed up wages. In the last five years, the Brazilian minimum wage rose from approximately $70–$80 per month to over $350 per month (R$545) in 2011, and is likely to continue to rise.[38] In 2011, inflation-adjusted average real wages rose to $970 (R$1,579) per month, almost three times the monthly minimum wage.[39]

Labor scarcity is pushing up wages in Brazil, particularly for skilled workers, as the Brazilian agricultural sector is increasingly fueled by capital- and skilled labor-intensive technologies. Unskilled farm workers in Mato Grosso can earn $460–$920 per month (R$750–R$1,500). While skilled workers, such as harvester operators, earn about

[34] In the U.S. Northern Plains and Corn Belt regions, the average cropland value increased 56 and 39 percent, respectively, to $1,700 per acre ($4,200 per ha) and $4,920 per acre ($12,150 per ha) during 2007-11. Average values for pastureland were much lower and rose only slightly during the same period, or 7 percent, reaching $1,100 per acre ($2,720 per ha) in 2011. Pastureland in the Northern Plains and Corn Belt regions showed higher-than-average rates of growth, at 26 percent and 10 percent, respectively, to $553 per acre ($1,370 per ha) and $2,100 per acre ($5,190 per ha). USDA, NASS, "Land Values: 2011 Summary," August 2011.

[35] Industry official, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.

[36] CIA, *The World Factbook: Brazil*; CIA, *The World Factbook: United States*. Data for the U.S. agricultural sector include laborers in farming, forestry, and fisheries.

[37] Industry representative, interview by USITC staff, Brasília, Brazil, August 25, 2011.

[38] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011; Tavener, "Brazil Minimum Wage May Top R$800 by 2015," September 27, 2011. This compares to a minimum wage in the United States of about $1,260 per month, at an hourly wage of $7.25 per hour. U.S. Department of Labor, Wage and Hour Division.

[39] Lopez, "Brazil Labor Market Still Tight, Stoking Inflation," July 19, 2011.

BOX 4.4 Legal Limits on Foreign Land Ownership in Brazil

There is considerable foreign investment in Brazilian agricultural land, with official estimates ranging from 4 million to 7 million hectares (10 million to 17 million acres).[a] Unofficial estimates are up to five times higher.[b] Major investments come from the EU-27, Japan, and China, among others.[c] In 2010, the Brazilian government put in place new legal limitations on foreign land ownership. In August 2010, the Brazilian attorney general issued an opinion on the 1971 law that had limited the purchase of land by foreigners, and the new interpretation reinstated the restriction that had ended based on a previous opinion, which had been in force between 1994 and 2010.[d] The new interpretation limits the size of foreign purchases of farmland to 250–5,000 ha (620–12,350 acres), depending on the state; prohibits foreign ownership of more than 25 percent of the farmland of any given municipality; and requires justifications for its use from potential investors before approval is granted by the Agrarian Reform Ministry.

Instead of direct land purchases, the Brazilian government encourages potential foreign investors, including those from China, to enter into production agreements with Brazilian agribusinesses and long-term land leases.[e] New legislation has been introduced in the Brazilian congress to ease some of the restrictions, but maintain the prohibition on foreign ownership of farms of more than 10,000 ha (24,700 acres). Many in the Brazilian agribusiness community are unhappy with any new restrictions, asserting that the economic impacts of the restrictions are significant for Brazil.[f] The uncertainty of the rules for foreign ownership has reportedly caused the price of agricultural land to drop by 14–19 percent in regions of Brazil with high levels of foreign participation, particularly Western Bahia and Paraná. In contrast, in Mato Grosso and Mato Grosso do Sul, where foreign investment has been lower, land values are rising due to large land investments by Brazilian farmers.[g]

[a] Sauer, "Agrarian Structure," April 6, 2011; Informa Economics, *Brazilian Agribusiness Opportunities*, April 13, 2011.
[b] Correio Braziliense, "Mas de 4 Milhões de Hectares Estão sob Comando de Estrangeiros" [More than 4 Million Hectares are under Control of Foreigners], June 9, 2010.
[c] Sauer, "Agrarian Structure," April 6, 2011; Informa Economics, *Brazilian Agribusiness Opportunities*, April 13, 2011.
[d] Informa Economics, *Brazilian Agribusiness Opportunities*, June 15, 2011.
[e] Industry representative, interview by USITC staff, Washington, DC, June 22, 2011.
[f] *Brazilintl News*, May 2011, part II.
[g] Stewart, "Prices for Brazil's Big Farms Slide," November 3, 2011.

$1,410 (R$2,300) per month.[40] Salary packages include a wide range of additional benefits required by law, including medical and dental benefits, meals, and housing and/or transportation to the farm. Some operations also provide extensive training programs, and occasionally scholarship money for college. In Mato Grosso, most of the labor is drawn from surrounding areas and the workforce is sometimes unionized.[41] Because farms in the Center-West region are very large—a farm typically has 20,000 ha (49,000 acres) and 200 employees—these requirements add considerable costs to the farming operation.

Complex and rigid labor laws in Brazil add significant administrative costs and operational inefficiencies to agribusiness firms' operations.[42] Compliance with labor laws is reported to be very expensive for Brazilian firms, and revisions to the complicated system of labor laws in the last five years have increased costs of compliance further.[43] "Social charges" (encargos sociais), which consist of payments employers are required by law to make to workers, such as unemployment funds or meal and housing stipends, can

[40] Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 28, 2011.
[41] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.
[42] *Economist online*, "Brazil's Strange Labour Market: On Steroids?" March 10, 2011.
[43] *Economist online*, "Brazil's Strange Labour Market: On Steroids?" March 10, 2011; industry representative, interview by USITC staff, Mato Grosso, Brazil, August 31, 2011.

add up to 70 percent of an employee's wage.[44] Costs for laying off workers are high as well. Depending on the circumstances of the dismissal, some unionized employees could be entitled to withdraw the total deposits made by an employer to his unemployment compensation fund account, plus interest, monetary adjustment, and a 50 percent fine based on the total amount deposited. Additional payments by firms may also be required.[45]

Brazilian labor laws also allow for a high level of state intervention in labor disputes. When JBS closed a slaughterhouse in São Paulo, resulting in job losses for 1,300 workers, the Brazilian Ministry of Labor opened an investigation into possible illegalities related to the firings.[46] Moreover, many labor regulations were originally intended for urban settings but are now being applied to rural and farm work. For example, because farm workers are required to have 11 hours of continuous rest between shifts, contract workers must be brought in during the harvest time to cover those rest periods. This regulation also appears to be problematic for herders that do not work consistent shifts.[47] Overall, Brazilian labor laws contribute to low labor productivity and high turnover, and leave employers little incentive to train workers. As a result, Brazilian agricultural operators continue to look for ways to decrease labor costs, including investments in mechanization.

Workers with technical and managerial skills are in short supply in the Brazilian agricultural sector. There are also regional differences in availability of skilled and unskilled labor. In response, the Brazilian government has been funding new agricultural training programs, with farm management often a priority.[48] For some firms, the acute lack of skilled labor in some regions is affecting their expansion plans, forcing them to increase production abroad. Reportedly, in some agricultural industries, American, Chinese, and European managers and engineers are being brought to Brazil to fill highly technical positions.[49]

On a positive note for the future of the agricultural sector, Brazilian farm families are not facing the succession problems that often occur in other major producing countries when the younger generation leaves farming for other, more lucrative pursuits, often in urban centers. In Brazil, children of farmers are becoming better educated, but they typically still want to work on the farms.[50] Many of these young farmers are pursuing business degrees even while they run farm operations; for example, in Mato Grosso, some fly to the state capital, Cuiabá, on the weekends for classes in business management, economics, and accounting.[51] Some of Brazil's most prestigious graduate schools offering MBAs have seen a surge in demand from Brazil's rural population, and they are now offering programs across the interior. A prominent graduate school, São Paulo's

[44] James, "Business Basics in Brazil," November 2011.

[45] Ibid.

[46] *Brazilian Meat Monitor*, "JBS: Slaughterhouse Lays Off 1,300 to Save Tax," September 30, 2011.

[47] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 31, 2011.

[48] For example, the University of São Paulo's agricultural school, the Escola Superior de Agricultura Luiz de Queiroz (ESALQ), will begin offering a management degree in 2013. Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

[49] Industry representative, interview by USITC staff, São Paulo, Brazil, August 22, 2011.

[50] Industry representative, interview by USITC staff, São Paulo, Brazil, August 26, 2011.

[51] Ewing, "Brazil Farmers Return to School to Keep Their Edge," September 23, 2011.

Getulio Vargas Foundation, has expanded agricultural economics and MBA programs into 20 satellite courses across the Brazilian farm belt.[52]

Despite rigid labor laws that promote inefficiency and raise overall administrative costs, Brazilian labor costs are still lower than those in the United States, although inflation and a dearth of skilled workers are pushing up the wage rate. The lack of skilled workers will likely hamper the Brazilian agricultural sector's efforts to increase exports of highly processed, value-added food and agricultural products.[53]

Chemical inputs

Brazilian agriculture is heavily dependent on chemical inputs such as fertilizers, agrochemicals, and pesticides. For fertilizers on most farmland, the "top dressing" requires a combination of nitrogen, phosphorus, and potassium (NPK). To obtain the same yields, 500 kilograms (kg) of NPK is required in Brazil per hectare, versus 100 kg in Argentina and 100–200 kg in the United States.[54] Currently, Brazil imports more than 70 percent of its fertilizer and 80 percent of its pesticides. The additional transport costs inside Brazil make these chemical costs about 8–10 percent higher than in neighboring Argentina.[55]

Although Brazil produces fertilizer and is rich in some of the necessary mineral resources, the Brazilian agricultural sector's strong demand growth for fertilizer has rapidly outpaced its domestic supplies, increasing reliance on imports. Potassium is not mined in Brazil, while Brazil's phosphorus is of poor quality. Brazil is the world's second-largest importer of phosphate fertilizers after India and the fourth-largest potash-importing country after the United States, China, and India.[56] Prices for fertilizer are high in Brazil, owing to the limited number of large domestic producers and volatility in the price of imports owing to fluctuating global supplies.[57] High fertilizer costs also reflect Brazil's weaknesses in infrastructure for handling and shipping bulk commodities.

The Brazilian government has expressed an intent to make Brazil self-sufficient in fertilizers by 2020, through investments of R$11 billion in the sector.[58] Observers note that it is unlikely that increased domestic production of fertilizer will eliminate the need for imports, because domestic demand will continue to grow as crop expansion continues. Moreover, natural resource and extraction constraints will limit the expansion of fertilizer production.[59] Certain imports, such as nitrogen and phosphate, could decline with increased domestic production, although imports of potassium are likely to remain at about 80 percent of consumption.[60] Price volatility in the global fertilizer market may also decrease as planned production expansions outside of Brazil come on line.[61] In light of these developments, as Brazilian producers of export-oriented food and agricultural

[52] Ibid.
[53] Cabral, "Brazil's Booming Agriculture Sector Eyes Global Markets," May 25, 2010.
[54] Industry representative, interview by USITC staff, São Paulo, Brazil, August 26, 2011.
[55] Ibid.
[56] The Fertilizer Institute, "Statistics FAQs," n.d.
[57] MoA, Livestock and Food Supply, SAP, *Brazil Agricultural Policies*, 2008, 31.
[58] Informa Economics, "Production of Fertilizers in Brazil Is Still Incipient," April 27, 2011.
[59] Industry representatives, interview by USITC staff, Mato Grosso, Brazil, September 1, 2011.
[60] Gomes, "Brazil to Slash Fertilizer Imports in 5 Years—Industry," July 12, 2011.
[61] *Corn and Soybean Digest*, "Brazil Likely to Need Fertilizer Imports," July 15, 2010.

products continue to seek higher productivity through increased yields, the cost of fertilizer will continue to be a significant factor for Brazilian agriculture.

Financing

Financing is a critical factor in the expansion of the Brazilian agricultural sector. Agricultural producers need credit to finance their daily operations prior to harvest and sale, and for investment in capital goods and assets. In Brazil, financing for agriculture is available from several sources: government agricultural credit disbursed through the National System of Rural Credit (SNCR); agricultural input suppliers, processors, and exporters; commercial banks; or other government agencies. In Brazil, interest rates are higher than in the United States, and credit availability is limited. Total credit granted by the financial system to the private sector in 2009 was less than 30 percent of gross domestic product (GDP), which is one of the lowest levels of credit availability anywhere in the world.[62] Further information on credit provided by the Brazilian government, including BNDES, is provided in chapter 3.

The prevailing commercial rate offered to farmers by Brazilian banks was 15 percent in 2011, while smaller operations were commonly offered a 20 percent rate from local banks, typically with minimum fees of 1–2 percent of the loan value.[63] This is considerably higher than commercial farm loan rates in the United States, which were generally lower than 5 percent in 2011.[64] In light of these constraints, farmers often secure financing through their business partners. During the past 10 years, input supply companies and trading companies provided the bulk of production financing for farmers, a critical factor in the expansion of the agricultural sector. In the case of grain and soybean production, much of this financing was provided through the barter system by trading in “sacks” of goods (box 4.5).

Large Brazilian agribusinesses have more options for financing than small farmers. Because interest rates are lower abroad, large multinationals may have access to inexpensive financing. Within Brazil, a larger firm with a strong balance sheet and sufficient collateral may qualify for a one-year loan for operational lines of credit at interest rates between 7–8 percent, while investment loans may run 10–12 percent for investing in land development or other capital projects.[65] However, rates vary significantly depending on the length of the project, the project’s possible returns, and the company itself. For example, a multinational with a strong balance sheet looking to finance an investment with a 5–7 year loan from sources both within Brazil and abroad may have access to the London Interbank Offered Rate (Libor) plus 4 percent.[66]

[62] Valdes, Lopes, and Lopes, “Brazil’s Changing Food Demand Challenges the Farm Sector,” 2009.
[63] Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 2011.
[64] Henderson and Akers, “Agricultural Finance Databook,” January 2011.
[65] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.
[66] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011. During 2006–10, the 12-month Libor ranged from a high of 5.8 percent in June 2006 to a low of 0.7 percent in July 2011. “Historical LIBOR rate information,” FedPrimeRate.com.

BOX 4.5 In Brazil, Farmers Can Use Sacks of Soybeans and Corn in Lieu of Cash Payments

In many agricultural areas of Brazil, particularly those producing soybeans and corn, farmer payments for inputs (e.g., seeds and fertilizers), rents, and land purchases are often contracted in 60 kg sacks rather than in *reais*.[a] This system of bartering has a long history in Brazil, going back many years before the country's economic stabilization in the early 1990s.

Global price discovery for soybeans and corn occurs in U.S. dollars at the Chicago Board of Trade, with Brazilian spot markets and sales contracts adjusted for local conditions such as transportation costs. While Brazilian farmers can be paid in cash for their harvest, the price they receive in *reais* is directly related to Chicago prices.[b]

Setting prices in sacks rather than *reais* is beneficial both for farmers and the parties that buy and sell from them. Using sacks as a proxy for U.S. dollars is a hedge against inflation. Price variances for production inputs are largely disregarded, and if the price of a sack declines, farmers lose revenue but also lower their overall cost. They can focus primarily on increasing harvest yields to boost profits. Moreover, paying in soybeans give farmers better cash flow and more liquidity, because they receive seeds and fertilizers months before final payments are due.[c]

According to an industry representative, traders such as ADM and Bunge that provide inputs to farmers in exchange for sacks of soybeans or corn are willing to continue this system because it provides guaranteed crop volumes for crushing or export. Bankers who loan to farmers prefer payments in U.S. dollars when they acquire international capital denominated in that currency, but they are often willing to set repayment terms in sacks as a second-best option because soybean prices are strongly correlated to Chicago prices. Most traders and bankers also have access to sophisticated international hedging instruments to lower the price risks associated with bartering.[d]

[a] Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August–September, 2011.
[b] Thompson, "Behind the Numbers," October 1, 2003. Broadly speaking, soybeans are a proxy for U.S. dollars. Historically, this was important in Brazil, where for a considerable period the local currency continually lost value against the U.S. dollar. Over time, Brazilian farmers grew accustomed to discussing finances not in *reais* but in the number of sacks paid for a combine or fertilizer. Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August–September, 2011.
[c] Thompson, "Behind the Numbers," October 1, 2003. The effect of the barter system is to lower financing costs for farmers and minimize input price volatility, thereby lowering their overall cost of production.
[d] Industry representative, interview by USITC staff, Mato Grosso, Brazil, September 1, 2011.

Brazilian agricultural producers generally pay more for credit than their U.S. counterparts; higher credit costs limit their ability to expand production and make exports less competitive. However, smaller operations are more affected by this phenomenon than large agribusinesses, which have more access to lower international rates of credit and large government-funded credit sources.

Exchange Rate

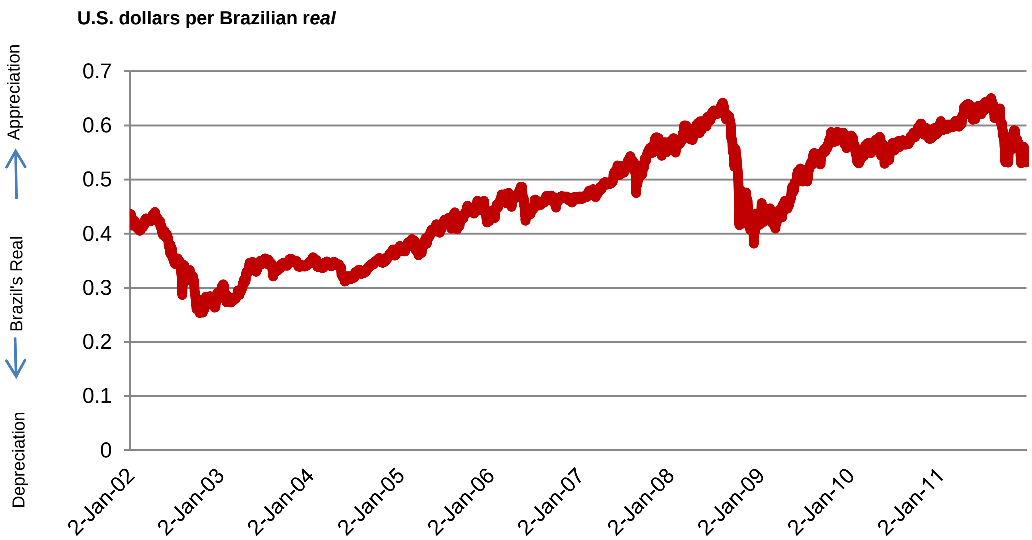
Exchange rates have an important effect on a country's export competitiveness, as they affect not only the price of final traded goods but also the cost of inputs used in production, particularly when many of those inputs are imported. A country's exports tend to rise with depreciation and fall with appreciation.

In recent years, Brazil's *real* has appreciated substantially against the U.S. dollar.[67] From October 2002 to July 2011, the Brazilian *real* appreciated in nominal terms by approximately 60 percent. More recently, the *real* appreciated by 35 percent between

[67] Interviews conducted in Brazil noted that "the exchange rate is a huge problem because many important third-country markets are pegged to the dollar." Industry representative, interviews by USITC staff, São Paulo, Brazil, August 23, 2011.

December 2008 and July 2011 (figure 4.2). When comparing the relative cost of goods in two countries, the nominal bilateral exchange rate is important; but changes in relative prices must also be taken into consideration, particularly if countries experience different rates of inflation. Considering relative prices of the United States and Brazil, the *real* appreciated by 33 percent in real terms between October 2008 and July 2011. This suggests a loss of Brazilian export competitiveness during that period. Thus, despite strong demand for Brazilian exports, the country's trade surplus with the world declined from $45 billion in 2005 to $30 billion in 2011.[68] Although the Brazilian *real* has more recently depreciated against the U.S. dollar (by 14 percent between July 2011 and December 2011), at the end of 2011, its value was still 22 percent higher than in 2006.

FIGURE 4.2 The U.S.-Brazil nominal exchange rate, January 2002–November 2011, shows the *real's* appreciation



Source: U.S. Board of Governors, FRS, "Statistics and Historical Data" (accessed December 22, 2011).

Exchange rate movements, commodity prices, and exports

Most of Brazil's export transactions are conducted in U.S. dollars, so movements in the U.S.-Brazil bilateral exchange rate affect Brazil's competitiveness. The prices of Brazil's commodity exports have changed significantly in the last five years and the appreciation of the Brazilian *real* against the U.S. dollar reduced Brazilian export competitiveness particularly since late 2008.[69] For example, because soybeans are traded globally and Brazil's export price is tied to prices on the Chicago Board of Trade (CBOT), profit margins for Brazilian exporters decline when the *real* appreciates. The appreciation of the *real* causes the cost of domestically-produced inputs to increase relative to other global producers and causes the revenue received in *reais* to decline relative to the price in dollars.[70] The price in dollars of soybeans, one of Brazil's main exports, increased

[68] GTIS, Global Trade Atlas database (accessed February 15, 2012).
[69] Industry representatives, interviews by USITC staff, São Paulo, Brazil, August 23, 2011.
[70] The cost of imported inputs decline as the *real* appreciates, but they typically only account for a small percentage of overall costs in Brazil.

67 percent between 2006 and 2010, but the price in *reais* increased by only 36 percent (table 4.1).[71] Because Brazilian producers are generally price takers and global prices are set in U.S. dollars, in the short term, Brazilian exporters are unable to increase their selling price to buyers in response to rising costs.[72] When the *real* appreciates, the cost of inputs that are priced domestically in *reais*, such as labor and land, rise relative to the cost outlays for the same input for a farmer in the United States.[73] Consequently, if the dollar price of the exported good remains stable, Brazilian profit margins decline.[74]

TABLE 4.1 Brazil's market price of soybean exports, 2006–11

Year	Dollars per metric ton	Percentage change	Brazil *reais* per metric ton	Percentage change
2006	227		493	
2007	283	24.6	550	11.5
2008	447	58.1	819	48.9
2009	400	–10.5	799	–2.5
2010	380	–5.1	668	–16.3
2011[a]	516	35.8	847	26.7

Source: IMF, *International Financial Statistics; Yearbook 2007,* 2008; IMF, *International Financial Statistics*, October 2011.

[a]Data refer to August 2011.

The effects of exchange rate movements on exports may vary across exported products because each product has different shares of imported inputs and their export demands differ across countries, among other things. For instance, one recent economic study estimated that a 1 percent appreciation in the exchange rate for the Brazilian *real* would lower Brazil's exports of soybeans and poultry by 1.23 percent and 0.63 percent, respectively.[75]

In summary, in recent years Brazil's *real* has appreciated substantially. As a result, Brazil's agricultural exports have lost some of their competitiveness in world markets and profit margins have declined. That has prompted exporters to divert to the domestic market certain commodities that in previous years would have been exported.[76]

Factors Affecting Product Differentiation

Brazilian food and agricultural producers differentiate their products in a number of ways, particularly by meeting specific customer specifications and through environmental and socially sustainable marketing, as elaborated below. Although many Brazilian food products enjoy strong brand recognition at home, Brazilian exports remain primarily undifferentiated, bulk commodities.

[71] The price received in *reais* by Brazilian exporters is a function of both the CBOT price and the exchange rate between the *real* and the U.S. dollar. If the *real* increases in value relative to the U.S. dollar, the *real* price received by the exporter declines.

[72] In the long run, if Brazilian producers account for a larger portion of global production of a crop, such as soybeans, higher costs due to an appreciating *real* may be increasingly reflected in the CBOT price for the commodity.

[73] See table 6.7 for an example of the impact of exchange rate fluctuations on soybean production costs.

[74] Industry representatives, interviews by USITC staff, São Paulo, Brazil, August 23, 2011.

[75] Almarwani, Jolly, and Thompson, "Exchange Rates and Commodity Prices," January 2007.

[76] Industry representatives, interviews by USITC staff, São Paulo, Brazil, August 23, 2011; industry representative, telephone interview by USITC staff, Washington, DC, June 15, 2011.

Customer-Oriented Production

Brazilian agricultural industries benefit from their emphasis on customer-oriented production. Certain industries produce specialty products for particular export markets.

Poultry

Brazilian poultry producers tend to cater to their overseas customers' demand for niche products more than the U.S. industry does.[77] This is likely because the Brazilian poultry industry was export-oriented from its inception, and domestic consumption was not the primary market. This is changing somewhat as domestic poultry consumption grows, but third-country markets are still a vital part of industry sales.

An example of the Brazilian poultry sector's focus on export markets is its capacity for halal production. Halal is a term used to designate food as permissible for consumption by Muslims under Islamic law. Middle Eastern consumers require poultry produced to halal standards, and Brazilian processors hire local Muslim imams who are licensed to certify halal in particular export markets, such as Saudi Arabia, Egypt, and Malaysia.[78] Some Brazilian poultry firms produce nearly all their poultry as halal because it is more expensive to have multiple production lines in a factory, and "halal production" can be sold domestically or abroad to non-halal customers as well.

For other customers who are not price sensitive but insist on exacting product standards, in particular the Japanese, Brazilian poultry producers hand-cut and hand-pack chicken parts, giving processors the ability to provide cuts to precise customer specifications. While labor costs for this type of production are higher than for mechanized production—and labor costs in the Brazilian poultry industry have quadrupled in the last few years—many customers are willing to pay for the increased costs.[79]

The poultry industry in the United States targets certain markets and customers, but its largest market is the domestic market, and exports are not as vital for profitability as in Brazil. However, the U.S. industry is better able to satisfy U.S. and export customers who value large volumes of standardized product. For example, the way that U.S. processors debone chickens produces standardized wings for the fast food chain KFC, a key requirement for securing that business.[80] But because U.S. poultry processing is highly mechanized, U.S. exporters have little flexibility in responding to specific customer requests for smaller orders. For a broader discussion of Brazil's poultry industry, see chapter 8.

[77] See chapter 8 for additional discussion of customer-oriented production in the Brazilian poultry sector.
[78] Industry representative, interview by USITC staff, São Paulo, Brazil, August 22, 2011.
[79] Industry representative, interview by USITC staff, São Paulo, Brazil, August 25, 2011.
[80] Ibid.

Non-GM soybeans

Unlike in the United States, there is considerable production in Brazil of non-GM soybeans, particularly in northern and western Mato Grosso.[81] These soybeans can serve niche markets that demand them, such as in the European Union (EU-27). Because of the need to segregate non-GM product from GM product from the farm gate throughout the marketing chain, non-GM soybeans require a price premium which customers often are willing to pay. This premium has been in the range of R$1–$4 per sack, but is typically about 2 percent of the final price.[82] The premium varies depending on the availability of non-GM production. For example, soybean production in areas near the Madeira River in western Mato Grosso is 90 percent non-GM and, as result, premiums are rarely offered.[83] In areas where premiums are offered, owing to the scarcity of GM product, it is not clear that at current prices they are high enough to cover the segregation costs.[84] Recently, global price rises have dampened customers' ability to pay a premium for this product, and industry observers suggest that the higher costs of segregating non-GM soybeans may become prohibitive.[85] To the extent that customers, particularly in the EU-27, continue to demand non-GM grains, Brazil is uniquely positioned to fill that niche. However, prices will dictate the Brazilian dedication to that line of trade.

Environmentally and Socially Sustainable Production

Several programs in Brazil that promote sustainable production in both the environmental and social sense make it possible to differentiate agricultural products through marketing. Social and environmental sustainability are increasingly desirable in the global marketplace, and certain customers are willing to pay a premium for sustainably produced goods.

One such program that involves Brazilian soybean producers is the Soy Moratorium, an agreement involving the members of two major Brazilian soybean and grain industry trade associations, including major trading companies such as ADM and Cargill. These firms pledged not to trade or finance soybeans harvested after July 24, 2006, in deforested areas within the Amazon biome. This agreement is currently in place until July 31, 2013. Members of the Brazilian Vegetable Oil Industry Association (ABIOVE) and the Brazilian Grain Exporters Association (ANEC) work with the Brazilian Ministry of the Environment and the National Institute of Space Research (INPE) to register Amazon farms and to map and monitor cleared land areas. European customers of Brazilian soy products have lauded the moratorium as an "essential tool" to reach their goal of sustainable sourcing.[86]

The Brazilian government's Program for Sustainable Production of Palm Oil similarly seeks to encourage the production of palm oil by sustainable manufacturers not engaged

[81] See chapter 6 for additional discussion of customer-oriented production in the Brazilian soybean sector.

[82] Industry representatives, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011; industry representative, interview by USITC staff, Paraná, Brazil, August 31, 2011.

[83] Industry representatives, interviews by USITC staff, Mato Grosso, August 28 and 31, 2011.

[84] Industry representative, interview by USITC staff, Paraná, Brazil, August 31, 2011.

[85] Industry representative, interview by USITC staff, São Paulo, Brazil, August 26, 2011.

[86] ABIOVE, "The Soy Moratorium Will Be Renewed for Another Year," October 2011; ABIOVE, "2010 Joint Statement of the European Soy Customer Group," July 8, 2010.

in deforestation of the Amazon. Oil palm is a more intensive and lucrative use of land currently devoted to cattle ranching. Currently, Indonesia and Malaysia account for 90 percent of global production of palm oil, but the industries in these countries have been criticized for their destruction of tropical rainforests. The Brazilian program has focused on sustainably produced palm oil, mainly on Brazilian degraded pastureland, and has committed $60 million dollars toward the development of the industry. Currently 100,000 ha (247,000 acres) of oil palm are planted in the region of the Capim, Guamá, and Tocantins rivers, and the project, implemented in 44 municipalities in the North and Northeast, aims to increase production to 130,000 ha (320,000 acres) by 2014. According to Embrapa, the estimated amount of land suitable for such cultivation is close to 30 million ha (74 million acres), more than twice the 13 million ha (32 million acres) of total global area harvested for oil palm currently.[87] The program has a social component in that it encourages participation from small family farms in order to promote middle-class development. Globally, the Brazilian focus on sustainability places Southeast Asian producers at a disadvantage in selling to European and U.S. firms, which are increasingly concerned about buying palm oil associated with forest destruction.

Brazilian biodiesel producers can also differentiate their product under the Brazilian government's Social Fuel Stamp program.[88] This program encourages Brazilian biodiesel producers to purchase feedstock, including oil palm and soybeans, from small family farms. Participating biodiesel producers will provide family farmers with technical assistance focused on sustainable agricultural practices. In return, the biodiesel companies benefit from the Social Fuel Stamp program (by gaining access to better financial conditions through BNDES and other financial institutions); the right to compete in auctions for the purchasing of biodiesel by the National Agency for Petroleum, Natural Gas, and Biofuel (ANP); certain tax exemptions; and the use of the Social Fuel Stamp logo for sustainability marketing. As environmental and social concerns garner worldwide attention demand for sustainable products may increase, regardless of the price premium they carry. Brazil is well positioned to take advantage of this emerging phenomenon.

Factors Affecting Reliability of Export Supply

Brazil's impressive agricultural performance of the past few years, in terms of both production and exports, is likely to continue, despite the pressures faced by its farm sector. It will keep certain supply advantages, such as favorable government policies toward exports, that will facilitate its agricultural production reaching world markets. But as its economy grows, domestic demand for food and agricultural products will increase accordingly, absorbing more of Brazil's production volumes.

[87] Industry representative, interview by USITC staff, Brasília, Brazil, August 25, 2011.

[88] The large grain trading company ADM participates in this program. ADM, "ADM to Invest in Sustainable Palm Production in Brazil," February 9, 2011.

Rising Domestic Demand

Economic reforms implemented after 2003 not only increased Brazil's real per capita income, but also improved its income distribution.[89] More people have moved into the formal labor force, and the middle class has expanded to 54 percent of the total population in 2008 from less than 42 percent in 2004. Further gains in these areas, as well as increased urbanization, are expected to lead to higher demand for all foods and to a shift from staple foods to a more diversified diet, including higher animal protein consumption.[90] USDA projections indicate that just 3 percent annual Brazilian income growth will lead to gains in consumer spending on food. According to USDA, Brazil will need to produce 7 percent more grain and 43 percent more oilseeds above 2008 levels to meet projected domestic and foreign demand, particularly for livestock and biofuels production, by 2018.[91]

Poultry consumption in northeast Brazil, where the Brazilian government spends billions in social development funds, has risen 14 percent annually in recent years, largely due to the growth of the middle class.[92] As a result, Brazilian poultry producers are focusing more than before on the domestic market. About 30 percent of Brazilian poultry production is currently exported, down from 45 percent two years ago.[93] There is also stronger domestic demand for beef, particularly from the restaurant sector.[94] Since Brazil is a large producer of beef, pork, and poultry, domestic demand for those meats also stimulates demand for animal feed, particularly corn and soybeans.[95]

The effect of rising domestic demand on export supplies is accentuated by the strength of the *real*, which is another factor that has caused many Brazilian producers to shift their focus to the domestic market.[96] For many commodities, including beef and chicken, the domestic market is currently providing better prices than export channels are. As these conditions persist, Brazilian producers will direct increasing amounts of their total production to domestic markets. If their production does not expand at the same rate, this will leave less product to serve their export markets. For more discussion of domestic consumption, see chapter 2.

Land Available for Agricultural Expansion

In order to maintain or increase exports and also meet rising domestic demand, Brazilian producers will need to boost total production. Considering Brazil's relative land abundance, the future of Brazilian agricultural production appears to rest heavily on continuing to exploit this resource. Its prospects of doing so are limited by problems rehabilitating marginal land, in terms of both technology and cost, and by the Brazilian government's actions to further restrict the use of protected lands.

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[89] Real per capita income (GNI per capita, PPP) increased 25 percent between 2006 and 2011. World Bank, *Data,* World Development Indicators database http://data.worldbank.org/indicator/NY.GDP.PCAP.CD (accessed November 22, 2011).

[90] Valdes, Lopes, and Lopes, "Brazil's Changing Food Demand Challenges the Farm Sector," 2009.

[91] Ibid.

[92] Industry representative, interview by USITC staff, São Paulo, Brazil, August 22, 2011.

[93] Industry representative, interview by USITC staff, Paraná, Brazil, September 1, 2011.

[94] Industry representatives, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.

[95] Industry representative, interview by USITC staff, São Paulo, Brazil, August 25, 2011.

[96] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

Brazil's current stock of agricultural land spans some 264 million ha (652 million acres), including land for crops (about 69 million ha, or 170 million acres) and pasture for grazing (about 195 million ha, or 482 million acres).[97] With agricultural land around the world becoming more scarce as the global population continues to grow, agricultural productivity must increase and/or more land needs to be brought into agriculture. Brazil is one of the few places left on the globe with uncultivated agricultural land, without even considering the Amazon, an important protected biome representing 420 million ha (1 billion acres) of Brazil's total 846 million ha (2 billion acres) of land area.[98] The relatively recent cultivation of the Brazilian *cerrado* (204 million ha, 504 million acres, or 22 percent of Brazilian territory), made possible by technological advances, has brought large amounts of new land into agricultural use.[99] Although growth in planted area has slowed significantly since 2005, between 2001 and 2005 planted area in Brazil expanded from 38 million ha (94 million acres) to 49 million ha (121 million acres), an increase of 30 percent.[100]

Brazilian land available for agricultural expansion includes new land not currently planted to crops and land now used for grazing that could be converted to cropland. USDA forecasts that by 2018, an additional 10 million ha (25 million acres) of cropland in Brazil will be brought into production. Beyond that timeframe, Brazilian government estimates indicate that about 40 percent of current pastureland is currently degraded[101] and not suitable for crops, but that 60 percent could be converted to crop production.[102]

However, as agricultural production expands in Brazil, it moves to marginal lands where the climate is not as favorable to the land-intensive practices used in other areas, reducing productivity and output. For example, in northeastern Mato Grosso, weather conditions force later plantings and are not suitable for double-cropping. In addition, demand for second-crop corn in this region is limited because it is located far from key livestock production areas. Lack of rain there also limits the productivity of grass and, consequently, the weight gain of cattle. Some cattle producers counter this by feeding their cattle grains, but this solution may not be cost-effective.[103] In addition, producers must consider the potential returns for their goods in making expansion investments. This is particularly important in light of the poor state of Brazil's infrastructure and the slow pace of its development in newly opened land, which significantly raises the final costs of goods.

Another factor limiting available land for agricultural production is government policy regarding land use in Brazil, as mentioned above. The Amazon biome is an important

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[97] FAO, FAOSTAT (accessed March 13, 2012); *Economist*, *The Global Power of Brazilian Agribusiness*, November 2010, 4.
[98] Government of Brazil, "Geography: Biome and Vegetation; Protected Areas" (accessed November 8, 2011).
[99] In Mato Grosso, 54 percent of the land is part of the Amazon biome, while the remainder is *cerrado*.
[100] These data double-count area used for double-cropping.
[101] Degraded pasture land has typically been poorly managed or completely unmanaged, leaving the soil barren because of low fertility and/or high amounts of erosion. Without intervention, this type of land cannot support intensive crop or livestock production. Research in Brazil on ways to rehabilitate such land, through soil management and specialized grasses, is ongoing and promising. There are currently 72 million ha (180 million acres) of degraded pastureland in Brazil. Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011.
[102] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011.
[103] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 31, 2011.

natural resource, not only for Brazil but globally, that has been encroached upon over time by agriculturally based settlements. Although degraded pastureland with potential for agricultural production is available in abundance in areas outside the Amazon region, its cost can be prohibitive. It is more expensive to buy degraded pastureland and rehabilitate it than to buy water-abundant land in the Amazon at $100–$200 per ha and use it as pasture. The low price reflects the relatively poor soil quality for crops, and therefore settlers rely on ranching for their livelihoods.[104]

In addition, because property rights in the Amazon region are weakly enforced, numerous settlers have come to occupy areas at the edge of the Amazon, clearing the forest and selling the timber to large companies.[105] This activity, carried out without education or technical assistance and multiplied by many smallholders, has made inroads into the Amazon forest. Over time, these settlers have been granted ownership of the land by the Brazilian government and permitted to continue farming there. However, the rate of land expansion through deforestation appears to be decreasing because of international attention and government monitoring and enforcement.[106] These enforcement efforts, as well as new definitions of protected areas in the updated forest code, may discourage land expansion by small family farmers who lack the means to comply with the regulations, leaving that to owners of large, financially secure agricultural operations.

Livestock Diseases

Livestock diseases found in Brazil, particularly foot-and-mouth disease (FMD), limit the ability of Brazilian beef and pork producers to compete in many export markets. These markets are likely to remain closed to Brazilian pork and beef, and further market expansion is not likely in the short term. Consequently, Brazil's pork exports are only likely to expand to markets such as Russia, Argentina, and Asian countries other than Japan and South Korea.

Although traceability of the cattle herd is one way to contain outbreaks, only about 50 percent of cattle are currently being traced. It is unlikely that the entire herd will ever be traceable owing to the high costs of registering millions of cattle roaming over such large land areas. Also, as long as Brazilian beef exports are hampered by sanitary issues, notably FMD, traceability is not profitable for producers to pursue. Eradicating FMD from the Brazilian herd, or even a portion of it, is not yet feasible because the cost of segregating the cattle in all links of the supply chain, including export markets, remains prohibitive.[107] For more discussion of livestock diseases, see chapters 9 and 10.

[104] The government has a program to stimulate the use of good agricultural practices by offering a low interest rate (5.5 percent) to farmers that buy degraded pastureland and farm it. Industry representative, interview by USITC staff, São Paulo, Brazil, August 25, 2011.
[105] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011.
[106] Industry representative, interview by USITC staff, São Paulo, Brazil, August 25, 2011.
[107] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

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CHAPTER 5
The Role of Brazilian Agribusiness in the Global Food Supply Chain

Overview

Commercial agribusiness firms in Brazil account for most of the country's participation in the global food supply chain, through agricultural exports and foreign direct investment (FDI). A number of Brazil-based agribusinesses have evolved into large national and multinational corporations with a substantial impact on the country's agricultural exports, particularly in the meat industry. Several of those companies have also expanded overseas, most notably beef and poultry companies JBS-Friboi (JBS) and Marfrig Frigorificos e Comercio de Alimentos S.A. (Marfrig), becoming important players in the United States and other markets. Multinational agribusiness firms based outside of Brazil also have invested heavily in Brazil's expanding agricultural sector. In this way they have become important competitors in Brazil's agricultural markets and are helping to shape the country's participation in the global food supply chain, particularly in soybeans and grains.

In both the United States and Brazil, farmer cooperatives have also played an important role in enabling farmers to export through global food supply chains. Farmer cooperatives are important agribusiness actors in Brazilian regions where farms tend to be smaller; they are particularly active in the state of Paraná, in the south of Brazil. Farmers use cooperatives for access to distribution facilities, purchasing of inputs, domestic sales and exports, and technical assistance.[1] In Mato Grosso and other areas of Brazil's Center-West region, conditions favor much larger farms, and farmers are more likely to have access to the capital needed to operate without a cooperative structure.[2]

Foreign-owned multinational agribusiness firms also have a strong presence in Brazil and handle a significant share of Brazilian agricultural exports. Global commodity markets are highly integrated and to a great extent are effectively served by the "Big Four" multinational agribusiness firms (Bunge, Cargill, Archer Daniels Midland (ADM), and Louis Dreyfus), which see the goal of linking producers in one country with consumers in another as part of their mission. This is particularly true in grain and oilseed markets, but is increasingly the case in the meat sector (beef, pork, and poultry) as well. Because of their global presence, these companies generally do not see world markets as characterized by competition between suppliers in Brazil and the United States. Instead, they see the principal exporting countries as an integrated system on which they can rely to supply growing worldwide demand. Brazil and the United States, for example, have different growing seasons for grains, so production overlaps provide year-round supply to major importers.[3] Direct competition between Brazilian and U.S. producers in the focus

[1] For instance, Coamo Agroindustrial Cooperativa, the largest cooperative, maintains a staff of 230 agronomists. Industry representative, interview by USITC staff, Paraná, Brazil, August 29, 2011.

[2] Industry representatives, interviews with USITC staff, Paraná, Brazil, August 22–September 1, 2011.

[3] Industry representatives, interviews by USITC staff, Washington, DC, July 12, 15, and 19, 2011.

products has been somewhat muted as growth in food demand in many emerging markets provides new sales opportunities for all exporters. In interviews, agribusiness firms expected this situation to continue into the foreseeable future, as emerging economies continue to grow and their people are able to spend more on food. In particular, rising global meat consumption is raising demand for meat, as well as grains and soybeans used for animal feed.[4]

Brazil has welcomed foreign agribusiness firms, which is consistent with a broader trend among developing countries to encourage and permit foreign participation in their agricultural sectors, although most multinational agribusiness firms concentrate on the non-farming aspects of the agricultural supply chain. The multinational firms tend to buy commodities from local farmers, through either markets or contract farming arrangements, and concentrate their direct activities in upstream industries (those that supply inputs, seeds, and machinery) and downstream industries (those involved in trading, processing, and retailing). These non-farming activities have become the most profitable segments of the overall food value chain.[5]

This chapter will describe the forces that have led to the strong growth of Brazilian agribusiness companies, examine the current role of agribusiness in Brazilian production and exports of meats, grains, and soybeans, and identify and discuss the factors that affect Brazilian agribusiness firms' decisions to access the global food supply chain through exports or FDI. The information presented in this chapter suggests several principal conclusions regarding agribusiness in Brazil:

- Economic conditions and government policies have promoted the growth of large agribusinesses (including large cooperatives) in Brazil for production and export of meats, soybeans, and grains;

- Large agribusinesses are the primary exporters in Brazil for those products, either directly through large producers or through small producers' associations with the Big Four multinational trading firms;

- For Brazilian agribusinesses in the meat and poultry industries, there are strong incentives both to export and to grow by acquisition, at home and abroad. JBS, Marfrig, and Brasil Foods SA (BRF), the three largest Brazil-based agribusiness firms, have successfully leveraged their production strategies and knowledge of the industries to enter the ranks of the world's largest protein producers and exporters, operating both in Brazil and in foreign markets. Brazil's strong currency has made overseas acquisitions more affordable for Brazilian firms, and producing overseas allows these firms to access foreign markets and avoid sanitary and phytosanitary (SPS) barriers, such as export bans on Brazilian beef triggered by the presence of foot-and-mouth disease (FMD) in Brazil;

- For Brazilian agribusinesses focused on soybeans and grains, the industry structure has promoted exports rather than foreign investment. Brazilian companies have taken advantage of economies of scale to become very large suppliers. Grains and soybeans are often exported whole from Brazil (without

[4] Ibid.

[5] UNCTAD, *World Investment Report*, 2009, 94, 105–6.

further processing) and processed in the importing market, allowing multinational distribution and trading companies to build upon their existing global supply chain systems and market knowledge networks to maintain control over Brazilian exports throughout the supply chain.

How Brazilian Agribusinesses Decide to Enter Global Supply Chains

The growth of Brazilian exports of livestock, grains, and soybeans over the last five years has been largely due to domestic and foreign investments boosting the scale and scope of Brazilian agribusiness. These investments throughout Brazil's agricultural production system allow the sector to supply higher-quality foods at lower costs, making Brazilian food products price-competitive in global markets. As they grow, agribusiness firms must decide whether to enter the global food supply chain through exporting or through FDI. In order to analyze the effects of Brazil's agribusinesses on the country's rapidly expanding agricultural trade and investment, it is useful to have a framework, discussed below, showing the factors influencing the investment and export decisions of Brazilian agribusiness firms.

Agribusiness refers to commercial agricultural enterprises, namely farms, ranches, cooperatives, and related businesses that are directly involved in the supply chain of agricultural products. These businesses range "across production, post-harvest handling, processing, transportation, marketing, distribution and other agro-based commercial activities" (figure 5.1), and the firms involved may or may not be multinational corporations (MNCs).[6] This report will focus on Brazilian firms' participation in the central production and basic processing stages, and non-Brazilian firms' participation in downstream trading and processing.

FIGURE 5.1 The global agribusiness supply chain as viewed by Brazil

- Seeds (Monsanto, Syngenta, Embrapa)
- Fertilizers, agrochemicals (Dow Agroscience, Dupont)
- Equipment suppliers (John Deere, CLAAS, CNH)

- Plantation companies (Bom Futuro, André Maggi Group, SLC Agricola)
- Grower-shippers (JBS, Marfrig, Brasil Foods)

- Wholesalers, specialist traders, distribution companies (Cargill, ADM, Bunge, Louis Dreyfus)
- Food manufacturers (Kraft, Nestle)
- Biofuel producers (Ecodiesel, Biolix, AgroDiesel)
- Supermarkets (Carrefour)
- Restaurants (McDonald's, KFC)

Source: USITC staff, based on UNCTAD, *World Investment Report 2009*, 108, figure III.3.

[6] OECD, *Business for Development*, 2008, 72.

A common theoretical framework used to analyze the factors that determine the international investment choices of agribusinesses is the ownership-location-internalization (OLI) paradigm, most notably expounded by John Dunning.[7] In this paradigm, three factors are crucial to business decisions to invest across international borders: ownership-specific advantages, locational advantages, and internalization advantages. Ownership-specific advantages refer to the value of maintaining exclusive ownership of income-producing assets such as manufacturing tools or intellectual property, rather than leasing or licensing such assets to outside firms. Locational advantages include immobile or natural assets such as sun, soil, and water for farming, or the advantages conferred by doing business directly in the targeted market, such as access to finance or close contact with customers. Internalization advantages are benefits that derive from producing a good or service internally within the firm, which affects the ways in which the firm organizes itself.

Of the three types of advantages, locational ones will most strongly affect a company's decision to site production or marketing operations abroad, rather than exploit competitive advantages through international trade. Locational advantages in foreign markets might include lower labor costs, the ability to produce goods close to customers, favorable agricultural conditions, and an attractive business climate. On the other hand, ownership advantages more often lead to increased trade through the sale of intermediate goods and technology licensing rather than FDI.[8]

A firm's final decision about whether to exploit its competitive advantage externally (by exporting) or internally (through FDI) depends on an analysis of relative business risks and rewards.[9] Factors specific to the FDI decision for agribusiness companies include access to land, the ability of food processors to contract with farmers for local food inputs, and nontariff measures such as SPS restrictions and technical barriers to trade (TBTs) that completely prevent trade in agricultural goods from some locations, but not from others. Figure 5.2 illustrates the range of options available to agribusinesses seeking to participate in the Brazilian market. The decision process that a firm uses to decide whether to participate overseas may be similar to the process it uses to make investment decisions in its home market.

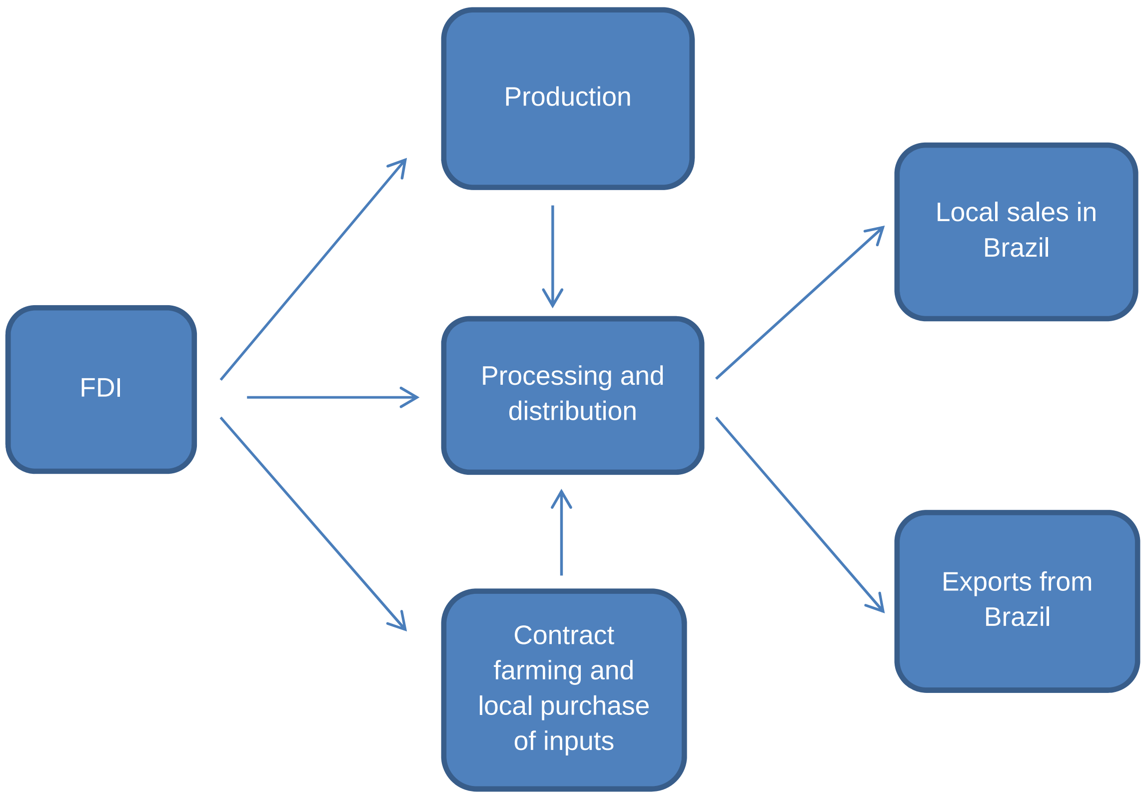
The OLI framework lends insight into firms' decisions about entering the global food supply chain through trade or FDI. In the meat sector, several of Brazil's largest companies, particularly JBS, Marfrig, and BRF, are globally active across the beef, poultry, and pork segments and have become notable outward investors to the United States. Operating outside of Brazil gives agribusiness firms significant locational advantages, including access to local markets for fresh meat products; presence in the

[7] The model is also known as the "eclectic paradigm." For the author's discussion of the model and its evolution see Dunning, "The Eclectic Paradigm as an Envelope," 2000; Dunning, "The Eclectic (OLI) Paradigm of International Production," 2001.

[8] Dunning's model discusses company decisions under the OLI paradigm to engage in FDI or "other forms" of internationalization such as trade or contractual arrangements. UNCTAD, *World Investment Report*, 109. The other forms of internationalization can be viewed as types of trade, whether in tangible goods or intangible services (i.e., licensing agreements and other technology transfers).

[9] UNCTAD, *World Investment Report*, 2009, 109.

FIGURE 5.2 Participation options for FDI in Brazilian agribusiness



Source: Compiled by USITC staff, based on UNCTAD, *World Investment Report 2009*, 110, figure III.4.

United States, the world's largest meat market; and in the case of the beef industry, avoiding export restraints related to FMD. Meat companies also report internalization advantages from direct investment. In the United States, for example, JBS has upgraded slaughterhouse equipment and processes in existing U.S. facilities acquired from U.S. firms, bringing its in-house expertise to a new market.[10] In contrast, foreign firms play a very small role in Brazil's beef sector, although they are more active players in the poultry industry. FDI in the Brazilian poultry sector has given foreign-owned firms a foothold in the Brazilian domestic market and a platform for exports to new markets, including the European Union (EU-27), the Middle East, and Japan.[11]

In the soybean and grain industries, foreign-based MNCs are significant actors in the downstream processing and export market segments within Brazil, but the largest Brazilian producers have generally not invested abroad. In Mato Grosso, where farms tend to be very large, many producers maintain their own soybean- and grain-processing facilities, largely for oil and meal that will be consumed within Brazil. Soybeans and

[10] Industry representative, interview by USITC staff, Washington, DC, August 1, 2011.
[11] Industry representative, telephone interview by USITC staff, June 15, 2011.

grains for export are more often shipped unprocessed; many of the large farm producers export directly, while others contract with third parties such as the Big Four multinational traders for logistics and export services. Unlike in the meat industry, the strong global demand for unprocessed soybeans and grains means that there is little localization advantage for Brazilian farmers in investing in processing facilities in foreign markets, or in processing their soybeans and grains in Brazil before exporting them.[12] The commodity nature of the products also means that there are few ownership or internalization advantages promoting FDI by Brazilian firms. Table 5.1 compares the extent of outbound Brazilian FDI in the meat and poultry industries versus the grain and soybean industries. See appendix D for additional detail on FDI projects.

TABLE 5.1 Estimated number of outbound Brazilian agribusiness investment projects in the meat, grain, and soybean sectors, 2003–11

	Reported projects		Meat and poultry		Grains and soybeans	
Type of investment	Number	Value	Number	Value	Number	Value
		Million $		Million $		Million $
Greenfield	18	820.6	18	820.6	0	0
Acquisition	21	5,406.8	19	5,296.8	2	110.0
Total	39	6,227.4	37	6,117.4	2	110.0

Sources: Bureau van Dijk, Zephyr database (accessed November 17, 2011); Financial Times, fDiMarkets database (accessed November 15, 2011).

Note: Greenfield projects are new establishments. Projects reported in press reports. May not include all relevant projects. Project values were not reported for all transactions, and some values are estimates.

Incentives for the large Brazilian agribusiness firms to export include the high level of taxation on domestic market sales and the difficulty that large firms have in competing with smaller firms that may evade taxes. (See chapter 3 for more details on Brazilian tax policy). In addition, the concentration of vertical distribution channels in global markets gives Brazilian firms the ability to supply the largest supermarket and restaurant chains, allowing the firms to avoid some of the high costs involved in establishing their own horizontal distribution lines and in making the investments required to build a brand.[13]

Smaller grain and soybean farmers (mostly in Paraná and other southern states, but also in the Center-West region) generally outsource the downstream processing, exporting, and distribution functions to larger firms, either multinational trading and distribution firms or Brazilian-owned cooperatives; such firms can take advantage of economies of scale. The Big Four are simultaneously the largest players in the grain processing and distribution industry in Brazil, the United States, and China (one of the fastest-growing import markets), as well as in most other major global food markets.[14] The multinational firms have significant ownership advantages in their global distribution and market information networks, which rely on information systems more than on-farm production knowledge. In Brazil, FDI by such firms tends to focus on downstream storage and distribution facilities, such as grain elevators and crushing facilities, rather than on-farm production.

[12] However, many of these producers have large investments in Brazilian processing facilities focused on the domestic market.
[13] Desouzart, "Brazilian Agribusiness," 2011.
[14] According to estimates, the Big Four account for between 75 and 90 percent of global grain trade. Precise figures are not available. Lawrence, "The Global Food Crisis," June 2, 2011.

FDI in soybean crushing facilities tends to focus on product intended for sale in the domestic market. Exports are shipped mostly raw, partly due to China's status as the world's leading soybean importer. Chinese government investment incentives and higher tariffs on processed soybean products, compared with tariffs on raw soybeans, create a substantial Chinese price differential between whole beans and processed meal and oil. Thus, it is more profitable for global firms to locate processing facilities in China rather than in Brazil, when the final product is destined to be sold in China. As the global companies have located additional crushing capacity there, China has also become a regional exporter, supplying much of Asia with soymeal, even while it imports soybeans from Brazil and elsewhere.[15] Table 5.2 illustrates the extent of foreign FDI in Brazil's grains and soybeans industries, compared with the meat and poultry segments.

TABLE 5.2 Estimated number of inbound agribusiness investment projects in the Brazilian meat, grain, and soybean sectors, 2003–11

	Reported projects		Meat and poultry		Grains and soybeans	
Type of investment	Number of projects	Value	Number of projects	Value	Number of projects	Value
		Million $		Million $		Million $
Greenfield	33	4,226.4	1	13.5	32	4,212.9
Acquisition	28	330.1	9	26.1	19	304.0
Total	61	4,556.5	10	39.6	51	4,516.9

Sources: Bureau van Dijk, Zephyr database (accessed November 17, 2011); Financial Times, fDiMarkets database (accessed November 15, 2011).

Notes: Projects reported in press reports and not verified independently. May not include all relevant projects. Project values were not reported for all transactions, and some values are estimates.

The following sections address the role of agribusiness in Brazil's meat and soybean sectors, with a focus on the large agribusiness firms that are active in each sector and the factors that have shaped those firms' supply chain business decisions. The sectors are starting to converge in some cases, as Brazil increases its use of grains for animal feed, and as meat and grain companies expand into each other's markets. Appendix D lists selected agribusiness firms active in Brazil's meat, poultry, grains, and soybean markets, to provide a sense of the scale of Brazilian agribusiness in 2011.

Government Policies toward Agribusiness in Brazil

Brazilian government policies over the last several decades have been significant factors in shaping today's highly competitive agribusiness sector. Brazil's national development strategy has promoted industrialization and urbanization since the 1930s, increasing food demand and helping to spur the formation of modern Brazilian agribusiness firms.[16] These firms have expanded and consolidated in recent years. Brazilian companies have boosted their technological capabilities, allowing them to improve overall productivity and expand food supplies. At the same time, rising labor costs and growing land availability in Brazil have favored the introduction of mechanization and large-scale farming. These conditions have led many less productive farmers relying on older technology to abandon agriculture, which has contributed to industry consolidation and

[15] Wilkinson, "Globalization of Agribusiness," September 2009.
[16] Barros, "The Challenges in Becoming an Agricultural Superpower," 2009, 81.

the success of larger agribusiness firms. The Brazilian government has also reduced its footprint in the market through deregulation and opened Brazil's domestic market to foreign firms, leading to increased competition and efficiencies. Economic stabilization following the successful fight against hyperinflation has also been crucial in aiding the success of Brazilian agribusiness.[17]

Several government programs enacted during the 1960s helped to modernize the agricultural sector, including price supports and subsidized rural credit to provide food security for the urban population and better compensation for farmers.[18] The reduction of this state support in the 1980s forced private firms to fill the gap, leading to hundreds of billions of dollars of new investment in farm capital projects, warehouses, and processing facilities. At the same time, new technology increased productivity and raised export revenues, while Brazil removed export taxes and other export restrictions on soybeans, cotton, and meat and eliminated import licenses for corn, promoting competition. Price controls were removed in the early 1990s.[19] Commodity markets were liberalized, Brazil unilaterally reduced many trade barriers, and private agricultural financing instruments were introduced to the market.[20]

The 1994 *Real* Economic Stabilization Plan generally stabilized Brazil's economy and substantially reduced the country's inflation rate, and removed significant barriers to foreign investment. The plan had widespread impacts across Brazil's economy. Particularly important results for the agribusiness sector were the ability of foreign firms to acquire existing Brazilian agribusiness firms, leading to significant new foreign investment in agricultural research and development (R&D) and integrated supply chains, and the increased availability of credit to agricultural producers. This occurred as food demand was rising across the country due in large part to the successful stabilization of the economy.[21]

Today, several Brazilian government programs continue to provide support for the country's agribusiness firms. Most importantly, the Brazilian Development Bank (BNDES) has played a major role in promoting the internationalization of Brazilian agribusiness through FDI. BNDES helps Brazilian companies identify opportunities, and offers financial support by lending directly to firms, guaranteeing loans that are processed through commercial banks, or taking direct equity shares in Brazilian companies.[22] In 2009, for example, BNDES provided support for expanding capacity, modernizing

[17] Falling real food prices and high labor costs in the years following hyperinflation gave farmers a strong incentive to invest in productivity-enhancing mechanization and large-scale farming. Nassar, "Brazil as an Agricultural and Agroenergy Superpower," 63; Barros, "The Challenges in Becoming an Agricultural Superpower," 2009, 82.

[18] Chaddad and Jank, "The Evolution of Agricultural Policies," 2nd Quarter 2006, 86.

[19] Barros, "The Challenges in Becoming an Agricultural Superpower," 2009, 86; Chaddad and Jank, "The Evolution of Agricultural Policies," 2nd Quarter 2006, 86–7; Valdes, "Brazil's Booming Agriculture Faces Obstacles," November 2006, 31.

[20] The reforms were initiated largely as a response to Brazil's debt crisis of the late 1980s and subsequent structural reforms. Valdes, "Brazil's Booming Agriculture Faces Obstacles," November 2006, 31; Chaddad and Jank, "The Evolution of Agricultural Policies," 2006, 86–87.

[21] Valdes, "Brazil's Booming Agriculture Faces Obstacles," November 2006, 32.

[22] BNDES, "Internationalization of Companies" (accessed December 7, 2011); industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 28, 2011; industry representative, interview by USITC staff, Rio de Janeiro, Brazil, September 2, 2011. See chapter 3 for more details on BNDES.

existing facilities, and implementing new industrial units for agricultural cooperatives in the poultry, pork, grains, and dairy segments.[23] The following tabulation shows total BNDES disbursements for agribusiness support in the past five years.

BNDES disbursements to Brazil's agribusiness sector

Year	Agribusiness disbursements	Agribusiness share of total BNDES disbursements
	Billion $	Percent
2006	1.6	7
2007	2.7	8
2008	3.0	6
2009	3.6	5
2010	5.8	6

Source: USITC calculations based on data from Brazilian government officials, interview by USITC staff, Rio de Janeiro, Brazil, September 2, 2011.

Among other goals, BNDES has a specific aim of providing financing for Brazilian companies to make overseas acquisitions that will promote Brazilian exports. As noted by BNDES, the goal is "to encourage the insertion and the strengthening of companies in the international market by supporting investments or projects to be carried out overseas."[24] The largest Brazilian agribusiness firms have all benefited substantially from these policies. According to press reports, BNDES contributed $44 billion to the four biggest Brazilian meat companies between 2008 and 2010, and as of mid-2011, JBS and Marfrig together reportedly had received loans of R$18 billion ($10.6 billion) from BNDES. As of October 2011, BNDES controlled 35.1 percent, 30.4 percent, and 14.0 percent of shareholder equity in BRF, JBS, and Marfrig, respectively.[25] BNDES equity financing was used in 2010 to finance JBS's acquisition of Pilgrim's Pride and Marfrig's acquisition of Keystone Foods, both U.S. agribusinesses, and was part of the financial package for the Perdigão SA-Sadia SA merger that created BRF in 2009.[26] In February 2012, BRF accepted a $1.43 billion credit line from BNDES; the company reportedly planned to use the loan to finance its expansion plans.[27] Some observers see BNDES' support for these overseas acquisitions as a state effort to create "national champion" companies. In response, BNDES officials have noted that the JBS and Marfrig loans were made at commercial rates. It is not clear whether BNDES' lending is subsidized by below-market interest rates or how much below market those rates may have been.[28]

BNDES has seemingly been quite successful in its goal of promoting the overseas presence of Brazilian agribusiness firms. Whether or not its strategy was specifically

[23] BNDES, *Annual Report 2009*, n.d., 148 (accessed January 19, 2012).

[24] BNDES, "Internationalization of Companies" (accessed December 7, 2011).

[25] *Economist*, "Brazil's Development Bank," August 5, 2010; BM&F BOVESPA, "Company Data," http://www.bmfbovespa.com.br/cias-listadas/empresas-listadas/BuscaEmpresaListada.aspx?idioma=en-us (accessed November 4, 2011); JBS SA, August/September 2011; Bureau van Dijk, Zephyr database (accessed October 31, 2011).

[26] BNDES also holds a 23 percent stake in Laticinios Bom Gosto and may also hold equity stakes in other agribusiness firms. Bureau van Dijk, Zephyr M&A database (accessed November 17, 2011); *Business Wire*, "Fitch Affirms Marfrig's Ratings," September 9, 2010; *Setor Avícola*, "BNDES Will Invest an Additional R$2.5 Billion in Marfrig," July 21, 2010.

[27] Meatingplace.com, "Brasil Foods to Acquire $1.4 Billion Credit Line," February 6, 2012.

[28] *Economist*, "Brazil's Development Bank," August 5, 2010.

aimed at creating "national champions," JBS, Marfrig, and BRF are regarded as having attained that status. Outside of those firms, BNDES more often makes loans rather than directly taking equity stakes. For example, Vanguarda recently invested R$100 million ($60 million) in an expansion of its pork operations, of which 25 percent was paid from retained earnings and 75 percent by a loan from BNDES.[29] However, BNDES loans reportedly are available only to large firms that can provide the necessary paperwork and can serve as large capital investments for the development bank. Once a company receives an initial loan from BNDES, further financing is reportedly easier, as an ongoing partnership has been established. For information on other investment loans provided by commercial banks but supported by the government, see chapter 3.[30]

In addition to BNDES financing, the Brazilian government has offered support to agribusiness through targeted R&D programs, most notably through Embrapa. Embrapa began a number of public-private partnership programs in the 1990s (box 5.1).

Agribusiness in Brazil's Beef and Poultry Industries

Brazil's beef and poultry exports have grown rapidly in recent years, as discussed in more detail in chapters 8 and 9. Since 2008, Brazilian agribusiness firms have vastly expanded their participation in the global food supply chain, gaining global market share through both exports and FDI.[31] Exports accounted for a large share of production for all of Brazil's three largest protein companies. JBS is the world's largest beef exporter; the firm sells its products in over 100 countries.[32] For JBS, BRF, and Marfrig, exports represented 24 percent, 38 percent, and 38 percent, respectively, of each company's total sales, although these are consolidated data for global companies, so the data include substantial exports from outside Brazil.[33]

Within Brazil, the meat and poultry agribusinesses have experienced extensive consolidation in recent years, allowing them to reap ownership benefits from growing economies of scale. Particularly large acquisitions within Brazil include the aforementioned merger of Sadia and Perdigão, two of Brazil's largest poultry companies, to create BRF;[34] JBS' acquisition of Bertin, a major rival in the beef business; and Marfrig's acquisition of Seara Alimentos SA (Seara), formerly controlled by Cargill, all in 2009. All of the top three companies combine beef, poultry, and other protein businesses. In contrast, most of the smaller Brazilian beef and poultry firms concentrate on a single segment of the industry (beef or poultry) and tend to export rather than operate through overseas affiliates. Examples include Minerva, Brazil's third-largest beef

[29] BNDES financing was offered through a 10-year loan financed at an interest rate of 6.75 percent. Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 28, 2011.

[30] Banco do Brasil and Bradesco are the largest private lenders to agribusiness. Industry representatives, interviews by USITC staff, Rio de Janeiro and Mato Grosso, Brazil, August 28–September 2, 2011.

[31] *Brazilian Meat Monitor*, "Giants of the Meat Industry Are Betting on Diversifiication and Gains Post-Crisis," April 8, 2011, 1.

[32] JBS Web site, "History and Profile," http://www.jbs.com.br/ir/, n.d.

[33] These figures represent consolidated data from all divisions of each company, based on annual reports, so exports originate both inside and outside Brazil. For JBS, data are for 2010 and are reported by production volume. For BRF, data are for 2010 and reflect revenue share. For Marfrig, data are for 2009 and reflect revenue share.

[34] The merger was announced in 2009 and received final antitrust approval in July 2011. Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.

BOX 5.1 Public-Private Partnerships with Embrapa

The Brazilian government's commitment to agricultural research has significantly contributed to the growth of agribusiness, particularly through Embrapa, Brazil's leading public agricultural research institute. Earlier in its history, Embrapa directly funded the bulk of its research. Beginning in the late 1990s, however, Embrapa began to focus its funding on a range of domestic and international partnerships with multinational agribusiness firms and universities, leading to significant gains in the productivity of Brazilian agribusiness. Through the Agricultural Technology Development Project (the Project) (1997–2005, partially funded by the World Bank), Embrapa began funding research proposals through a competitive grants system which established partnerships with the private sector, universities, and farmers' organizations, and increased international collaboration as well. Embrapa's research into methods to improve the productivity of inferior soils allowed the *cerrado* region to become a major agricultural production area, and the development of new seeds for crops, particularly those used for animal feed, also helped to increase productivity.[a]

During its eight-year lifespan, the Project financed 470 public/private contracts involving 112 private entities, including agribusiness and agricultural equipment firms and producer federations, and 89 Brazilian and foreign universities. Embrapa remained the leader of this agricultural research process, but the agency's direct contribution to the research funding dropped from 84 percent to 50 percent between 1997 and 2005.[b]

Embrapa's public-private partnerships with agribusiness firms take several forms:

- Partnerships with MNCs for the development of new technologies: Embrapa partners with a particular firm to develop research and development (R&D) projects, and the resulting technology is then made available for broader use in Brazil. In one example, BASF and Embrapa signed an agreement to develop herbicide-resistant plant varieties.

- Partnerships for incorporating technologies from other corporations into Embrapa products: Embrapa identifies and licenses existing technologies and then incorporates them into its own products, facilitating technology transfer to other Brazilian firms.

- Partnerships in which Embrapa licenses its own seed varieties and technologies to Brazilian and foreign agribusiness firms, which may commercialize Embrapa technologies both in Brazil and abroad. Since 1998, Embrapa has created virtual laboratories in France, the Netherlands, the United Kingdom, and the United States, and also carried out cooperation projects in all South American and 13 African countries.[c]

Embrapa has also pursued partnership projects with Brazilian agricultural cooperatives, focusing its R&D initiatives in response to feedback from farmer members. In one example, Embrapa conducted research into swine and poultry genetics under contract with Aurora Alimentos, a large cooperative. The improved swine herd allowed Aurora to increase its pork production, and the close cooperation between Embrapa and Aurora ensured that the research met the needs of the farmers.[d]

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[a] Chaddad and Jank, "The Evolution of Agricultural Policies," 2nd Quarter 2006, 85–90; Barros, "The Challenges in Becoming an Agricultural Superpower," 2009, 97–8; industry representative, interview by USITC staff, Brasília, August 25, 2011; World Bank, "Implementation Completion Report," 2006.

[b] World Bank, "Implementation Completion Report," 2006.

[c] UNCTAD, based on inputs from Antonio Flavio Dias Avila, Embrapa (Brazil), cited in *World Investment Report 2009,* 142.

[d] Fronzaglia et al., "The Role of Agricultural Cooperatives," 2008, 15.

exporter with 25 percent of beef exports, and U.S.-based Tyson, which operates three poultry processing plants in Brazil and supplies poultry for the domestic market and for export.[35]

The strengthening Brazilian *real* has made it more difficult for Brazilian companies to export, but it has also made it easier for large companies with access to capital to expand overseas through acquisitions. This in turn has allowed Brazilian firms to access markets that are closed to direct exports from Brazil because of certain SPS restrictions.[36] Both Marfrig and JBS have invested heavily in the United States via JBS's 2007 acquisition of Swift Foods (a beef company), its 2009 acquisition of Pilgrim's Pride (a poultry producer), and Marfrig's 2010 acquisition of Keystone Foods (Keystone) (primarily a beef producer). In fact, JBS's USA division exports more beef, by volume, than its Mercosul division.[37] JBS has become a highly globalized company, with revenue from its Brazilian operations now accounting for only 16 percent of the total in 2009. By contrast, 65 percent of JBS's revenue came from the firm's U.S. beef and pork divisions combined, while 12 percent came from Australia.

Several Brazilian firms, especially JBS and Marfrig, have extensive investments in other countries as well. Marfrig alone accounts for 30 percent of Uruguay's beef production, and Brazilian firms together accounted for 36 percent of Uruguayan slaughter capacity in 2011.[38] The companies' global reach has also enhanced their flexibility. For example, when Brazil's processed beef exports to the United States were suspended in May 2010, following a recall of JBS products that were found to have impermissible levels of veterinary drug residues,[39] Marfrig quickly announced that it would fulfill U.S. demand for cooked meats, tinned meats, and beef jerky via its operations in Uruguay and Argentina.[40] Unlike JBS and Marfrig, Minerva has limited its overseas acquisitions to Uruguay and Paraguay.[41] Both ownership and localization factors have encouraged Brazilian agribusiness' foreign acquisitions.

The largest agribusiness companies have also branched out across segments of the protein industry. JBS, the world's largest beef company, entered the poultry industry through its acquisition of Pilgrim's Pride. The Bertin and Pilgrim's Pride acquisitions made JBS the world's largest protein company, surpassing Tyson. The merger with Bertin also introduced JBS to the dairy products segment, created the world's largest leather

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[35] Minerva Web site, http://www.mzweb.com.br/minerva/web/conteudo_en.asp?idioma=1&conta=44&tipo=7663 (accessed September 2, 2011); industry representative, telephone interview by USITC staff, June 15, 2011; *Brazilian Agribusiness Opportunities,* "Minerva Expands Market Share," April 13, 2011, 6.

[36] *Economist Intelligence Unit,* "The Global Power of Brazilian Agribusiness," 12 (accessed February 13, 2012).

[37] JBS, *Annual Report 2010,* 36–38. JBS USA includes Australia. JBS Mercosul includes all South American operations.

[38] The Brazilian-controlled share of Uruguay's beef production includes Minerva's entry into the Uruguayan market with the acquisition of Pul in 2011. Valued at $65 million, the Pul acquisition was announced in January 2011. Uruguayan cattle slaughter totaled 2.2 million head in 2010. Bureau van Dijk, Zephyr database (accessed November 17, 2011); *Brazilian Meat Monitor,* "Brazilian Slaughterhouses Now Have 36% of Slaughter in Uruguay," January 21, 2011, 7.

[39] Residues were found to exceed the maximum tolerance established by the Food and Drug Administration. Brazil's Agriculture Ministry suspended exports of cooked beef products from all Brazilian producers to the United States between May 2010 and January 2011.

[40] *Brazilian Meat Monitor,* "Marfrig to Redirect Exports to the USA," May 13, 2011, 8.

[41] Bureau van Dijk, Zephyr database (accessed November 9, 2011).

processing company, and strengthened JBS' distribution channels in the retail and food services areas.[42] Marfrig, likewise known primarily as a beef company, became Brazil's second-largest poultry and pork producer with the Seara acquisition.[43] And while BRF is known as a poultry company, only 17 percent of its export revenue and 11 percent of its total sales come from beef and poultry.[44]

Agribusinesses that export poultry from Brazil can be split into two distinct tiers.[45] The first tier, made up of the biggest companies, accounts for almost one-half of total Brazilian poultry production.[46] BRF is by far the largest firm and was the largest Brazilian agribusiness exporter in 2010, with consolidated export revenues of R$9.1 billion ($5.4 billion) and poultry export revenue of R$5.8 billion ($3.4 billion).[47] BRF's weekly poultry slaughter is estimated at about 30 million birds, followed by Marfrig's Seara division (about 15 million per week) and Doux-Frangosul, with smaller production levels. These major exporters typically export about 80 percent of their production.[48] Other major poultry producers are Kaefer, Diplomata, Jandelle, and the cooperatives Aurora, C. Vale, Copacol, and Lar. Together, these 10 companies and cooperatives generated 3.6 percent of Brazil's total (both agricultural and non-agricultural) 2010 export revenue.[49] BRF and Marfrig together accounted for 72 percent of Brazil's poultry meat exports in the first quarter of 2011.[50]

Firms in the second tier are mostly regional actors and tend to export closer to one-half of their production, slaughter about 1 million birds per week, and include Big Frango and Tyson do Brasil. Big Frango, which produces poultry, pigs, and cattle in several states, earned R$1.2 billion ($716 million) and exported to 60 countries in 2010. In 2011, Big Frango produced 1,000 metric tons (mt) of poultry (400,000 birds) per day, but the company plans to increase its poultry slaughter capacity to 500,000 birds per day in the next few years. In adition, Big Frango maintained a daily slaughter capacity of 1,500 pigs and 300 head per day of cattle and is building a processed food plant with a capacity of 140 mt per day.[51]

Foreign-owned firms have not been active investors in Brazil's beef industry, but they have played a larger role in the poultry segment. Several factors may play a role in these diverging trends. First, Brazil is ineligible to export beef to many countries due to FMD, so it does not serve as an attractive platform for foreign firms seeking to increase exports.

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[42] FoodBizDaily, "FBD: After Merger and Acquisitions JBS Becomes the Largest Protein Company," September 21, 2009; JBS, "Acquisition of Pilgrim's Pride and Association with Bertin S.A.," September 16, 2009.

[43] Marfrig, *2010 Management Report,* n.d., 1 (accessed February 13, 2012).

[44] USITC staff calculations, based on Brasil Foods, *Brasil Foods Annual and Sustainability Report 2010,* n.d., 29 (accessed February 13, 2012).

[45] The Brazilian poultry industry also includes small producers that focus on the domestic market; most are not approved to export. These firms mostly consist of a single production facility that slaughters about 300,000 birds per week. As a group, they supply about one-third of Brazil's domestic market. Industry representative, telephone interview by USITC staff, June 15, 2011; individual company information.

[46] Brazil's total weekly production is estimated at 110 million birds.

[47] BRF, *Annual Report 2010,* 29 (accessed February 13, 2012).

[48] Industry representative, telephone interview by USITC staff, June 15, 2011.

[49] *Brazilian Meat Monitor,* "BRF Was the Third Largest Exporter in Brazil," February 18, 2011, 12; BRF, *Annual Report 2010* (accessed November 15, 2011), 29.

[50] *Brazilian Meat Monitor,* "BRF and Marfrig Have 72% of Poultry Meat Exports," May 20, 2011, 18.

[51] *Brazilian Meat Monitor,* "Big Frango Group Increases Slaughter," January 7, 2011, 12; industry representative, interview by USITC staff, September 1, 2011.

In contrast, U.S. poultry producers face export barriers that Brazilian producers do not, such as the EU-27 ban on certain pathogen reduction treatments (PRTs), such as chlorine washing, used in the United States, making Brazil of interest to poultry exporters.[52] Second, the Brazilian acquisitions of U.S.-based Swift and Keystone effectively eliminated two of the strongest potential foreign investors in the Brazilian beef market. There are, however, two prominent examples of foreign firms in Brazil's poultry market: Tyson Foods (United States) and Groupe Doux (France). Tyson entered the market in 2008, acquiring poultry production plants from three Brazilian firms (Avicola Itaiopolis, Macedo Agroindustrial, and Frangobras). Tyson saw a locational advantage in Brazil, planning to use its Brazilian venture to boost exports to the EU-27, the Middle East, Japan, and other markets that did not import poultry from the United States.[53]

JBS

As of 2010, JBS was the world's leading beef producer and exporter, with operations in the United States, Brazil, Australia, Argentina, Uruguay, and Paraguay, and a daily slaughtering capacity of over 86,000 head of cattle. JBS was also the world's second-largest poultry producer that year, with operations in the United States, Mexico, and Puerto Rico and a daily slaughtering capacity of approximately 7.9 million birds, as well as the third-largest pork producer in the United States. The company was also the world's leading lamb producer and exporter, the global leader in leather tanning, and Brazil's third-largest dairy producer. Other markets served by JBS include transportation, biodiesel, and collagen.[54] In addition to Bertin and Pilgrim's Pride, the company has acquired more than 30 Brazilian and foreign companies since 1996, giving it a presence in more than 100 countries (table 5.3).[55] BNDES has been a substantial source of funding for these acquisitions; as of August 2011, BNDES reportedly has a 30.4 percent equity interest in JBS, with overall investment of more than $3 billion in the company.[56] With regard to the OLI framework, JBS faces several specific locational advantages prompting it to invest abroad. The company's strong position in Brazil's meat industry means that it would likely face antitrust problems if it were to acquire poultry operations within Brazil; doing so in the United States removes that threat. Entering the U.S. beef market also allows JBS to be a direct, active player in the world's largest beef market, and enables the company to export beef to third-country markets without facing FMD concerns.[57]

Marfrig

In the last several years, Marfrig has become one of the largest protein-based food companies worldwide, with businesses in beef, pork, poultry, and fish. The company employs about 90,000 people in 22 countries and sells its products in more than 140 countries. Sales revenue increased from about $1 billion in 2006 to $9.6 billion in 2010,

[52] USDA, FAS, *EU-27: Update on the EU-27 Pathogen Reduction Treatment Approval Process*, July 18, 2008. The EU ban on PRTs is discussed in more detail in chapter 9.

[53] Bureau van Dijk, Zephyr database (accessed November 17, 2011); industry representative, telephone interview by USITC staff, June 15, 2011.

[54] JBS, *Annual Report 2010*, n.d., 13–14 (accessed February 13, 2012).

[55] BS SA, August/September 2011, n.d. (accessed February 13, 2012).

[56] This figure represents separate funding allocations in 2007 and 2011. Bureau van Dijk, Zephyr database (accessed October 28, 2011).

[57] Industry representative, interview by USITC staff, Washington, DC, August 1, 2011.

TABLE 5.3 Selected JBS mergers and acquisitions

Target company name	Target country	Deal type	Deal value (million $)	Completed date
Swift & Company	United States	Acquisition 100%	1,425.0	July 2007
Pilgrim's Pride	United States	Acquisition 64%	800.0	December 2009
Smithfield Beef Group	United States	Acquisition 100%	565.0	October 2008
Inalca	Italy	Minority stake 48.6%	346.7	May 2008
InalcaJBS	Italy	Acquisition increased from 50% to 100%	305.6	Announced March 2011
Swift Armour	Argentina	Acquisition 85.3%	200.0	September 2005
Tatiara Meat Company	Australia	Acquisition 100%	27.0	February 2010
McElhaney Feedyard	United States	Acquisition 100%	24.0	Announced June 2010
Toledo International	Belgium	Acquisition 100%	13.8	July 2010
Bertin	Brazil	Acquisition 100%	([a])	Announced September 2009
LSI	Brazil	Joint venture 100%	([a])	September 2010

Source: Bureau van Dijk, Zephyr M&A database (accessed November 17, 2011).

[a]Not available.

largely due to a series of acquisitions.[58] Marfrig's principal operating units are highlighted in table 5.4. Although known primarily as a beef producer, Marfrig has recently increased its presence in the global poultry market. As noted, the company is now Brazil's second-largest poultry producer. Like JBS, Marfrig benefits from the locational advantages of operating directly in the United States and Europe, which are major consuming markets, and of having acquired several FMD-free export platforms.

In the last three years, Marfrig has completed 38 acquisitions. The company's operations now cover five continents and consist of 93 processing facilities and offices, with a distribution network that gives access to more than 100 countries.[59] The Seara and Keystone acquisitions significantly expanded Marfrig's global reach. Through Seara, Marfrig acquired 12 processed-food plants and a port terminal, along with Seara's subsidiaries in Europe and Asia. Valued at $899 million, the transaction turned Marfrig into Brazil's second largest broiler producer. Marfrig now produces 650 million broilers and 6 million turkeys annually.[60] As a result of the Keystone acquisition, Marfrig has $6.4 billion in revenue and was a leading supplier to 28,000 restaurants in 13 countries, including such globally known chains as McDonald's, Campbell's, Subway, Yum! Brands, and Chipotle. The acquisition price was $1.26 billion.61 Marfrig continues to expand, investing in a poultry processing plant in Mato Grosso and cattle feedlot

[58] Based on the exchange rate at that date. EIU, "The Global Power of Brazilian Agribusiness," 8; Marfrig Web site, http://ir.marfrig.com.br/eng/comunicados/noticia.asp?id=1742 (accessed July 29, 2011); Bureau van Dijk, Orbis database (accessed October 7, 2011).

[59] Marfrig Web site, http://ir.marfrig.com.br/eng/comunicados/noticia.asp?id=1742 (accessed July 29, 2011); http://ir.marfrig.com.br/eng/downloads/fact_sheet/marfrig_FS_3Q10_baixa.pdf (accessed August 1, 2011).

[60] Marfrig, "MARFRIG Concludes SEARA's Acquisition," January 4, 2010; Wattagnet.net, "Marfrig in Talks with Globoaves," March 3, 2010.

[61] Marfrig, "Material Fact: Acquisition of Keystone," June 14, 2010; Grudgings and Parra-Benal, "Brazil's Marfrig to Buy Keystone Foods," June 15, 2010.

TABLE 5.4 Marfrig Alimentos SA: Principal operating units

Company	Country of primary operation	Primary products	Primary brands	Notes
Marfrig	Brazil	Production and processing of beef and lamb	Bassi, Palatare, GJ, Pampeano, Seara	Founding company began operations in 1986 as supplier to restaurants in São Paulo.
Marfood USA	United States	Beef jerky, corned beef, nuggets, burgers	Pemmican, Pecos Bill's	Products are sold in 17 of the 25 largest American retail chains.
Tacuarembó	Uruguay	Cooked and frozen beef, beef jerky, bresaola, organic beef, lamb	Tacuarembó, Viva, Paty, Bernina	Accounted for 30 percent of beef exports from Uruguay in 2010; also operates in Chile.
Quickfood	Argentina	Beef, sausages, ham, beef jerky, breaded and frozen vegetables	Aberdeen Angus, La Morocha, Paty, Seara, Green Life	Exports frozen beef to more than 40 countries.
Moy Park	Northern Ireland	Organic production of industrialized foods made from chicken, turkey, and pork, products made from vegetables, and breads	Moy Park	Acquired in 2008; the largest integrated system of industrialized, poultry-based food production in the United Kingdom.
Seara	Brazil	Poultry, pork, frozen ready-to-eat meals	Seara	One of the largest producers and exporters of food made from poultry and pork in the world, and a well-known Brazilian brand.
Keystone Foods	United States	Poultry, beef, fish, and food distribution services. Supplier to chain restaurants, food service companies, and retail outlets around the world	Keystone	Acquired in 2010; operates in 13 countries.

Sources: Marfrig Web site, http://ir.marfrig.com.br/eng/grupomarfrig/perfil.asp (accessed August 1, 2011); Keystone Foods Web site, http://www.keystonefoods.com/global-business-units/ (accessed October 4, 2011).

operations in Argentina in 2010.[62] Marfrig also entered Brazil's turkey market in 2009, acquiring the turkey production assets owned by Doux Frangosul S/A Agro Avícola Industrial (Doux Frangosul).[63]

Brasil Foods

BRF is the world's largest poultry exporter and second-largest meat exporter. According to the company, BRF accounted for 9 percent of global protein trade in 2010, exports to 140 markets, and owns three production plants outside of Brazil.[64] Like JBS and Marfrig, BRF probably derives locational advantages from operating directly in its principal markets outside of Brazil, but the consolidated company is too new to have pursued this

[62] Marfrig, "Material Fact: Marfrig and Seara Alimentos Announce Investments," April 9, 2010; Marfrig, "Marfrig Invests in Feedlot Operations in Argentina," January 27, 2010.

[63] The 2009 acquisition included a slaughter plant in Rio Grande do Sul, with daily slaughter capacity of 30,000 turkeys; a feed plant; an incubation facility; and four farms with approximately 1 million birds for slaughter, 50,000 birds for the production of fertile eggs, and more than 300 integrated producers to supply birds. Marfrig, "Marfrig Enters the Turkey Market," June 23, 2010.

[64] BRF Web site, http://www.brasilfoods.com/ir/ (accessed November 8, 2011).

strategy extensively.[65] Unlike JBS and Marfrig, as a poultry exporter, BRF does not have FMD concerns, so has fewer incentives to invest directly in foreign markets.

In 2010, BRF shipped 32 percent of its exports to the Middle East, 21 percent to the Far East, and 19 percent to Europe.[66] Table 5.5 illustrates the scale of the company's production and exports. BRF supplies food processing and food service companies in Europe, and was the first Brazilian company approved to sell processed poultry products to European consumers.[67] The company's export strategy focuses on broadening its product lines beyond poultry to include beef, dairy, and additional processed food products. The domestic market accounted for 58 percent of BRF's combined net sales in 2009, while exports made up 42 percent.[68] Marfrig and BRF together accounted for about 45 percent of officially inspected poultry slaughter in 2010, an estimated 586 million head.[69]

TABLE 5.5 Brasil Foods: Domestic sales, exports, and total sales, by product, 2010

	Quantity			Value		
Product	Domestic sales	Exports	Total sales	Domestic sales	Exports	Total sales
	1,000 mt			R$ million		
Meats	1,837	2,278	4,115	8,668	9,051	17,719
Unprocessed	40	1,922	2,322	1,930	7,361	9,291
Poultry	255	1,640	1,895	1,039	5,847	6,886
Pork/beef	145	282	427	891	1,515	2,406
Processed meats	1,437	357	1,793	6,738	1,690	8,428
Dairy products	1,075	3	1,078	2,292	20	2,311
Other processed foods	455	18	473	2,026	91	2,117
Soybean products	389	6	395	529	4	533
Total	3,756	2,306	6,062	13,515	9,166	22,681

Source: BRF, *Annual and Sustainability Report 2010,* n.d., 29 (accessed February 13, 2012).

In addition to producing across the different protein segments, many poultry firms also grow soybeans and corn. The firms may either sell these goods or use them to produce feed for their poultry stocks or biofuels to power local processing operations. The Sadia (now BRF) facility in northern Lucas do Rio Verde, Mato Grosso, for example, is the largest pork and poultry processing facility in South America. The plant is a fully integrated operation that is also energy self-sufficient (figure 5.3); more firms are likely to use similar integrated facilities in the future. This plant currently sources half of its soybeans from small producers in order to maintain its certification in Brazil's national biofuel mandate program.[70]

[65] And until July 2011, BRF continued to face antitrust scrutiny in Brazil, so was unlikely to plan significant outbound investment. Now that the Sadia-Perdigão merger has been approved, BRF may well consider further investment in foreign markets.

[66] BRF Web site, http://www.brasilfoods.com/ir/ (accessed November 8, 2011).

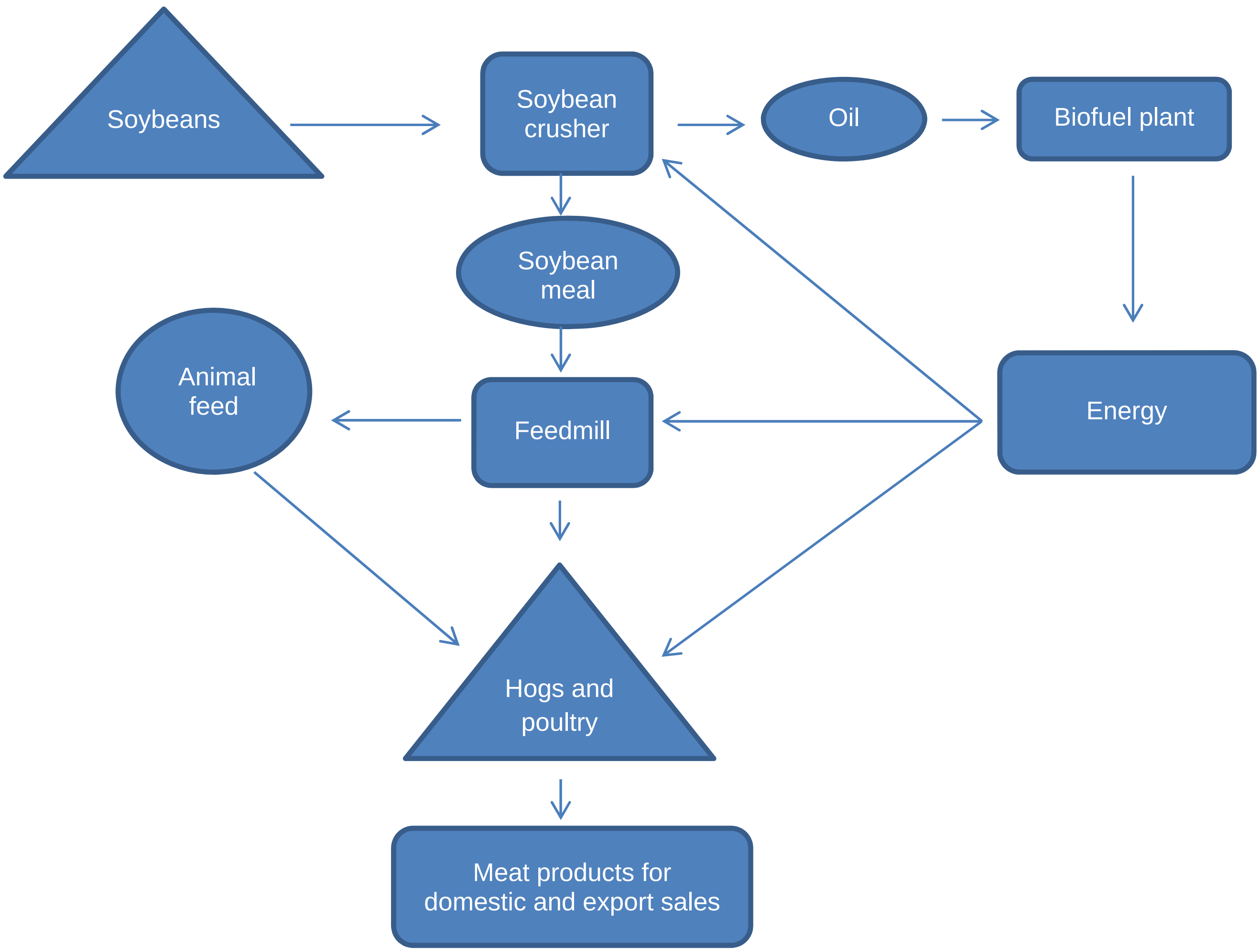
[67] BRF Web site, "Competitive Strengths," http://www.brasilfoods.com/ir/ (accessed November 8, 2011).

[68] Ibid.

[69] *Brazilian Meat Monitor,* "After Successive Conquests, Consolidation and Diversification," January 27, 2011, 2.

[70] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.

FIGURE 5.3 BRF's integrated, energy self-sufficient pork and poultry processing plant



Source: Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.

Agribusiness in Brazil's Soybean Industry

As discussed in chapter 6, Brazil is also a huge soybean producer, but agribusiness in the soybean industry has developed along quite different lines than in the meat industries. The differences reflect the global markets for the two types of products, the different structures of the existing global agribusiness sectors, and the commodities themselves. Most Brazilian soybean exports are in the form of whole beans; many of the exports are controlled by the Big Four global agricultural distribution firms, all of which have extensive investments in Brazil. As of 2009, the Big Four accounted for over 40 percent of soybean crushing capacity in Brazil, and all of them were also involved in segments of the grain industry.[71] These companies are primarily processors and traders—they are not involved in actually growing most of the food crops that they handle.

Brazil's largest soybean producers are in the Center-West region of the country, particularly Mato Grosso. As of 2011, Brazil's (and the world's) largest soybean producer is Grupo Bom Futuro. Other large producers include André Maggi Group, Vanguarda, Imcopa, Caramuru, and SLC Agrícola. Most of these started as family farm operations in Mato Grosso and expanded over time to become large companies whose management relies on professional, career executives. Many of these producers have begun to attract investor financing, which allows steadier growth and access to capital at lower interest rates than are available through Brazilian bank financing. However, outside financing also comes with requirements for maintaining audited company accounts and a formalized corporate governance structure. Owing in part to such costs, the move by family-owned companies to more professional management is also encouraging rural enterprises to consolidate.[72]

A number of large Mato Grosso soybean producers, including Vanguarda and Imcopa, concentrate on non-genetically modified (GM) seed varieties, which are beneficial for exporting to the EU-27.[73] Vanguarda is an integrated producer, growing corn, cotton, and other agricultural products in addition to soybeans. The company owns 10 production units in Mato Grosso and one in Bahia, and planted nearly 226,000 hectares (ha) (558,200 acres) in the 2009–10 harvest season.[74] Vanguarda sends its soybeans to a Bunge facility for crushing and then buys back some of the meal for its own animal feed operations.[75] Like many other Brazilian companies that primarily focus on grains and soybeans, Vanguarda also has a presence in the meat industry, growing out both hogs and cattle but sending them to other Brazilian firms for slaughter. Pork capacity is approximately 40,000 head, and cattle capacity is approximately 60,000 head. Vanguarda also operates processing facilities, including cotton processing and cottonseed crushing to manufacture feed and oil.[76] Imcopa is another major soybean producer that performs its crushing operations in-house, with a combined daily crushing capacity of almost 5,000 mt and a combined daily receiving capacity of 8,500 mt in two main production facilities. Imcopa deals exclusively in non-GM soybeans, and all received soybeans are tested for GM traits.[77]

The state of Paraná, in Brazil's southern region, is also a strong producer of grains and soybeans. Individual producers tend to be much smaller in Paraná than in Mato Grosso, and far smaller than the country's largest agribusiness firms. In order to take advantage of economies of scale in upstream and downstream production segments, farmers have organized cooperatives to handle much of the off-farm distribution and sales activities and to act as sources of inputs, including seed and chemicals. These cooperatives are

[71] UNCTAD, *World Investment Report,* 2009, 114.

[72] Savanachi, "Rei da Soja, Rei do Boi" [King of Soy, King of Beef], September 2007.

[73] However, Vanguarda does rotate GM soybeans every few years in an effort to reduce weeds.

[74] The marketing year is a 12-month period, usually beginning with a new harvest, during which the product is marketed. Marketing years differ for each commodity and country.

[75] Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 28, 2011.

[76] Vanguarda was acquired by Ecodiesel, a Brazilian company focused on biodiesel production, in September 2011. Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 28, 2011.

[77] The company's products include crushing and production of lecithin, refined oil, soybean protein concentrate, and soy ethanol. Imcopa Web site, http://www.imcopa.com/ (accessed September 2, 2011).

among the large Brazilian agribusinesses; representative examples include Coopavel, COAMO, and Cocamar (box 5.2). In many cases, the cooperatives provide farmers with an alternative to the Big Four global agribusiness firms.

BOX 5.2 Concept and Background: Agricultural and Livestock Cooperatives

Brazil's first agricultural cooperatives were established in the state of Minas Gerais in 1907, primarily for coffee; they were aimed at reducing the power of mostly foreign agricultural middlemen. Agricultural and livestock cooperatives are now established throughout Brazil, particularly in the South. Cooperatives provide a wide range of member services, including technical support, storage, product promotion, and social and educational assistance. The large cooperatives normally cover the entire production chain, from land preparation to the final sale of farm products. They use advanced technology in all stages of the chain and have adopted modern management and marketing principles.[a] The advantage of the cooperative structure is that it allows farmers with relatively small landholdings and limited capital resources to buy inputs and market their products on a similar scale to large farmers and processors, thereby benefiting from similar economies of scale. In the first half of 2011, cooperatives' leading export products by value were sugar (17 percent), coffee (12.7 percent), and soybeans (12.5 percent).[b]

The state of Paraná has the largest number of agricultural cooperatives; they account for 34.5 percent of total exports by cooperatives, closely followed by cooperatives in the state of São Paulo (32.8 percent). In Paraná, agricultural cooperatives controlled 53 percent of the state's agricultural economy in 2006, accounting for 18 percent of its gross domestic product (GDP). Paraná cooperatives' total exports of $852.9 million that year were equal to 8.5 percent of total exports from Paraná. Minas Gerais, Rio Grande do Sul, and Santa Catarina also report significant exports by cooperatives, but agricultural cooperatives are a much smaller force in Mato Grosso, where farms may be as large as 50,000 ha (123,500 acres) or more.[c]

Brazil's agricultural and livestock cooperatives, 2008

Number of cooperatives	1,544
Total members	879,649
Direct jobs	139,608
Share of agricultural GDP	38.4%
Share of cooperative GDP	47.5%
Direct exports (2007)	$3.3 billion

Source: Organização das Cooperativas Brasileiras, Web site, "Statistics" (Web site dated 2008), http://www.brasilcooperativo.com.br/site/ramos/eng/agropecuario_numeros.asp (accessed September 23, 2011).

Note: Agriculture and livestock cooperatives are defined as groups that are made up of rural producers who own their means of production, including pastures and fisheries, and that manage the purchase or sale of inputs, production, and storage in common, and provide technical, educational, and social assistance to their members.

[a] Organização das Cooperativas Brasileiras, "Background" (accessed September 23, 2011).
[b] *Soybean & Corn Advisor,* "Brazil Ag Co-ops Report US$ 3 Billion Trade Surplus," August 29, 2011.
[c] Ritossa and Bulgacov, "Internationalization and Diversification Strategies of Agricultural Cooperatives," July/September 2009, 188.

The Big Four global agribusiness firms all have extensive operations in Brazil and see Brazil as a major source of supply for their global trading and distribution operations.[78] There are little available data on their operations or investment in Brazil, but all of them have extensive facilities in Brazil, including assets such as grain elevators, crushing facilities, port terminals, and other processing and distribution facilities. Soybeans are an

[78] Industry representatives, interviews by USITC staff, Washington, DC, July 2011.

important focus for all four firms, although they also handle grains, such as wheat and corn, and other products, including sugar, coffee, cocoa, and orange juice. Each of the companies has a slightly different strategy for its Brazil operations.

Bunge first invested in Brazil in 1904, before it began U.S. operations; about one-third of its global business takes place in Brazil, partly driven by the country's historical differential export tax system, which was eliminated in the 1990s. Bunge operates between 80 and 90 grain elevators in Brazil, clustered near five ports.[79] Cargill has operated in Brazil since 1965, and owns five soybean crushing plants, as well as warehouses, port terminals, and branch offices in nearly 180 cities throughout Brazil. Between 60 and 70 percent of Cargill's Brazil revenues come from soybeans and corn, with smaller amounts from cocoa and corn processing.[80] ADM is a more recent entrant to the Brazil market, arriving in 1997. The company's main Brazil business is soybeans, but it also processes and sells corn, cocoa, and sorghum, and produces fertilizers, biofuels, and chemicals. As of 2011, the company owns or leases grain elevators in five states and owns a soy-biodiesel plant in Mato Grosso.[81] ADM sources approximately 10 million mt of oilseeds, corn, and wheat in Brazil each year; processes about 4 million mt of soybeans annually in five Brazilian soy crushing facilities; and operates an elevator network with a crop-storage capacity of 2.2 million mt.[82] Louis Dreyfus Company Brazil has focused on building assets such as grain elevators and crushing facilities in Brazil. It has also been building assets aimed at improving logistics, such as storage, contract rail, port terminals, and processing facilities.[83]

Grupo Bom Futuro

Grupo Bom Futuro (GBF), which operates in 20 cities throughout Mato Grosso, is the world's largest soybean producer and exemplifies the rapid growth of the huge farming operations emerging in Brazil's Center-West region. GBF planted 230,000 ha (568,100 acres) with soybeans in marketing year 2009/2010, with production of 720,000 mt, yielding revenue of R$300 million ($176.5 million) from soy alone. The company double-crops 90 percent of its land, so the equivalent farmed acreage is close to 400,000 ha (988,000 acres). In addition to soybeans, GBF planted 110,000 ha (271,700 acres) of cotton in 2010 (30 percent of which was first crop), and 43,000 ha (106,200 acres) of corn (all of which was second crop). For marketing year 2010/2011, GBF expected to produce 550,000 mt of soybeans, representing 3 percent of total production in Mato Grosso (estimated at 19 million mt). Aside from soybeans, the company produces and distributes cotton, corn, beans, rice, and beef; farms freshwater fish for distribution to supermarkets in Mato Grosso; produces soybean and cotton seeds; and constructs hydroelectric facilities (see tabulation on next page). The company also is actively engaged in R&D related to new plant varieties and hybrids, farm practices, and fertilization management. GBF has another 200,000 ha (494,000 acres) of pastureland, with 50,000 head of cattle, and feedlots alongside the pasture. Company employment was estimated at about 3,700 workers in 2009. The company leases 70 percent of its land and

[79] Industry representative, interview by USITC staff, Washington, DC, July 12, 2011.
[80] Cargill Web site, http://www.cargill.com.br/brazil/en/home/about-cargill-brazil/index.jsp (accessed July 14, 2011).
[81] ADM Web site, http://www.adm.com/en-US/worldwide/brazil/Pages/default.aspx (accessed September 2, 2011).
[82] Ibid.
[83] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

Grupo Bom Futuro, revenue and production, major products, 2009–10 harvest year

Product	Revenue	Production
	R$ Million ($ million)	Thousand mt (except as noted)
Soy	300 (176.5)	720.0
Cotton	280 (164.7)	110.0
Corn	200 (117.6)	60.0
Seeds (million sacks)	150 (88.2)	1.2
Livestock (million head)	50 (29.4)	50.0
Fish farming	15 (8.8)	4.0

Source: Savanachi, "Rei da Soja, Rei do Boi" [King of Soy, King of Beef], *Dinheiro Rural,* July 2010.

directly owns the remaining 30 percent. Most exports transit through the port of Paranaguá.[84]

GBF has also expanded into the beef industry in an effort to diversify and to make better use of its land. The company is using a new model of soybean-livestock integration to increase the size of the firm's cattle herd, and reports that its model yields annual beef productivity of 80 kg/ha, compared with average production in Brazil of 4 kg/ha. Under the new system, land is used part of the year for oilseed production. Soy fixes nitrogen in the soil, so the land is more productive. Cattle farmers therefore do not need to apply nitrogen fertilizer to the pasture, reducing costs and increasing productivity. After the soybean harvest, cattle graze on the land through September, when early soybean planting begins. GBF handles the entire beef value chain in-house, and annual sales of livestock have reached R$50 million ($29.4 million). As of 2010, the company expected to double the size of the herd to 100,000 head.[85]

GBF has faced problems related to infrastructure in several areas, including insufficient electric power, bad roads, and limited grain storage capacity. In an effort to address these challenges, the company has invested in a public-private partnership to install small-hydro electricity production, maximizing the potential of the rivers to generate electricity for its warehouses and cotton processing mills. The combined project is expected to generate 100 megawatts of electricity, enough to meet about half of the company's total electric power demand. As of January 2011, GBF was still awaiting financing in the form of grants from the National Electric Energy Agency (Aneel) to start all of the projects, which were expected to take about two years. Total investment from GBF is expected to be about R$1 billion ($588.2 million). Feasibility studies began in 2008, and one plant began operations in 2010. The project expects to generate surplus power which will be sold back to the Brazilian energy market. GBF also plans to invest R$50 million ($29.4 million) to build a grain terminal in the port of Santarém with an annual capacity

[84] Industry representatives, interviews by USITC staff, Mato Grosso, August 28, 2011; Savanachi, "Rei da Soja, Rei do Boi" [King of Soy, King of Beef], July 2010; *Bloomberg Business Week*, "Bom Futuro Group: Company Overview" (accessed August 12, 2011).

[85] Savanachi, "Rei da Soja, Rei do Boi" [King of Soy, King of Beef], July 2010; *Beef World;* "Bom Futuro Invests in Cattle," April 28, 2010.

of 3 million mt of grain and 1.5 million mt of cargo in containers. Expected construction costs were reported at R$30 million ($17.5 million). Construction began in early 2011.[86]

[86] *Tn Petroleo,* "Grupo Bom Futuro deve aplicar R$1 bilhão na geração de energia elétrica" [Bom Futuro Group to Invest R$1 Billion in Power Generation], January 27, 2011; Marques, "Bom Futuro Seeks Efficiency," June 12, 2011; Carneiro, "Soja: Megaproductor vai construir terminal" [Soy: Megaproducer will construct a terminal], June 29, 2010.

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CHAPTER 6
Soybeans

Overview

Soybeans remain the backbone of Brazil's agricultural economy, fueling export-led growth since the 1990s. Brazilian soybeans and soybean products (meal and oil) are currently cost-competitive with those produced anywhere in the world, including the United States—the world's largest producer (tables 6.1, 6.2, and 6.3). Advantages for the Brazilian soybean sector include significant areas of underutilized arable land, a tropical climate which encourages double-cropping, government resources devoted to agricultural research, private sector seed research, and capital investments in farming that boost productivity.

Soybeans are the engine of growth for Brazil's entire agricultural sector. In the tropical Center-West region, opportunities for double-cropping encourage corn, sorghum, and cotton planting in the second season.[1] Added supplies of soybeans and feed grains in Brazil's domestic market have kept costs globally competitive for Brazil's poultry and pork sectors and have increased agricultural exports.

For the most part, soybeans from Brazil and the United States are highly substitutable commodities. However, direct competition between the two countries in third-country markets is limited, as large increases in global demand over the last five years, particularly from China, have generally outstripped soybean supplies from both countries.[2] In addition, complementary harvest seasons in Brazil and the United States allow China and other importing nations to buy freshly harvested soybeans from each in turn during most of the year.[3] A decline in future demand for soybeans without a corresponding decline in production, however, could result in higher levels of direct competition between the United States and Brazil in third country markets.

U.S. soybean exports to Japan face little competition from Brazilian product, since the golden color of U.S. soybeans is considered more desirable for certain food-grade applications than the reddish color of Brazilian soybeans. In the EU-27, however, Brazil's current ability to provide conventional (non-genetically modified, or non-GM) soybeans and traceability at a reasonable cost gives it a competitive advantage over the United States.

[1] Double-cropping involves multiple crop plantings and harvest on the same land in the same year. In Brazil, corn is planted immediately after soybeans are harvested. Soybean double-cropping with corn is not possible in the United States because of the shorter U.S. growing season. However, double-cropping with winter wheat as the first crop and soybeans as the second crop is practiced in certain U.S. states. According to the USDA's National Agricultural Statistics Service (NASS), 6 percent of the U.S. soybean planted acreage in 2011 followed another crop, mostly limited to winter wheat in states such as Virginia, Oklahoma, and North Carolina. USDA, NASS, *Acreage*, June 30, 2011.

[2] Between 2007–11, Chinese import demand for soybeans increased by 14 percent annually, a significantly higher rate than production and export growth in both Brazil and the United States. GTIS, Global Trade Atlas database (accessed April 10, 2012).

[3] The Brazilian soybean harvest begins in January, and the U.S. harvest begins in September.

TABLE 6.1 Soybeans: Production, consumption, and trade, selected producers and markets, marketing year (MY) 2010/11 (1,000 mt)

	Production	Consumption	Imports	Exports	Trade balance
Producers					
United States	90,606	48,394	393	40,859	40,466
Brazil	75,500	39,233	37	29,951	29,914
Argentina	49,000	39,235	13	9,205	9,192
China	15,100	65,950	52,339	190	–52,149
India	9,800	10,885	0	10	10
All other	24,174	47,882	35,713	12,205	–23,508
Total	264,180	251,579	88,495	92,420	–
Selected major markets					
China	15,100	65,950	52,339	190	–52,149
EU-27	1,048	13,465	12,465	55	–12,410
Japan	220	3,255	2,917	0	–2,917
Russia	1,222	2,200	1,000	1	–999
Korea	105	1,378	1,239	0	–1,239
Subtotal	17,695	86,248	69,960	246	–69,714

Source: USDA, PSD Online (accessed January 25, 2012).

TABLE 6.2 Soybean meal: Production, consumption, and trade, selected producers and markets, MY 2010/11 (1,000 mt)

	Production	Consumption	Imports	Exports	Trade balance
Producers					
United States	35,608	27,467	162	8,259	8,097
Brazil	27,850	13,445	58	13,987	13,929
Argentina	29,311	719	0	27,615	27,615
China	43,560	43,382	294	472	178
India	7,660	3,105	6	4,635	4,629
All others	30,981	82,049	55,566	3,458	–52,108
Total	174,970	170,167	56,086	58,426	–
Selected major markets					
China	43,560	43,382	294	472	178
EU-27	9,675	30,722	21,714	606	–21,108
Japan	1,591	3,804	2,208	0	–2,208
Russia	1,708	2,181	455	28	–427
Korea	733	2,329	1,658	72	–1,586
Subtotal	57,267	82,418	26,329	1,178	–25,151

Source: USDA, FAS, PSD Online (accessed January 25, 2012).

TABLE 6.3 Soybean oil: Production, consumption, and trade, selected producers and markets, MY 2010/11 (1,000 mt)

	Production	Consumption	Imports	Exports	Trade balance
Producers					
United States	8,567	7,618	72	1,466	1,394
Brazil	6,920	5,260	0	1,668	1,668
Argentina	7,181	2,507	0	4,561	4,561
China	9,840	11,109	1,319	52	–1,267
India	1,715	2,650	945	2	–943
All others	7,005	11,854	6,860	1,752	–5,108
Total	41,228	40,998	9,196	9,501	–
Selected major markets					
China	9,840	11,109	1,319	52	–1,267
EU-27	2,236	2,794	905	456	–449
Japan	378	403	19	0	–19
Russia	389	240	21	135	114
Korea	168	445	300	29	–271
Subtotal	13,011	14,991	2,564	672	–1,892

Source: USDA, FAS, PSD Online (accessed January 25, 2012).

Nonetheless, the Brazilian soybean sector faces important disadvantages, which may curb its growth prospects in the future. Problems include soil with poor nutrients that requires large volumes of imported fertilizer to maintain yields; poor transportation infrastructure in areas of Brazil where additional expansion of soybean production would be most likely; high capital costs, which tend to restrict investment in new storage facilities; and a complex tax system that discourages exports of value-added oil and meal. These factors have raised delivered costs of Brazilian soybeans in the last several years. Brazil's transportation inefficiencies alone now generally offset the soybean industry's farm production cost advantage over the United States. Whether Brazil can continue its rapid expansion of soybean production and exports depends largely on the ability of state and federal governments to improve railroads, roads, waterways, and ports, as well as to maintain a business environment conducive to private investment.

Global Trade in Soybeans

Global demand for soybeans has grown considerably since the early 1990s, and traded volumes of soybeans and soy products now outrank wheat, traditionally the largest traded agricultural commodity. Global consumption reached 252 million mt in 2010/11, while global imports rose from less than 40 million mt in the mid-1990s to almost 90 million mt in 2010/11.[4] Demand worldwide is being driven by rapidly growing livestock sectors, which use soybean meal as a key feed ingredient, as well as the rise in human consumption of edible oils as diets change in developing economies. To a lesser extent, vegetable oil use for biodiesel production also increases demand for soybeans. The preference of China, the main driver of global demand over the last decade, for imports of whole soybeans for crushing has raised and is likely to continue to raise the global import demand for soybeans versus meal and oil. As these trends continue, it is estimated that by 2020, global import demand for soybeans will reach 137 million mt, almost 45 million mt above 2010/11 levels.[5]

Brazil is the world's second-largest soybean producer and exporter, after the United States. Although the U.S. share of some soybean markets has declined as Brazil's exports have increased, the rapid growth in world demand has allowed all exporters to ship higher volumes, limiting direct competition between the United States, Brazil, and other soybean exporters. Brazil's position as a counterseasonal supplier to the United States also mitigates competition between the two countries, particularly in China.[6] Whereas U.S. soybeans are harvested in September through November, the Brazilian harvest begins in January and peaks in late March. As for other markets, Brazil tends to export to Europe, the Middle East, and North Africa, while the United States focuses its exports on North American and Asian markets.[7] These patterns have roots in historical relationships and soybean preferences: the EU-27 has ties to South America through colonization and the import of conventional beans, while U.S. soybeans are preferred in several Asian markets, such as Japan, Taiwan, and Indonesia. There is also limited competition between the United States and Brazil for soybean meal and oil. Brazil tends to supply meal and oil to the European Union (EU-27), the Middle East, and North Africa, while the United States sends its meal and oil to the Americas and Asia.

[4] USDA, FAS, PSD Online (accessed January 25, 2012).
[5] USDA, *USDA Agricultural Projections to 2021*, February 2012, table 10.
[6] Industry representatives, interviews by USITC staff, June 16–22, 2011.
[7] GTIS, Global Trade Atlas database (accessed January 18, 2012).

Brazilian Production, Consumption, and Trade

Brazil is a leading global producer and exporter of soybeans, soybean oil, and soybean meal. As noted, in marketing year 2010/11,[8] Brazil was the world's second-largest producer and exporter of soybeans, harvesting more than 75 million mt and exporting nearly 30 million mt (table 6.4).[9] Both soybean production and exports increased during 2006/07–10/11, with exports accounting for around 40 percent of production.[10] Brazil's growth in production is largely due to increasing yields and the expansion of soybean farming to newly available land, while exports have been growing to meet steadily rising global demand. The domestic market is almost exclusively supplied by domestic production, so imports are negligible.

TABLE 6.4 Brazil: Soybean production, consumption, exports, and imports, MY 2006/07–2010/11

	2006/07	2007/08	2008/09	2009/10	2010/11	Average annual change 2006/07–2010/11
	1,000 mt					Percent
Soybeans						
Production	59,000	61,000	57,800	69,000	75,500	6
Consumption	34,020	35,077	34,718	36,797	39,233	4
Crush rate[a] (%)	41	40	42	41	39	([b])
Exports	23,485	25,364	29,987	28,578	29,951	6
Imports	53	150	44	174	37	–9
Trade balance	23,432	25,214	29,943	28,404	29,914	6
Soybean meal						
Production	24,110	24,890	24,700	26,120	27,850	4
Consumption	11,118	12,257	12,418	12,835	13,445	5
Exports	12,715	12,138	13,109	12,985	13,987	2
Imports	167	180	83	86	58	–23
Trade balance	12,548	11,958	13,026	12,899	13,929	3
Soybean oil						
Production	5,970	6,160	6,120	6,470	6,920	4
Consumption	3,395	3,955	4,275	5,060	5,260	12
Exports	2,462	2,388	1,909	1,449	1,668	–9
Imports	4	67	6	37	0	([b])
Trade balance	2,458	2,321	1,903	1,412	1,668	–9

Source: USDA, FAS, PSD Online database (accessed February 2, 2012).

[a]The crush rate is the share of total domestic supply that is crushed into meal and oil.
[b]Not applicable.

Between 2006/07 and 2010/11, soybean meal and oil production increased at average annual rates of 4 percent—slightly lower than for whole soybeans. Domestic consumption of oil increased annually at an average rate of 12 percent, and annual consumption of meal increased at an average rate of 4 percent during 2006/07–2010/11.

[8] The marketing year is a 12-month period, usually beginning with a new harvest, during which the product is marketed. Marketing years differ for each commodity and country.
[9] USDA, FAS, PSD Online (accessed October 20, 2011).
[10] In 2008/09, production decreased while exports increased, resulting in an export-to-production ratio of 52 percent.

Domestic soybean oil demand is expected to continue to grow by about 150,000 mt annually, based on Brazil's current 5 percent biodiesel blend mandate.[11]

Production of biodiesel accounts for about one-third of soybean oil consumption in Brazil; it is produced in 69 refineries with a total capacity of 5 billion liters.[12] Human consumption of soybean products is also on the upswing. Brazilians are consuming more soy-based drinks, the market for which rose 14 percent in value between 2008 to 2009.[13] As a result of increased domestic consumption, between 2006/07 and 2010/11, the share of Brazil's domestic soybean meal production that was exported fell from 53 percent to 50 percent; for oil, it fell from 41 percent to 24 percent.[14]

Like other major soybean-exporting countries, Brazil ships the majority of its soybean exports to China (figure 6.1). Between calendar years 2006 and 2011, Brazilian soybean exports to China increased by 350 percent.[15] In 2011, China imported 67 percent of Brazilian soybean exports, or almost $11 billion—more than four times the value shipped to Brazil's second-largest market, the EU-27, which was $2.7 billion (table 6.5).[16] Brazil's soybean industry increased production in response to generally favorable prices, driven largely by the rapidly growing demand in China's feed industry over this period.[17] Brazilian soybean exports to Thailand, Taiwan, and Japan also more than doubled over the period, but from a much smaller base.[18]

Total soybean meal exports more than doubled over the period, with the main destination being the EU-27, whose livestock industry relies heavily on imported animal feed ingredients. Exports to Asia also grew rapidly as two major markets, Korea and Vietnam, experienced even higher growth rates than the EU-27. Although emerging Asian countries account for an increasingly large share of Brazilian soybean meal exports, combined they are still significantly smaller than Brazil's number one customer, the EU-27, which consistently accounted for about 70 percent of Brazilian soybean meal exports during 2006–11.[19]

Brazil's soybean oil exports fluctuated during 2006–11. China was Brazil's largest market from 2007 to 2011, reflecting growing Chinese demand. The value of Brazilian soybean oil exports to China increased about sevenfold during this period, rising from 9 percent of total Brazilian oil exports in 2006 to 36 percent by 2011.

[11] In January 2010, the Brazilian government raised the mandated blend requirement for biodiesel to 5 percent. From that date, diesel fuel offered for sale must contain at least 5 percent biodiesel. USDA, FAS, *Brazil: Oilseeds and Products Annual*, April 4, 2011.

[12] USDA, FAS, *Brazil: Oilseeds and Products Annual*, April 4, 2011.

[13] USDA, FAS, *Brazil: 2010 Annual Oilseeds Report*, April 6, 2010.

[14] USDA, FAS, PSD Online (accessed October 20, 2011).

[15] GTIS, Global Trade Atlas database (accessed March 14, 2012).

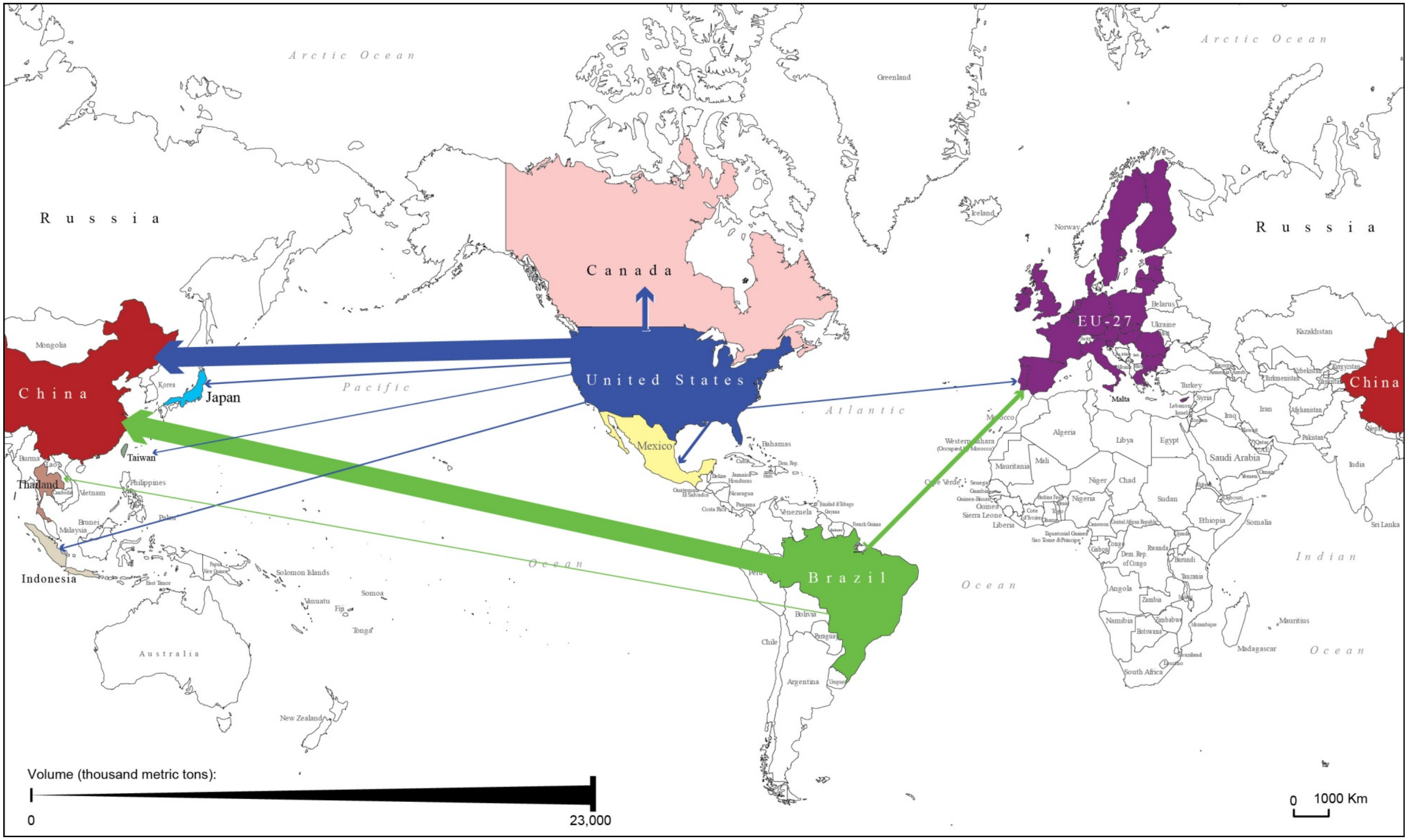
[16] Ibid.

[17] USDA, FAS, *Brazil: 2010 Annual Oilseeds Report*, April 6, 2010.

[18] GTIS, Global Trade Atlas database (accessed March 14, 2012).

[19] Ibid.

FIGURE 6.1 The United States and Brazil continued to dominate the global supply of soybeans in 2011



Source: Compiled by USITC staff using data from GTIS, Global Trade Atlas database (accessed February 13, 2012).

TABLE 6.5 Brazil: Soybean exports to selected markets, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
Soybeans							
China	2,432	2,831	5,324	6,343	7,133	10,957	35
EU-27	2,271	2,747	3,907	3,465	2,298	2,730	4
Thailand	172	279	536	363	445	578	27
Taiwan	120	60	76	216	248	482	32
Japan	50	109	215	246	193	254	38
All other	619	682	894	792	727	1,326	17
Total	5,663	6,709	10,952	11,424	11,043	16,327	24
Soybean meal							
EU-27	1,615	2,094	3,254	3,269	3,302	4,010	20
Thailand	247	206	267	348	469	563	18
Korea	91	146	222	342	304	267	24
Indonesia	110	177	90	130	84	156	7
Vietnam	11	10	23	32	133	133	65
All other	377	374	438	453	316	569	9
Total	2,420	2,959	4,364	4,593	4,719	5,698	19
Soybean oil							
China	114	318	830	407	786	764	46
India	107	183	190	132	72	174	10
Algeria	13	0	49	80	76	167	67
Egypt	10	17	46	7	11	164	75
Bangladesh	17	101	33	97	33	129	50
All other	968	1,101	1,523	511	374	731	–6
Total	1,229	1,720	2,671	1,234	1,352	2,129	12

Source: GTIS, Global Trade Atlas database (accessed April 10, 2012).

Note: Totals may not add due to rounding.

Industry Structure

Regional Production and Processing

Brazil became a large soybean producer during the 1970s and 1980s, when soybean varieties adaptable to warmer climates were developed. These varieties were first created in the United States and then further adapted by Empresa Brasileira de Pesquisa Agropecuária (Embrapa), Brazil's government agricultural research service.[20] At that time, Brazilian production was limited mainly to the Southern states of Paraná and Rio Grande do Sul. With Embrapa's development of soybean seeds for lower (warmer) geographic latitudes, and its introduction of new methods for enhancing soil conditions, Brazil's soybean production moved north into the country's central and northern regions, where vast tracts of previously undeveloped land in the Brazilian *cerrado* became suitable for growing soybeans. Production increased rapidly.

The Center-West, comprising the states of Mato Grosso, Mato Grosso do Sul, Goiás, and the Federal District, is now the largest soybean-producing region in Brazil (table 6.6). In 2010, the Center-West accounted for 46 percent of Brazil's total production. Mato Grosso alone supplied 27 percent of the total and is also the largest soybean exporter, accounting

[20] Goldsmith, *Soybean Production and Processing in Brazil*, February 20, 2008.

TABLE 6.6 Brazil: Soybean production by region, 2006–10

	2006	2007	2008	2009	2010	Average annual change 2006–10
	1,000 mt					Percent
Center-West	25,911	26,202	29,132	28,974	31,609	5
South	17,721	22,917	20,427	18,428	25,685	10
Northeast	3,468	3,909	4,832	4,421	5,304	11
Southeast	4,102	3,662	4,012	4,079	4,298	1
North	1,262	1,167	1,430	1,443	1,623	7
Total	52,465	57,857	59,833	57,345	68,519	7

Sources: IBGE, SIDRA database (accessed October 1, 2011).

Note: Totals may not add due to rounding.

for 30 percent of Brazil's soybean exports in 2010.[21] The Center-West region was also the most productive over the period, averaging yields of 2.9 mt per hectare (ha) (43 bushels per acre) in 2010, while the region with the lowest yields was the South (the states of Paraná, Santa Catarina, and Rio Grande do Sul).[22] Brazilian soybean growers are now looking at the potential for producing soybeans in the North and Northeast, where there are at least 20 million ha (49 million acres) of degraded pastureland that could be rehabilitated for row crops.[23] The states with the most potential include Maranhão, Tocantins, Piauí, and Bahia.[24]

Processing has also been moving from traditional port areas of the South to the interior Center-West.[25] As mentioned earlier in this study, this is partly due to Brazil's complex tax system, which is discussed in more detail below.[26] About 80 percent of Brazilian soybean oil and one-half of its soybean meal is consumed domestically, a share that has been rising over time, reflecting increased demand for animal feed for Brazil's growing livestock and poultry sectors. Brazil's processing capacity has increased accordingly, reaching 54.5 million mt in 2009/10.[27] New capacity added in the Center-West increased daily crushing capacity to 176,834 mt in 2010.[28] As a result, Brazilian crushing capacity now exceeds that of the United States, where 63 soybean crushing plants had a daily crush capacity of 142,550 mt per day in 2007.[29]

Farm Size and Ownership

Like those of other large producers, including the United States, Brazilian soybean production systems are modern and efficient. A notable difference between the Brazilian and U.S. sectors is the large size of many Brazilian soybean farms. About two-thirds of soybean operations in Center-West Brazil are over 2,500 ha (6,200 acres), and many are

[21] USDA, AMS, *Soybean Transportation Guide: Brazil 2010*, July 2011, 25.
[22] IBGE, SIDRA, Tabela 1613, "Área plantada," n.d.
[23] Industry representative, telephone interview by USITC staff, May 26, 2011.
[24] Industry representative, interview by USITC staff, Brasília, Brazil, August 25, 2011.
[25] Industry representative, interview by USITC staff, São Paulo, Brazil, August 22, 2011.
[26] Goldsmith and Hirsch, "The Brazilian Soybean Complex," 2006.
[27] USDA, FAS, *Brazil: 2010 Annual Oilseeds Report*, April 6, 2010.
[28] Approximately one-quarter of Brazil's processing plants can crush 3,000 mt per day, and half can process over 1,500 mt per day. USDA, FAS, *Brazil: 2010 Annual Oilseeds Report*, April 6, 2010; industry representative, e-mail to USITC staff, August 23, 2011.
[29] HighQuest Partners and SoyaTech, *How the Grain and Oilseed Trade Works*, 2008, 14.

more than 20,000 ha (49,000 acres).[30] These Brazilian "mega-farms" are the result of huge undeveloped tracts of land becoming available in the *cerrado* just as technology began to enable rising soybean yields and mechanized harvests on flat parcels in tropical areas. Southern Brazilian soybean farms are much smaller—in Paraná most farms are less than 60 ha (148 acres).[31] In 2007, the average size of a U.S. soybean farm was less than 300 ha (740 acres).[32] The Brazilian mega-farms have economies of scale that allow them to spread certain fixed costs, such as equipment for harvesting and planting, over many units of output.

Ownership type and the degree of vertical integration differ between regions in Brazil. In the southern states, cooperatives help to offset the reality that smaller farmers do not have economies of scale. These cooperatives range from a few hundred farmers to large organizations with over 16,000 members.[33] They provide inputs such as fertilizer and technical assistance, and buy the soybeans from their members after harvest.[34] After storing and processing members' production, the cooperatives sell the meal and oil to large global trading companies, or market it themselves domestically or abroad.[35] In the Center-West region, cooperatives are not prevalent, since large operations reach similar economies of scale on their own. Farmers in the *cerrado* generally sell their harvested crop directly to trading companies such as Archer Daniels Midland (ADM) and Bunge, relying on the marketing and logistics infrastructure of these agribusinesses.

Primary Factors Affecting Competitiveness

Cost of Production

The strength of the Brazilian soybean sector lies in its low cost of production. Although Brazilian production costs vary by state, soybean producers generally enjoy significantly lower field costs (particularly in terms of land and seeds) than U.S. soybean growers. In 2010, Brazilian production costs (17–18 cents per kilogram) were only 57–61 percent of U.S. costs (30 cents per kilogram). Table 6.7 compares the costs of growing soybeans in the U.S. Heartland with costs in two large, productive soy-growing Brazilian states—Paraná and Mato Grosso.[36] Land and other production costs for soybeans vary considerably by region within Brazil; farm gate prices for soybeans are generally lowest in northern Mato Grosso and highest in the southern states of Paraná and Rio Grande do Sul.

[30] In contrast, most farms in the midwestern United States were originally laid out before mechanization was widely used; sizes were generally determined by the area of land necessary to support a homestead. The Homestead Act of 1862 granted ownership of 65 ha (160 acres) land parcels west of the Mississippi River to settlers. Goldsmith, *Soybean Production and Processing in Brazil*, 2008, 779–804.

[31] Industry representatives, interviews by USITC staff, Paraná, Brazil, August 2011.

[32] USDA, NASS, *Data Comparison: Major Crops*, n.d.

[33] Industry representatives, interviews by USITC staff, Paraná, Brazil, August 29–30, 2011.

[34] Ibid.

[35] Ibid.

[36] According to the USDA's defined resource regions, the Heartland region includes all of Illinois, Indiana, and Iowa, and parts of Missouri, Minnesota, South Dakota, Nebraska, Kentucky, and Ohio.

TABLE 6.7 Soybeans: Average 2010 costs of production at various R$/$ exchange rates (¢/kg)

	United States Heartland	Brazil					
		Paraná	Mato Grosso	Paraná	Mato Grosso	Paraná	Mato Grosso
	(actual)	(actual) R$1.76/$1		(hypothetical) R$2.00/$1/US$ = 2.0		(hypothetical) R$1.50/$1	
Seed	4.14	2.19	1.01	1.93	0.89	2.57	1.19
Fertilizer	1.22	2.00	4.68	1.76	4.12	2.35	5.49
Chemical inputs	1.20	1.74	3.17	1.54	2.79	2.05	3.72
Labor	1.23	0.56	0.77	0.49	0.68	0.65	0.90
Other operational costs	3.25	1.86	1.60	1.64	1.41	2.19	1.88
Total, variable costs	11.04	8.35	11.23	7.35	9.89	9.80	13.18
Land	12.58	3.09	1.88	2.72	1.65	3.63	2.20
Physical capital	5.37	5.33	2.45	4.69	2.16	6.25	2.87
Other fixed costs	0.67	1.30	1.47	1.15	1.29	1.53	1.72
Total fixed costs	18.62	9.72	5.79	8.56	5.10	11.41	6.79
Total	29.66	18.07	17.02	15.91	14.98	21.21	19.97

Source: CONAB, "Custo de Produção: Soja Plantio Direto," May 2010; USDA, "Soybean Production and Returns," 2010; IMF, Exchange rates.

Table 6.7 is denominated in U.S. dollars for comparison purposes. But exchange rates are a dynamic factor that affect cost competitiveness in export markets. They are important particularly because Brazilian export sales are predominantly denominated in dollars, while costs are denominated in *reais*. Table 6.7 shows two additional exchange rate scenarios, both of which have been witnessed in recent years, demonstrating that exchange rate fluctuations make a difference in relative production costs in Brazil and the United States.

The major differences between costs in the United States and Brazil are land and seed costs. Current average land prices in the United States are many times those in Brazil, and the discrepancy is particularly wide in the expansion areas of Mato Grosso. Large Brazilian farms also allow growers to spread non-land capital costs over many acres, thus yielding a lower cost per unit.[37] In addition, in the tropical Center-West region, farmers can reap two and sometimes three different crops on the same land each year.[38] Because Brazil still has room for crop expansion—by some estimates up to 70 million ha (173 million acres) of convertible pasture land in the *cerrado*—land continues to be relatively inexpensive in Brazil when compared to the United States.[39] However, new estimates suggest that the cost advantage historically experienced by farmers in the Center-West region is beginning to erode.[40] For example, CONAB, part of the Brazilian Ministry of Agriculture, estimates that land costs per ha in Sorriso, Mato Grosso, more than doubled between 2010/11 and 2011/12.[41]

Seed costs are also lower in Brazil because of the varieties used. Many growers in Mato Grosso choose to grow conventional soybeans instead of GM beans in order to avoid the

[37] Dohlman, Schnepf, and Bolling, "Soybean Production Costs and Export Competitiveness," October 2001, 21.
[38] Baumel et al., "Brazilian Soybeans: Can Iowa Farmers Compete?" December 2000.
[39] Dohlman, Schnepf, and Bolling, "Soybean Production Costs and Export Competitiveness," October 2001, 20.
[40] CONAB, "Custo de Produção: Soja Plantio Direto," May 2011.
[41] Government official, e-mail to USITC staff, November 4, 2011.

technology fee, or royalty.[42] The average royalty on GM seed in Mato Grosso is R$0.45 per kilogram of seed.[43] Several Brazilian farmers reported that GM seed does not always significantly improve yields in Mato Grosso, and yet can be more expensive because of technology fees.[44]

The one significant advantage that U.S. farmers have over Brazilian farmers in soybean production is the cost of fertilizer and other chemical inputs. Although the soil in the southern region of Brazil is naturally conducive to soybean production, the dark red and red-yellow soils found in the Center-West have a low pH and poor nutrients. They need to be balanced by lime and enriched with other minerals to be productive.[45] On average, Brazilian soybean farmers spend 10 percent of their income on fertilizer, and apply approximately 500 kg of fertilizer per hectare.[46] Brazil has large supplies of agricultural lime, but is deficient in several other minerals, which must be imported to produce certain types of fertilizer.[47] Imports of fertilizer, which totaled 22.4 million mt in 2009, supplied 60 percent of total fertilizer needs.[48] Brazil also imports 80 percent of its pesticides, and has a higher rate of pesticide application than the United States owing to its tropical climate.[49] Shipping and other costs related to imports make similar fertilizers and chemical inputs more expensive for Brazilian farmers than for U.S. farmers. But overall, Brazil continues to have a significant farm gate cost advantage over the United States in the production of soybeans.

Transportation Costs

On the other hand, higher inland transportation and freight costs erode the production cost advantages enjoyed by soybean producers in Brazil compared with those in the United States.[50] Road transport by truck accounts for roughly two-thirds of soybean transport in Brazil.[51] Costs for road transport are generally high relative to other transport

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[42] A technology fee or royalty is paid by the farmer to the seed company as part of the cost of the seed. It covers the technology developed with the seed, such as herbicide resistance or higher yields. Non-GM seeds do not have royalties, so farmers can avoid a cost by choosing a conventional seed. However, many farmers choose to grow GM seeds because they obtain higher yields in certain areas or have traits, e.g., pest resistance, not found in conventional seeds. Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 31, 2011.

[43] Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 31, 2011.

[44] Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 31, 2011. In certain instances, yield increases using GM seed may have not been achieved because early GM seeds used in the Center-West region of Brazil were made from conventional seed that had not been adapted to the conditions of the region.

[45] Flaskerud, *Brazil's Soybean Production and Impact*, July 2003, 4. Soybeans do not need much nitrogen to grow, but require a significant amount of phosphorous and potassium—more than corn, wheat, and rice.

[46] Data are for 2002. FAO, *Fertilizer Use by Crop in Brazil*, 2004, 46. Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 28, 2011.

[47] Leibold et al., "Brazil and Iowa Soybean Production: A Cost Comparison," December 2001. Soybeans require more phosphorous than other crops, such as corn.

[48] USDA, FAS, *Brazil: 2010 Annual Oilseeds Report*, April 6, 2010: *Soybean and Corn Advisor,* "Brazil's Goal is to Reduce Phosphate Imports," October 13, 2011.

[49] Industry representatives, interviews by USITC staff, São Paulo, Brazil, August 26, 2011. Leibold et al., "Brazil and Iowa Soybean Production: A Cost Comparison," December 2001. Further discussion on Brazil's pesticide and fertilizer use is presented in chapter 4 of this report.

[50] This section is drawn from the following sources: Batista, *The Transport Costs of Brazil's Exports*, 2008, 3–14; Moreira, Volpe, and Blyde, *Unclogging the Arteries*, 2008, 132–40; USDA, AMS, *Soybean Transportation Guide: Brazil 2010*, July 2011.

[51] Industry representative, interview by USITC staff, Washington, DC, June 23, 2011.

modes in Brazil due to high diesel prices and poor road conditions, as well as the fact that inland production regions are far from ports and major domestic markets.

Without a viable rail network in Mato Grosso, soybeans must be transported by truck either for the entire trip to southern ports or for part of the way to railroad or waterway transfer terminals in the North. Poor road conditions lengthen the time of journeys and cause more frequent breakdowns of trucks. Despite efforts to do so, two of the main highways used to transport soy by truck—one that connects northern Mato Grosso to the transfer terminal of the Madeira River in Porto Velho (highway BR-364) and one that connects it to the Amazon River at Santarém in Pará state (highway BR-163)—remain largely unpaved.[52] For this reason, in 2009, while 52 percent of Brazilian soybean production took place above the 15th parallel, only 16 percent of production went through the northern ports.[53] The southern ports of Paranaguá, Rio Grande, Santos, and São Francisco do Sul still handle over 75 percent of Brazil's soybean exports.[54] As a result, the practice of shipping soy over long distances using the most expensive transport mode—trucking—continues to contribute to high overall transportation costs.

Transport is expected to become more efficient and less expensive with the final completion of highway BR-163, the 1,756-kilometer highway linking Mato Grosso to the northern port at Santarém,[55] but rail and waterway projects will take another 10–15 years to finish.[56] Once the BR-163 highway is completed, it is estimated that the cost of trucking soybeans from farms to Santarém will drop from R$180 ($110) per mt to R$130 ($80) per mt, a savings of R$50 ($31) per mt.[57] However, some observers have commented that even though BR-163 completion will result in a huge logistical benefit for farmers, investment in railway and waterway systems would likely decrease transit costs far more than investment in roads.[58]

Inland transportation costs in the United States are considerably lower than those in Mato Grosso, particularly given the less expensive barge transport down the Mississippi River to Gulf ports.[59] Although port prices (farm gate plus inland transportation costs) vary, the prices of soybeans at Brazil's ports are comparable to the prices of soybeans at U.S. ports. For soybeans produced in Mato Grosso, domestic transportation costs account for 25–30 percent of the cost of soybeans at the port, compared with 8–10 percent in the United States (table 6.8).[60]

Ocean freight rates to transport soybeans to Hamburg, Germany, and Shanghai, China, vary, but are typically higher from Brazil than from the United States (tables 6.9 and 6.10). Freight rates are based on many factors; any development that affects the

[52] Industry representatives, interviews by USITC staff, São Paulo, Brazil, August 22–23, 2011. See figures 3.1 and 3.4 for maps depicting Brazil's main roadways and ports, respectively.

[53] Industry representative, interview by USITC staff, Brasília, Brazil, August 25, 2011.

[54] Government official, interview by USITC staff, Brasília, Brazil, August 24, 2011.

[55] Vera-Diaz, Kaufmann, and Nepstad, *The Environmental Impacts of Soybean Expansion*, May 2009, 3.

[56] USDA, FAS, *Brazil: 2010 Annual Oilseeds Report*, April 6, 2010.

[57] Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 31, 2011.

[58] Vera-Diaz, Kaufmann, and Nepstad, *The Environmental Impacts of Soybean Expansion*, May 2009, 3. Highway BR-163 was originally expected to be completed in 2011.

[59] Gulf ports include all sea and river ports in the following regions: East Gulf, Mississippi River, North Texas, and South Texas. Government official, e-mail to USITC staff, September 27, 2011.

[60] Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 2011.

TABLE 6.8 Brazil and the United States: Domestic transportation cost share of soybeans at the port, 2006–10, 2Q 2010 and 2Q 2011 (%)

	2006	2007	2008	2009	2010	2Q 2010	2Q 2011
In Brazil							
Santos port, from Northern Mato Grosso	32.5	29.5	24.4	23.0	26.9	29.7	24.6
Rio Grande port, from Northwestern Rio Grande do Sul	7.1	7.6	5.3	6.4	7.6	9.0	9.6
Paranaguá port, from Northern Center Paraná	9.1	10.3	7.8	6.8	9.0	10.5	8.7
Santos port, from Southern Goiás	18.7	15.8	12.9	13.1	16.6	19.3	14.7
In the United States							
Gulf ports[a] from Minneapolis, MN	17.7	12.6	10.1	8.9	9.5	9.2	9.5
Gulf ports[a] from Davenport, IA	14.8	10.6	9.1	7.4	7.9	7.5	7.5

Sources: Salin, "Soybean Transportation Guide: Brazil 2010," USDA, AMS, July 2011, 3, 50; Salin, "Soybean Transportation," USDA, AMS, August, 10, 2011, 3; USDA, AMS, *Grain Transportation Report*, September 29, 2011, 2–3.

[a]Includes all U.S. ports in the following regions: East Gulf, Mississippi River, North Texas, and South Texas.

TABLE 6.9 Brazil and the United States: Ocean freight rates for shipping soybeans to Hamburg, Germany, 2006–10, 2Q 2010 and 2Q 2011 ($/mt)

	2006	2007	2008	2009	2010	2Q 2010	2Q 2011
From Brazil							
Santos port	47	73	52	32	34	36	35
Rio Grande port	45	72	54	34	36	39	36
Paranaguá port	46	71	54	33	35	38	36
From the United States							
Gulf ports[a]	24	59	53	21	26	28	22

Sources: Salin, "Soybean Transportation Guide: Brazil 2010," USDA, AMS, July 2011, 3, 50; Salin, "Soybean Transportation," USDA, AMS, August, 10, 2011, 3; USDA, AMS, *Grain Transportation Report*, September 29, 2011, 2–3.

[a]Includes all U.S. ports in the following regions: East Gulf, Mississippi River, North Texas, and South Texas.

TABLE 6.10 Brazil and the United States: Ocean freight rates for shipping soybeans to Shanghai, China, 2006–10, 2Q 2010 and 2Q 2011 ($/mt)

	2006	2007	2008	2009	2010	2Q 2010	2Q 2011
From Brazil							
Santos port	57	83	70	59	56	55	50
Rio Grande port	56	82	72	59	58	59	51
Paranaguá port	26	81	72	59	59	59	58
From the United States							
Gulf ports[a]	42	81	81	51	62	68	52

Sources: Salin, "Soybean Transportation Guide: Brazil 2010," USDA, AMS, July 2011, 3, 50; Salin, "Soybean Transportation," USDA, AMS, August, 10, 2011, 3; USDA, AMS, *Grain Transportation Report*, September 29, 2011, 2–3.

[a]Includes all U.S. ports in the following regions: East Gulf, Mississippi River, North Texas, and South Texas.

availability of dry bulk vessels will influence the cost of ocean freight. One factor involves iron ore, since both soybeans and iron ore compete for similar vessels. If exports of iron ore decline, the availability of vessels to transport soybeans tends to increase, reducing freight rates for soybeans.[61] By the time the soybeans arrive in Hamburg and Shanghai, the total landed cost of soybeans from Brazil is generally close to the total landed cost of soybeans from the United States (tables 6.11 and 6.12), which would be

[61] Moreira, Volpe, and Blyde, *Unclogging the Arteries*, 2008, 136.

TABLE 6.11 Brazil and the United States: Landed costs of soybeans in Hamburg, Germany, 2006–10, 2Q 2010 and 2Q 2011 ($/mt)

	2006	2007	2008	2009	2010	2Q 2010	2Q 2011
From Brazil							
Northern Mato Grosso (via Santos port)	291	405	527	454	469	419	547
Northwestern Rio Grande do Sul (via Rio Grande port)	272	361	471	418	409	374	506
Northern Center Paraná (via Paranaguá port)	281	385	487	433	420	374	535
Southern Goiás (via Santos port)	280	390	492	422	423	372	520
From the United States							
Minneapolis, MN (via Gulf ports)[a]	267	373	517	420	426	399	536
Davenport, IA (via Gulf ports)[a]	263	379	511	420	426	399	536

Sources: Salin, "Soybean Transportation Guide: Brazil 2010," USDA, AMS, July 2011, 3, 50; Salin, "Soybean Transportation," USDA, AMS, August, 10, 2011, 3; USDA, AMS, *Grain Transportation Report*, September 29, 2011, 2–3.

[a]Includes all U.S. ports in the following regions: East Gulf, Mississippi River, North Texas, and South Texas.

TABLE 6.12 Brazil and the United States: Landed costs of soybeans in Shanghai, China, 2006–10, 2Q 2010 and 2Q 2011 ($/mt)

	2006	2007	2008	2009	2010	2Q 2010	2Q 2011
From Brazil							
Northern Mato Grosso (via Santos port)	302	414	545	480	491	438	562
Northwestern Rio Grande do Sul (via Rio Grande port)	252	370	489	443	431	393	521
Northern Center Paraná (via Paranaguá port)	291	394	505	459	444	394	535
Southern Goiás (via Santos port)	291	402	499	448	445	391	534
From the United States							
Minneapolis, MN (via Gulf ports)[a]	285	396	556	451	464	439	566
Davenport, IA (via Gulf ports)[a]	281	401	550	451	464	439	572

Sources: Salin, "Soybean Transportation Guide: Brazil 2010," USDA, AMS, July 2011, 3, 50; Salin, "Soybean Transportation," USDA, AMS, August, 10, 2011, 3; USDA, AMS, *Grain Transportation Report*, September 29, 2011, 2–3.

[a]Includes all U.S. ports in the following regions: East Gulf, Mississippi River, North Texas, and South Texas.

the expected outcome in a competitive global economy. In comparison to the United States, Brazilian farmers receive a smaller share of the price paid in Shanghai than do their U.S. counterparts. Conversely, a larger share of the destination price is used to pay for transportation and logistics from Brazil than from the United States.

The development of transportation infrastructure in Brazil has not been able to keep pace with the rapid growth of the soybean industry.[62] Going forward, Brazilian soybean production may be constrained by Brazil's inability to cost-effectively transport soybeans, meal, and oil from production and processing areas to ports for export. In addition, many port facilities are at full capacity and cannot grow quickly enough to meet export demands. The port of Santos, the largest port for Brazilian soybeans,[63] has had to turn away business because of the lack of available capacity to load vessels.[64] Storage capacity is also an issue: Brazil produces 160 million tons of grain annually but has only 130 million tons of storage capacity.[65] Most storage capacity is owned by cooperatives,

[62] USDA, FAS, *Brazil: 2010 Annual Oilseeds Report*, April 6, 2010.
[63] USDA, AMS, "United States and Brazil Soybean Transportation," October 21, 2010.
[64] Industry representatives, interviews by USITC staff, São Paulo State, Brazil, August 24, 2011.
[65] Industry representatives, interviews by USITC staff, Paraná, Brazil, August 30, 2011.

processors, or ports.[66] The situation is particularly problematic in the Center-West region, where farmers store only about 5 percent of the harvested crop on-farm.[67]

Agricultural Research

In recent decades, both public and private agricultural research have helped Brazil gain and maintain global prominence in soybean production and exports. The development of low-latitude soybean varieties in Brazil by the public research agency Embrapa in the 1970s has been characterized as one of the most significant technological innovations in agriculture of the Green Revolution.[68] It allowed production of a highly profitable crop to move into large areas of previously unproductive land, thereby transforming the soybean industry in Brazil. In addition, advances in short-cycle soybean varieties permit double-cropping, while the adaptation of no-till planting reduced long-term costs from soil degradation.[69]

Recent scientific discoveries have led to protection against soybean rust, a disease caused by fungus that kills the soybean plant if left untreated. When soybean rust first appeared in Brazil in 2000, it was devastating to the Brazilian crop, particularly in Mato Grosso, until scientists and farmers developed effective measures to combat it.[70] Treatment involves double-cropping corn following soybeans[71] or spraying soybean plants with large amounts of fungicides, which is costly. In addition, Brazilian scientists are developing soybean varieties with increasing tolerance to soybean rust. In 2009, Embrapa, in coordination with the U.S. Agricultural Research Service (ARS), identified soybean genes that are rust-resistant,[72] and a new rust-tolerant seed variety will likely be available by mid-2012.[73]

In addition, Brazil's regulatory environment has embraced GM seeds. Brazil enacted intellectual property laws increasing patent and plant variety protections in the mid-1990s, consistent with the terms of its accession to the World Trade Organization (WTO) and the Trade-Related Aspects of Intellectual Property Rights (TRIPS) Agreement.[74] These laws created additional legal avenues for seed companies to guard their new developments against infringement, offering companies incentives to sell new seed in Brazil. GM seeds rapidly gained popularity, and seed companies saw potential in new

[66] USDA, FAS, *Brazil: 2010 Annual Oilseeds Report*, April 6, 2010.

[67] Flaskerud, *Brazil's Soybean Production and Impact*, July 2003, 11.

[68] Goldsmith, *Soybean Production and Processing in Brazil*, February 20, 2008, 801. The Green Revolution is a term that describes a roughly 25-year period starting after 1960 characterized by extremely high growth rates in agricultural productivity in the developing world as a result of scientific breakthroughs in crop breeding and selection and the development of agrochemicals. During this time, governments in both developed and developing countries invested heavily in agricultural research. FAO, "The Green Revolution," 2011.

[69] Contini and Reifschneider, "Agribusiness: Innovation and Competitiveness in Brazil," 2009, 93.

[70] *Soybean and Corn Advisor*, Frequently Asked Questions, http://www.soybeansandcorn.com/Frequently-Asked-Questions#seven (accessed November 28, 2011); Yang, Del Ponte, and Dias, "Knowing the Risk of Soybean Rust," December 6, 2004.

[71] USDA, FAS, *Brazil: Oilseeds and Products Annual; 2011*, April 4, 2011.

[72] Soybean rust was identified in the continental United States in 2004. Suszkiw, "Scientists Identify Rust Resistance Genes in Soybeans," March 26, 2009; Yang, Del Ponte, and Dias, "Knowing the Risk of Soybean Rust," December 6, 2004.

[73] USDA, FAS, *Brazil: 2010 Annual Oilseeds Report*, April 6, 2010.

[74] Rodrigues, Lage, and Vasconcellos, "Intellectual Property Rights," June 2011.

research focused on Brazil.[75] Previously, Embrapa provided the vast majority of soybean seed to farmers, but that share decreased as large trading and seed companies actively sold GM seed in Brazil.[76] Monsanto recently announced the Roundup Ready 2 seed for Brazil, the first seed with a biotechnology trait Monsanto developed specifically for a non-U.S. market.[77] The regulatory approval process for GM traits in Brazil has been streamlined in recent years. Overall, the Brazilian government has approved 33 distinct GM crop varieties since 1998, with 23 of the approvals occurring within the last three years (see box 4.2).[78]

Tax System

Brazil's complex tax system creates supply chain distortions in the Brazilian soybean industry. While there are many separate taxes levied on Brazilian producers and consumers, the most distorting for the soybean complex is the Tax on Circulation of Goods and Services (ICMS), a state value-added tax charged both on intra- and interstate transactions. The tax rate is 7 or 12 percent (depending on the state) on all products transported for sale across state lines,[79] and the tax is levied on all soybean products, including whole soybeans destined for processing in a different Brazilian state.[80] In the context of competitiveness between U.S. and Brazilian soybean exports, the ICMS appears to have two principal and possibly offsetting effects. The first is that the ICMS is ultimately levied on domestic sales and not on exports, thereby stimulating exports relative to domestic consumption. The second is that the ICMS creates inefficiencies in Brazil's soybean supply chain by encouraging processors to locate in the state in which the soybeans are grown to avoid ICMS taxes.

The ICMS formerly applied to exports of all raw and semi-elaborated products, including soybeans and soybean products, but the tax on exports was eliminated by the 1996 Kandir Law.[81] In cases where soybean processing occurs in a different state than the one in which the soybeans were harvested, the ICMS must be paid when soybeans cross state lines, even if the meal and oil are then exported at a later date. In theory, this problem is mitigated by a tax credit offsetting (at least partially) the state-level ICMS tax; this credit is generated when the final goods are exported. However, not all firms are able to use all their credits. Although unused tax credits may be sold to another company, the traded market for ICMS tax credits is reportedly very thin.[82] The result is that companies with

[75] Government official, interview by USITC staff, Paraná, Brazil, August 31, 2011.
[76] Industry representative, interview by USITC staff, Paraná , Brazil, August 31, 2011.
[77] Monsanto, "Insect-Protected Roundup Ready 2 Yield Soybeans," August 20, 2010.
[78] *Soybean and Corn Advisor*, "GMO Crop Varieties Find Path to Approval in Brazil," October 13, 2011.
[79] Deloitte, "Brazil Highlights," 2011.
[80] Flaskerud, Brazil's Soybean Production and Impact, July 2003, 5.
[81] Goldsmith and Hirsch, "The Brazilian Soybean Complex," 2006.
[82] Industry representative, interview by USITC staff, São Paulo, Brazil, August 22, 2011.

tax credits at times must hold the credits for 3–4 years before they are able to sell them, and often they do not receive the full value of those credits.[83]

The ICMS has played a major role in determining the location of soybean processing facilities in Brazil. Traditionally, it was cheaper to transport and process whole soybeans than to transport soymeal and oil—particularly soybean oil, which requires tankers.[84] As a result, soybean processing was concentrated in the south, close to the original growing regions and ports for export. However, as noted, soybean production has shifted to the Center-West region, far from Brazil's East Coast ports and processing facilities; the ICMS, incurred on purchases of whole soybeans produced out of state, has become an issue for East Coast processors, resulting in a shift in soybean processing to the Center-West region.[85] Reportedly 20 percent of southern crushing capacity was idle in 2011, and older, less efficient plants closed altogether in the face of competition from newer facilities in Mato Grosso.[86]

Unfortunately, the new facilities are located near soybean production but not near large domestic consumer markets or main ports of export. This has impacted the makeup of Brazil's soybean production and exports, as Center-West producers overwhelmingly ship whole soybeans for export. By encouraging processing in suboptimal areas, the presence of the ICMS contributes to inefficiencies in the industry, making it more expensive to produce meal and oil in Brazil. But because the ICMS is a main source of revenue for state governments, politicians have little incentive to remove it.[87]

Non-GM Seed and Traceability

Brazil's geography and infrastructure allow farmers to grow conventional (non-GM) soybeans for export, while still remaining cost competitive. This ability gives the country an advantage in product differentiation over the United States in markets that demand them, mainly the EU-27. The climate in certain regions of the Center-West state of Mato Grosso is so favorable to growing soybeans that producers there can typically achieve the same high yields with conventional soybeans as they do with GM seed. This is unlike the situation in southern Brazilian states, where soybean production is virtually all GM.[88] To be sold as non-GM product, conventional soybeans must be segregated along the full marketing chain to end users. In certain regions of Brazil, not only have conventional beans been sold at a premium over GM beans—up to R$2–R$4 ($1.25–$2.50) per 60-kilogram bag[89]—but for every 1,000 ha (2,470 acres) of conventional seed planted,

[83] In addition, a São Paulo processor who buys whole soybeans from Mato Grosso pays a 12 percent tax on the shipment. However, oil produced from those soybeans in São Paulo is sold to refiners or end users with a reduced ICMS tax of 7 percent, since vegetable oils are considered staple foods. In effect, the processor is able to pass on only part of the ICMS cost to his customer and absorbs the 5 percent tax differential as an additional cost. Industry representative, interview by USITC staff, São Paulo, Brazil, August 22, 2011.

[84] Industry representative, interview by USITC staff, São Paulo, Brazil, August 25, 2011; Goldsmith and Hirsch, "The Brazilian Soybean Complex," 2006.

[85] Industry representative, interview by USITC staff, São Paulo, Brazil, August 22, 2011.

[86] Ibid.

[87] Goldsmith and Hirsch, "The Brazilian Soybean Complex," 2006.

[88] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.

[89] Industry representative, interview by USITC staff, Paraná, Brazil, August 31, 2011.

farmers have been able to save up to R$23,000 ($14,200) on royalty fees.[90] In the case of conventional soybean production in Mato Grosso, product is shipped to the northern port of Santarém on the Amazon River or to Itacoatiara in Amazonas by way of Porto Vehlo, where dedicated GM-free terminals handle the large volumes of conventional beans shipped from Mato Grosso to Europe. The large farms involved in this production are often capable of supplying enough soybeans to fill an entire vessel, making it relatively easy to keep conventional product isolated.

Brazilian producers have exploited their natural, historic, and geographic advantages in order to segregate the conventional bean supply chain in a way that is not cost-effective in the United States. The United States has one of the highest rates of biotechnology adoption for soybeans in the world, and only 6 percent of soybean seeds planted domestically are conventional.[91] Because most U.S. soybean farmers sell their soybeans to a local elevator, they are mixed with soybeans originating on other farms. It is not only costly for U.S. producers and exporters to store and ship conventional beans separately from GM beans, but yields of conventional beans in the United States also tend to be lower than those of GM seeds. This leaves little incentive for U.S. farmers to grow conventional soybeans.[92]

Changes in the markets for conventional soybeans could limit future Brazilian supplies. The current prevalence of conventional soybeans in western Mato Grosso means that any segregation costs are often borne by GM growers, who are in the minority there.[93] However, when construction and paving of the highway leading into the port of Santarém is completed, and the port expands, segregation might become more costly.[94] In addition, there are very few seed companies producing non-GM seed, increasingly resulting in a lack of supplies.[95] Among conventional growers there is a perception that seed companies are making it easier to use GM seeds than non-GM.[96] For example, Monsanto sells both conventional and GM seeds in Brazil, but they often come packaged together without offering the farmer the option to purchase only conventional ones.[97] This has begun to affect production levels of conventional soybeans in Mato Grosso. In 2011, conventional soybeans accounted for close to 40 percent of the total state production, but industry representatives in Brazil predicted a drop to 30 percent in 2012.[98]

In addition to supplying conventional soybeans, Brazilian soybean producers are also able to differentiate their product by ensuring its traceability back through the supply chain, which is an increasingly desirable characteristic, particularly for many EU-27 buyers. New regulations in the EU-27 require traceability for their soybean imports

[90] *Soybean and Corn Advisor*, "Conventional Soybeans Gaining Acreage in Mato Grosso," September 22, 2011. In 2010 in Mato Grosso, conventional soybean growers achieved comparable overall costs relative to GM soybeans despite much higher fungicide and herbicide costs, owing to lower costs for seeds/royalties, fertilizer, and postharvest handling. Industry representative, interview by USITC staff, São Paulo, Brazil, August 26, 2011.

[91] USDA, ERS, "Adoption of Genetically Engineered Crops in the U.S.: Soybeans Varieties," July 1, 2011.

[92] Industry representatives, interviews by USITC staff, Illinois and Missouri, September 19–23, 2011.

[93] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 31, 2011.

[94] Ibid.

[95] Ibid.

[96] Ibid.

[97] Ibid.

[98] Ibid.

because it must be proven that the soy was grown on non-deforested land.[99] Although U.S. industry groups are working to show that soybeans grown in the United States meet this criterion, it is nearly impossible to trace U.S. soybean shipments back to their original farm because of mixing during storage and transport. Brazil's large farm sizes make mixing less common, and it is therefore easier for soybeans to be traced to their exact growing location. In August 2011, ADM announced that it had succeeded in showing the EU Commission that certain South American farms met the EU's environmental criteria and that their soybeans would not be contaminated with those from non-audited farms.[100] Though ADM is headquartered in Illinois, the company chose to achieve this sustainability certification in South America because of the ease of traceability. The trade implications of this policy favor Brazil in the important EU-27 market.

Key Export Markets

China

Market Characteristics

China has become the largest global export market for soybeans owing to the diversification of the Chinese diet and the needs of its rapidly growing livestock sector.[101] In 2011, China imported approximately 53 million mt of soybeans, valued at $30 billion (table 6.13). In 2011, China imported nearly $13 billion of soybeans from the United States and almost $12 billion from Brazil, representing 42 percent and 40 percent of China's total soybean imports, respectively.[102] Argentina is the third-largest exporter to China.[103]

Chinese policy has encouraged the importation of whole soybeans for crushing within its borders to capture the value-added processing activity.[104] Over the period 2006–10, China consistently crushed between 67 and 75 percent of its total soybean supply.[105] China is not a large import market for soybean meal because it is largely self-sufficient in that product. It is, however, the second-largest market for soybean oil, because high levels of demand for cooking oil cannot be met by domestic production. China maintains a 3 percent import tariff on whole soybeans, a 5 percent import tariff on soybean meal, and a 9 percent import tariff on soybean oil.[106]

[99] ASA, "EU Renewable Energy Directive," n.d.
[100] ADM, "ADM First to Provide ISCC-Certified Sustainable Soybeans to Europe," August 10, 2011.
[101] USITC, *China's Agricultural Trade*, March 2011.
[102] GTIS, Global Trade Atlas database (accessed April 10, 2012).
[103] Ibid.
[104] USITC, *China's Agricultural Trade*, March 2011.
[105] USDA, FAS, PSD Online (accessed October 20, 2011). The remaining portion is destined for domestic food use, feed waste, and ending stocks.
[106] *Commodity Online*, "Soy Taxes and Tariffs: Chinese Cues for Brazil," August 5, 2011.

TABLE 6.13 China: Soybean imports, by supplier, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
Soybeans							
United States	2,719	4,234	8,443	9,333	11,319	12,653	36
Brazil	3,020	3,894	7,282	7,350	8,146	11,792	31
Argentina	1,619	3,181	5,789	1,650	4,979	4,362	22
Uruguay	127	155	292	321	601	807	45
Canada	5	7	6	131	35	219	113
All other	0	0	2	2	0	1	([a])
Total	7,489	11,472	21,814	18,787	25,081	29,834	32
Soybean meal							
India	113	32	89	45	75	87	–5
EU-27	1	1	2	1	3	5	38
Taiwan	([b])	([b])	([b])	1	3	3	45
United States	([b])	([b])	([b])	([b])	([b])	1	224
All other	36	([b])	([b])	([b])	([b])	([b])	–65
Total	151	33	90	47	81	96	–9
Soybean oil							
Brazil	135	315	922	392	809	593	34
Argentina	650	1,705	2,205	1,407	137	471	–6
United States	14	119	206	41	255	258	79
Korea	0	0	([b])	1	2	1	([a])
All other	([b])	7	1	2	([b])	2	40
Total	800	2,146	3,334	1,842	1,203	1,324	11

Source: GTIS, Global Trade Atlas database (accessed March 27, 2012).

Note: Totals may not add due to rounding.

[a]Not applicable.
[b]Less than $500,000.

Consumption Patterns and Preferences

China's population and income growth as well as the change in people's diets toward more proteins and edible oils led to a significant rise in domestic consumption of soybeans, soybean meal, and soybean oil between 2006/07 and 2010/11 (table 6.14).[107] China's domestic consumption of soybeans and soybean products is expected to keep growing. Increased development of the livestock and aquaculture sectors, higher GDP per capita, changing dietary demands, and an excess in crush capacity (discussed below) indicate that China is likely to remain the largest global consumer.[108]

China's preference for importing raw soybeans has fueled its processing sector. There is currently overcapacity in the sector resulting from state-owned enterprise (SOEs) investment in new plants, which creates potential demand for whole soybeans.[109] It is estimated that China's processing capacity exceeded 100 million mt in 2011, despite the

[107] USITC, *China's Agricultural Trade*, March 2011; USDA, FAS, PSD Online (accessed October 20, 2011).
[108] USDA, FAS, *China: Oilseed and Product Update*, May 28, 2011.
[109] Ibid.

TABLE 6.14 China: Soybean production, consumption, exports, and imports, MY 2006/07–2010/11

	2006/07	2007/08	2008/09	2009/10	2010/11	Average annual change 2006/07–2010/11
			1,000 mt			Percent
Soybeans						
Production	15,074	13,400	15,540	14,980	15,100	0
Consumption	46,120	49,818	51,435	59,430	65,950	9
Crush rate[a] (%)	74	75	69	67	68	([b])
Exports	446	453	400	184	190	–19
Imports	28,726	37,816	41,098	50,338	52,339	16
Trade balance	–28,280	–37,363	–40,698	–50,154	–52,149	([b])
Soybean meal						
Production	28,465	31,280	32,475	38,644	43,560	11
Consumption	27,630	30,849	31,673	37,546	43,382	12
Exports	867	634	1,017	1,181	472	–14
Imports	32	203	215	83	294	74
Trade balance	835	431	802	1,098	178	([b])
Soybean oil						
Production	6,410	7,045	7,325	8,726	9,840	11
Consumption	8,670	9,693	9,486	10,435	11,109	6
Exports	94	102	83	77	52	–14
Imports	2,404	2,727	2,494	1,514	1,319	–14
Trade balance	–2,310	–2,625	–2,411	–1,437	–1,267	([b])

Source: USDA, FAS, PSD Online database (accessed February 2, 2012).

[a]The crush rate is the share of total domestic supply that is crushed into meal and oil.
[b]Not applicable.

fact that in 2009 the Chinese government began actively restricting continued expansion in the sector, mainly by foreign and domestic private investors.[110]

Competition with the United States

China's demand has grown steadily: whereas in 1997 China imported no soybeans, it is now the global import leader. The United States is the country's largest supplier, exporting 25 percent of its raw soybean production to China.[111] Brazil tends to be the largest supplier to the Chinese market from January to June, while supplies from the United States rise after its soybean harvest begins in September. Chinese imports increased from each of its four largest suppliers from 2006 to 2011, indicating the strong growth in Chinese demand.

China is a major processor of soybean oil and meal from domestic and imported raw soybeans. In recent years, China was a slight net exporter of soybean meal and its imports of soybean oil are modest relative to its domestic production and consumption. During 2006–11, China imported soybean oil mostly from three countries—Argentina, Brazil, and the United States. Argentina was the largest supplier during 2006–09, but, according to industry reports,[112] China sharply reduced imports in 2010 in response to Argentina's imposition of countervailing duties on certain Chinese imports.[113] According to USDA, China officially lifted the ban in November 2010; however, Chinese imports of Argentine

[110] USDA, FAS, *China: Oilseed and Product Annual*, March 1, 2011.
[111] Industry representative, interview by USITC staff, Washington, DC, June 16, 2011.
[112] Ibid.
[113] Moore, *Argentina: There and Back Again?* June 2011.

soybean oil have remained low.[114] In 2011, Brazil was the largest supplier of soybean oil to China, and Argentina was the second-largest.

European Union

Market Characteristics

The EU-27 is the world's second-largest soybean importer. It accounted for approximately 14 percent of total global imports of soybeans in 2010, or over 13 million mt valued at almost $6 billion (table 6.15).[115] In 2011, the three largest suppliers of whole soybeans to the EU-27 were Brazil, Paraguay, and the United States, with Brazil exporting as much to the EU-27 as the United States and Paraguay combined. Although the quantity of beans exported from the United States to the EU-27 declined during 2006–10, the United States and Paraguay have gained market share because the EU-27's imports from Brazil have fallen at a faster rate. Historically, the United States was the second largest supplier of soybeans to the EU, but in 2011 Paraguay overtook that position. Paraguay's soybean production has grown rapidly, and exports, including to the EU-27, accounted for 80 percent of Paraguay's total output of 8.4 million mt in 2010/11.[116]

The EU-27 is the largest global importer of soybean meal, which is used for animal feed for the EU-27 livestock sector. Argentina and Brazil are its main import suppliers. The volume of EU-27 imports of soybean meal trended slightly downward over the period 2006–10 in favor of using its domestically produced rapeseed meal in animal feed, a trend that may continue long-term depending on the availability of other oilseeds.[117]

Consumption Patterns and Preferences

Domestic EU-27 consumption of soybeans, soybean meal, and soybean oil has fallen slightly over the period (table 6.16). Domestic production of soybeans is limited and soybean meal production in the EU-27 covers only a modest share of consumption in most years; the remainder is served by imports. Most soybeans shipped to the EU-27 are crushed into soybean meal and oil; the EU-27 crushes nearly 90 percent of its total soybean supply annually.[118] Soybean meal is used as feed in the EU-27 livestock sector and competes with other oilseed meals for this use. GM soybeans or oil produced from GM soybeans are not generally used for human food applications in the EU-27 owing to

[114] USDA, FAS, *China: Oilseed and Product Update*, May 28, 2011.

[115] GTIS, Global Trade Atlas database (accessed April 10, 2012). At the time of publication of this report several countries had not yet reported import data for 2011, including several relatively large soybean importers (Egypt, Iran, Israel, Tunisia, and Saudi Arabia). In 2010, those five countries imported $1.7 billion worth of soybeans, accounting for approximately 4 percent of global soybean imports.

[116] By comparison, in 2006/07 Paraguay's soybean exports accounted for 74 percent of its total soybean output of 5.6 million mt. USDA, FAS, PSD Online (accessed April 10, 2012).

[117] USDA, FAS, *EU-27 Soybean Imports from the United States Still Impeded*, November 3, 2009.

[118] USDA, FAS, PSD Online (accessed October 20, 2011).

TABLE 6.15 EU-27: Soybean imports, by supplier, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
Soybeans							
Brazil	2,298	3,260	4,521	3,922	2,584	2,756	4
Paraguay	248	337	479	319	1,012	1,410	42
United States	843	1,119	1,846	818	1,370	1,263	8
Canada	146	319	351	266	621	647	35
Ukraine	27	28	74	71	63	249	56
All other	73	156	302	130	296	273	30
Total	3,635	5,239	7,573	5,526	5,947	6,598	13
Soybean meal							
Argentina	3,110	4,147	5,442	4,549	4,274	4,510	8
Brazil	1,859	2,499	3,894	3,618	3,553	3,963	16
United States	18	46	224	133	433	165	56
India	1	4	117	44	19	143	170
Norway	37	48	64	67	66	71	14
All other	26	39	83	109	135	109	33
Total	5,051	6,783	9,824	8,520	8,479	8,960	12
Soybean oil							
Argentina	105	171	503	108	309	393	30
Brazil	371	502	593	196	47	188	–13
Russia	0	1	30	62	125	132	([a])
Norway	36	53	83	47	64	87	19
Serbia	4	26	46	28	37	56	70
United States	9	6	2	1	2	2	–26
All other	9	10	14	32	71	95	60
Total	535	768	1,272	475	655	953	12

Source: GTIS, Global Trade Atlas database (accessed April 10, 2012).

Note: Totals may not add due to rounding.

[a]Not applicable.

TABLE 6.16 EU-27: Soybean production, consumption, exports, and imports, MY 2006/07–2010/11

	2006/07	2007/08	2008/09	2009/10	2010/11	Average annual change 2006/07–2010/11
			1,000 mt			Percent
Soybeans						
Production	1,228	723	639	836	1,048	–4
Consumption	16,087	16,113	14,086	13,382	13,465	–4
Crush rate[a] (%)	86	88	88	90	87	([b])
Exports	47	37	22	36	55	4
Imports	15,180	15,129	13,213	12,429	12,465	–5
Trade balance	–15,133	–15,092	–13,191	–12,393	–12,410	([b])
Soybean meal						
Production	11,550	11,715	10,131	9,880	9,675	–4
Consumption	33,228	35,169	31,579	30,138	30,722	–2
Exports	552	424	467	472	606	2
Imports	22,207	24,449	20,993	20,730	21,714	–1
Trade balance	–21,655	–24,025	–20,526	–20,258	–21,108	([b])
Soybean oil						
Production	2,670	2,710	2,350	2,280	2,236	–4
Consumption	3,408	3,422	2,749	2,397	2,794	–5
Exports	243	334	399	387	456	17
Imports	977	1,036	794	550	905	–2
Trade balance	–748	–706	–394	–156	–449	([b])

Source: USDA, FAS, PSD Online database (accessed February 2, 2012).

[a]The crush rate is the share of total domestic supply that is crushed into meal and oil.
[b]Not applicable.

the negative perceptions many EU consumers have of GM food products.[119] Soybean oil derived from GM soybeans is used in biodiesel production.

Competition with the United States

The United States and Brazil compete directly in the EU-27 market, where the vast majority of soybeans are crushed into meal for use in livestock feed, along with other types of oilseed meals. For direct human consumption, conventional soybeans and products are used. In this narrow segment, Brazil's current ability to provide conventional soybeans and traceability at a reasonable cost gives it a competitive advantage over the United States in the EU-27 market.

Brazil's advantage in the EU-27 is related to the EU-27 preference for conventional soybeans. Brazil's major soybean-producing areas remained relatively free of GM seeds until the early 1990s, thus enabling Brazil to strengthen its position in the EU-27 market. In addition, the EU-27 blocked soybean shipments from the United States in 2009 because they contained traces of GM corn not yet approved in the EU-27, and the EU-27 has a zero tolerance policy for unauthorized biotech events. Though several of the biotech events in question were subsequently approved by the EU-27, USDA indicates that the

[119] Since the late 1990s, the EU-27 has required that products containing or derived from GM organisms be labeled as such. Although the U.S. soybean industry maintains that this and other policies affecting GM soybeans act as a barrier to U.S. soybean exports to the EU-27, USITC staff was not able to estimate the effects of these policies in its model simulation found in chapter 11 of the report because no price gaps relating to nontariff measures for these products were found in 2010.

policy has made importers generally hesitant to purchase soybeans from the United States.[120]

The United States competes directly with Brazil and Argentina for exports of soymeal to the EU-27. Both the United States and Brazil are at a competitive disadvantage with Argentina for EU-27 market share, owing to Argentina's differential export tax on soybean products (box 6.1). In addition, soybeans from all sources, including the United States and Brazil, that are used as inputs into the biodiesel industry in the EU-27 may not qualify in the future for EU tax credits and use mandates because of two Renewable Energy Directive (RED) requirements implemented in April 2009. The RED seeks to increase the use of renewable energy in the EU-27, including biodiesel fuel. To be eligible for EU tax credits and use mandates, the RED requires that biofuels reduce emissions of greenhouse gases a minimum of 35 percent, compared to petroleum diesel, by 2013; 50 percent by 2017; and 60 percent by 2018. The EU set the amount of greenhouse gas savings that soy biodiesel must meet at 31 percent, short of the 35 percent required, disqualifying soy from benefits when used as a feedstock for biodiesel in the EU-27. However, analysis conducted in the United States, using the EU's Joint Research Centre methodology with U.S. data, shows actual emissions savings from soybean oil in a range of 41 to 57 percent.[121] In 2011, RED requirements in effect in Germany and Austria distorted traditional trading patterns as Germany imported GM soybeans from non-EU-27 suppliers, crushed them, and exported the soybean oil to other EU member states for biodiesel production.[122] U.S. trade data for 2011 indicate that U.S. exports of soybeans to the EU-27 fell 28 percent by value and 41 percent by volume in that year compared to 2010.[123]

Japan

Market Characteristics

Japan is the third-largest global market (by value) for whole soybeans, and the United States and Brazil are its number one and number two suppliers respectively.[124] Japan imported approximately 2.8 million mt of soybeans, a total value of $1.8 billion, in 2011 (table 6.17). In 2011, the United States supplied 65 percent of Japan's soybean imports, while Brazil held a 17 percent market share.[125] While the bulk of Japan's imported soybeans and soy meal goes into animal feed, Japan imports some high-quality beans to process into tofu and other traditional Japanese foods. Japan is not a large market for soybean oil.

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[120] USDA, FAS, *EU-27 Soybean Imports from the United States Still Impeded*, November 3, 2009.
[121] ASA, "EU Renewable Energy Directive," n.d.
[122] USDA, FAS, EU-27: *Oilseeds and Products Annual*, April 7, 2011.
[123] Although RED policies may have created a nontariff measure (NTM) for U.S. soybean exports in 2011, the USITC model simulation in chapter 11 is based on 2010 trade data, when no trade-distorting NTMs in the form of relevant price gaps were found to be present in U.S. soybean trade.
[124] GTIS, Global Trade Atlas database (accessed April 10, 2012).
[125] Ibid.

BOX 6.1 Argentina's Differential Export Tax

Argentina is the leading global exporter of soybean meal and soybean oil.[a] The government of Argentina maintains a tax on exports of soybeans and soybean products which incentivizes the production of beans into meal and oil. The differential export tax (DET) is higher on whole soybeans than it is on meal and oil, therefore making it more profitable to process soybeans in Argentina for export. Currently, the DET for soybeans is 35 percent, while the DET for soybean meal and oil is 32 percent.[b] The 3 percent differential between the two taxes translates into a benefit of approximately $10 per metric ton on meal and oil exports,[c] enough to cover the variable cost of crushing.[d] If Argentina were to remove its DETs, industry representatives estimate that the United States would be able to ship an additional 2 to 3 million mt of soybean meal to the EU-27.[e]

Argentina's DETs have helped to encourage large processing companies to invest in crushing facilities there. Crushing plants in Argentina are located strategically along a waterway, facilitating exports. Large processing plants also create economies of scale, making each processed bean marginally less expensive.[f] These investments have been calculated to benefit Argentina by approximately $6.60 per metric ton.[g]

Argentina has another advantage with regard to the export of soybeans and soybean byproducts: there is little domestic demand for these products in Argentina. In MY 2009/10, Argentina consumed 30 percent of its soybean oil production and only 2.5 percent of its soybean meal production for its chicken, beef, and pork production.[h]

Over the past 20 years, Argentina increased its global export market share of soybean oil from 26 percent to 52 percent and soybean meal from 16 percent to 47 percent. If DETs were eliminated, the U.S. soybean industry estimates that it would see additional profits of $500 million per year, and Brazil would see additional profits of $300 million per year.[i]

[a] GTIS, Global Trade Atlas database (accessed February 2, 2012).
[b] LMC International Ltd, *Impact of Argentina's System of Differential Export Tax Rates*, 2010.
[c] LMC International Ltd, *Impact of Argentina's System of Differential Export Tax Rates*, 2010.
[d] Industry representative, interview by USITC staff, Washington, DC, June 2, 2011.
[e] Industry representative, interview by USITC staff, Washington, DC, June 2, 2011.
[f] Industry representative, interview by USITC staff, Washington, DC, June 2, 2011.
[g] LMC International Ltd, *Impact of Argentina's System of Differential Export Tax Rates*, 2010.
[h] This compares to domestic consumption of 80 percent of soybean oil production and 73 percent of soybean meal production in the United States, and 78 percent of soybean oil production and 49 percent of soybean meal production in Brazil. USDA, FAS, PSD Online (accessed December 5, 2011).
[i] LMC International Ltd., *Impact of Argentina's System of Differential Export Tax Rates*, 2010.

TABLE 6.17 Japan: Soybean imports, by supplier, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
Soybeans							
United States	979	1,300	1,712	1,190	1,262	1,181	4
Brazil	104	137	351	263	257	301	24
Canada	118	147	220	243	261	281	19
China	79	72	73	43	39	41	–12
Paraguay	([a])	([a])	1	([a])	2	2	54
All other	1	8	2	20	([a])	1	–1
Total	1,282	1,664	2,359	1,742	1,821	1,806	7
Soybean meal							
India	148	189	443	264	349	605	33
China	87	179	152	330	350	120	7
United States	157	156	244	202	212	210	6
Brazil	31	1	([a])	21	31	91	24
Korea	0	([a])	15	19	20	23	([b])
All other	20	226	5	39	18	19	–1
Total	444	550	860	875	979	1,068	19
Soybean oil							
Taiwan	2	5	10	5	4	10	38
United States	14	14	21	15	11	8	–11
China	33	20	41	25	9	7	–27
Korea	([a])	([a])	([a])	([a])	([a])	4	69
Argentina	([a])	([a])	1	0	0	2	72
All other	3	5	11	2	1	2	–8
Total	53	44	84	48	26	34	–9

Source: GTIS, Global Trade Atlas database (accessed April 10, 2012).

Note: Totals may not add due to rounding.

[a]Less than $500,000.
[b]Not applicable.

Consumption Patterns and Preferences

Soybeans and soy-based products have been historically central to the Japanese diet, and continue to be as the public becomes increasingly aware of the protein's health benefits.[126] Japanese consumption of soybeans was in the 3 to 4 million mt range from 2006/07 to 2010/11 (table 6.18).[127] Japan does not have a large crush capacity, importing oil and meal when needed instead of whole soybeans. However, edamame, which are boiled whole soybeans, are a popular snack food in Japan, and whole soybeans are imported for this use. Overall, food use accounts for 25 percent of soybean imports into Japan, as soybeans are used to make staple foods such as tofu, miso, and soy sauce.[128] Tofu can be made from soybean meal or whole soybeans, and accounts for 49 percent of total food soybean use.[129]

[126] USDA, FAS, *Japan: 2010 Update*, April 13, 2011.
[127] USDA, FAS, PSD Online (October 20, 2011).
[128] USDA, FAS, *Japan: 2010 Update*, April 13, 2011.
[129] USDA, FAS, *Japan: 2011 Update*, May 13, 2011. The only soy product destined for human use that does not require food-grade beans is soy sauce. USDA, FAS, *Japan: 2010 Update*, April 13, 2011.

TABLE 6.18 Japan: Soybean production, consumption, exports, and imports, MY 2006/07–2010/11

	2006/07	2007/08	2008/09	2009/10	2010/11	Average annual change 2006/07–2010/11
			1,000 mt			Percent
Soybeans						
Production	225	225	262	223	220	–1
Consumption	4,310	4,218	3,752	3,584	3,255	–7
Crush rate[a] (%)	64	64	64	62	62	([b])
Exports	7	5	0	0	0	0
Imports	4,094	4,014	3,396	3,401	2,917	–8
Trade balance	–4,087	–4,009	–3,396	–3,401	–2,917	([b])
Soybean meal						
Production	2,245	2,218	1,917	1,820	1,591	–8
Consumption	3,921	3,945	3,846	3,865	3,804	–1
Exports	0	0	0	0	0	0
Imports	1,737	1,747	1,812	2,106	2,208	6
Trade balance	–1,737	–1,747	–1,812	–2,106	–2,208	([b])
Soybean oil						
Production	534	528	456	432	378	–8
Consumption	577	573	536	459	403	–9
Exports	0	0	0	3	0	0
Imports	50	42	39	29	19	–22
Trade balance	–50	–42	–39	–26	–19	([b])

Source: USDA, FAS, PSD Online database (accessed February 2, 2012).

[a]The crush rate is the share of total domestic supply that is crushed into meal and oil.
[b]Not applicable.

Annual Japanese consumption of soybean meal was just under 4 million mt during 2006/07–10/11. However, meal imports have increased, due to a decline in Japan's small crushing capacity and resultant reduction in domestic soybean meal supply.[130] Only 11 percent of soybean meal in Japan is used for food consumption, as 89 percent goes into animal feed.[131] Consumption of soybean oil was steady during 2006/07–07/08, but declined in subsequent years as the price of rapeseed oil became more favorable in the Japanese market.[132] Palm oil is the major vegetable oil imported into Japan, and high tariffs on soybean oil limit imports from major global suppliers.

Competition with the United States

The United States is the principal supplier to the Japanese market, shipping more than three times as many soybeans there in 2011 than Brazil, Japan's the second-largest supplier. In addition to the historically strong economic and diplomatic relationship the United States and Japan have shared, which contributed to the United States' place as principal supplier of soybeans to Japan dating back to the 1950s, today the quality of U.S. soybeans and flexibility in shipping arrangements favor the United States in the Japanese market over Brazil.[133] Japanese consumers also prefer the golden color of U.S. soybeans for certain food-grade applications over the reddish color of Brazilian soybeans.[134] A

[130] USDA, FAS, *Japan: 2010 Update*, April 13, 2010.
[131] USDA, FAS, *Japan: 2011 Update*, May 13, 2011.
[132] USDA, FAS, *Japan: 2010 Update*, April 13, 2010.
[133] Industry representative, interview by USITC staff, Washington, DC, June 2, 2011; HighQuest Partners and SoyaTech, *How the Grain and Oilseed Trade Works*, 2008, 14.
[134] Ibid., 60.

portion of U.S. soybean exports to Japan consists of conventional soybeans, because Japan mandates that all food-grade soybeans (such as those for tofu and edamame) be non-GM. U.S. conventional soybean growers in various U.S. states, including Ohio, Iowa, southern Illinois, and Missouri, take advantage of this niche market shipping smaller volumes in containers, at times enjoying favorable shipping rates on containers that otherwise would have made the return trip to Asia empty.[135]

[135] Industry representative, interview by USITC staff, Washington, DC, March 15, 2012.

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CHAPTER 7
Grains

Overview

Brazil is a major global producer, consumer, and trader of cereal grains.[1] Corn is by far Brazil's most important grain crop, accounting for 78 percent of Brazil's grain production and 85 percent of its grain exports on average between marketing year[2] 2006/07 and 2010/11. Although the Brazilian corn industry does not have the same scale and efficiencies as the United States, it has become an important secondary supplier in the international market. Wheat is also produced in large quantities, accounting for 6 percent of Brazil's grain production and 8 percent of its grain exports over the same time period.[3] Brazil's wheat exports are typically lower in quality than those of the United States, and are more likely to compete with corn or other feed grains in third-country markets.

As the most heavily exported grains in Brazil, corn and wheat are the focus of this chapter. Brazilian farmers do produce other grains, such as rice, sorghum, barley, rye, and oats, but these products are sold primarily on the domestic market and the industries are generally not as export-oriented.[4] Given Brazil's natural endowments and available land, there is potential for expanding the production of rice, sorghum, barley, rye, and oats as technologies improve and better infrastructure aids in the development of integrated domestic and international markets. But because of strong demand for grains within Brazil, only corn and wheat are likely to compete for sales in global export markets in the foreseeable future.

Corn

Global Trade in Corn

Corn production and consumption has increased significantly over the last five years as more corn is used for ethanol production and animal feed.[5] The international corn market has many diverse importers, but only a few significant suppliers. The United States is the world's most important corn producer, accounting for about 40 percent of global production and more than half of the world's exports. However, the U.S. share of global exports has fallen in recent years as a larger percentage of U.S. corn supplies are being

[1] Grains can be defined as agriculturally grown cereals and are found in chapter 10 of the Harmonized Tariff Schedule of the United States.

[2] The marketing year is a 12-month period, usually beginning with a new harvest, during which the product is marketed. Marketing years differ for each commodity and country.

[3] USDA, FAS, PSD Online (accessed January 23, 2012).

[4] Sorghum is most commonly used as an animal feed in Brazil, and it can be substituted for corn in rations, but too little is produced for it to be a major factor in foreign animal feed markets.

[5] USDA, FAS, PSD Online (accessed January 23, 2012).

used for U.S. ethanol production, which has allowed other suppliers, such as Brazil, to increase their presence in the international market.[6]

Global corn price levels have risen considerably since 2006 due to a number of global economic conditions.[7] However, global demand continues to increase. With the United States providing a smaller share of exports for the international market, production and exports in other major producing countries have increased.[8] Brazil, in particular, has taken advantage of its ample natural resource base to expand production substantially and become an important exporter, particularly for countries trying to diversify their corn supply, markets interested in non-genetically modified (GM) corn varieties (most notably the European Union (EU-27)), and price-sensitive markets.

The Brazilian Corn Industry

Brazil is one of the world's largest corn-producing and -exporting countries, owing to its large tracts of arable land, ability to grow more than one crop per year in several production regions, and relatively low field costs (table 7.1 and 7.2). Over the past five years, Brazilian corn production grew about 3 percent annually, largely because of increased double-cropping of corn (planted after the soybean harvest in the tropical Center-West) as well as the application of more intensive farm management practices, such as improved seed and fertilizer use.[9] Corn production will likely increase in the future, primarily because of improved yields, but also because of expanded acreage (tied to increased soybean production). However, marketing channels are still developing as infrastructure evolves and domestic livestock industries expand. Even with Brazil's infrastructure investments, which lower transportation costs, and the increasing supply of corn available for export, the United States will likely remain the largest global corn exporter for the foreseeable future.

TABLE 7.1 Brazil: Corn production, consumption, exports, and imports, marketing years (MY) 2006/07–2010/11

Item	2006/07	2007/08	2008/09	2009/10	2010/11	Average annual change 2006/07–10/11
			1,000 mt			Percent
Production	51,000	58,600	51,000	56,100	57,500	3.0
Consumption	41,000	42,500	45,500	47,000	49,500	4.8
Exports	8,071	7,883	7,178	8,623	11,583	9.5
Imports	1,204	961	1,092	699	474	–20.8
Trade balance	6,867	6,922	6,086	7,924	11,109	12.8

Source: USDA, FAS, PSD Online database (accessed January 23, 2012).

[6] USDA, *USDA Agricultural Projections to 2020*, February 2011.
[7] Trostle et al., "Why Have Food Commodity Prices Risen Again?" June 2011.
[8] USDA, FAS, PSD Online (accessed January 23, 2012).
[9] Double-cropping involves multiple crop plantings and harvest on the same land in the same year. In Brazil, corn is planted immediately after soybeans are harvested. Corn double-cropping with soybeans is not possible in the United States because of the shorter U.S. growing season. However, double-cropping with winter wheat as the first crop and soybeans as the second crop is practiced in certain U.S. states. USDA, NASS, *Acreage*, June 30, 2011.

TABLE 7.2 Corn: Production, consumption, and trade, selected producers and markets, 2010/11 (1,000 mt)

Country	Production	Consumption	Exports	Imports	Trade balance
Producers					
United States	316,165	285,005	45,254	684	44,570
China	177,245	176,000	111	979	–868
Brazil	57,500	49,500	11,583	474	11,109
EU-27	55,795	62,500	1,078	7,359	–6,281
Argentina	22,500	7,100	15,000	7	15,152
All other	198,147	262,418	18,614	80,387	–70,831
Total	827,352	842,523	91,640	89,890	–
Selected major markets					
Japan	1	15,600	0	15,655	–15,665
Korea	74	8,223	0	8,107	–8,107
Mexico	21,130	28,700	100	8,000	–7,900
Egypt	6,500	12,100	10	5,400	–5,390
Taiwan	38	4,325	0	4,200	–4,200
Colombia	1,450	5,200	0	3,504	–3,504
Subtotal	29,193	74,148	110	44,866	–44,756

Source: USDA, FAS, PSD Online (accessed January 23, 2012).

Although the volume of U.S corn exports was more than six times that of Brazil during 2006-11, there is direct competition between the two in certain third-country markets. In coming years, strong growth in global demand for corn and other feed grains may offer opportunities for both countries to expand production and exports. However, Brazil is unlikely to achieve the same corn production volumes and efficiencies as the United States, primarily because the climate and increasing role of corn in Brazil as a second-harvest crop result in relatively lower yields. Additionally, rising corn demand from Brazil's domestic livestock industries will likely restrict supplies available for export. These factors are compounded by poor transportation infrastructure, particularly for the interior regions, and the detrimental effects of an appreciating currency common to other agricultural products in Brazil, which raise the delivered cost of Brazilian corn. However, Brazil will remain an important secondary supplier to the world market, with the possibility of increasing market shares in several countries where the United States has a presence.

Brazilian Production, Consumption, and Trade

Much of Brazil's increased prominence in the global corn market stems from its dramatic production growth in recent years. Corn production in Brazil increased 13 percent between 2006/07 and 2010/11, rising from 51 million metric tons (mt) to 58 million mt.[10] While its output is considerably smaller than that of the United States, Brazil was the third-largest corn producer in the world in 2010/11 and the largest in the Southern Hemisphere (table 7.3). Brazilian corn production has increased steadily over the past 30 years. However, recent production has plateaued after a significant production jump between 2005/06 and 2007/08. This jump coincided with strong global prices and low inventories worldwide during that period, which made corn economically attractive to Brazilian producers.[11]

[10] USDA, FAS, PSD Online (accessed January 23, 2012).
[11] USDA, FAS, *Brazil: Grain and Feed; Grain Annual*, 2007, March 20, 2007, 4.

TABLE 7.3 World corn production, MY 2006/07–2010/11

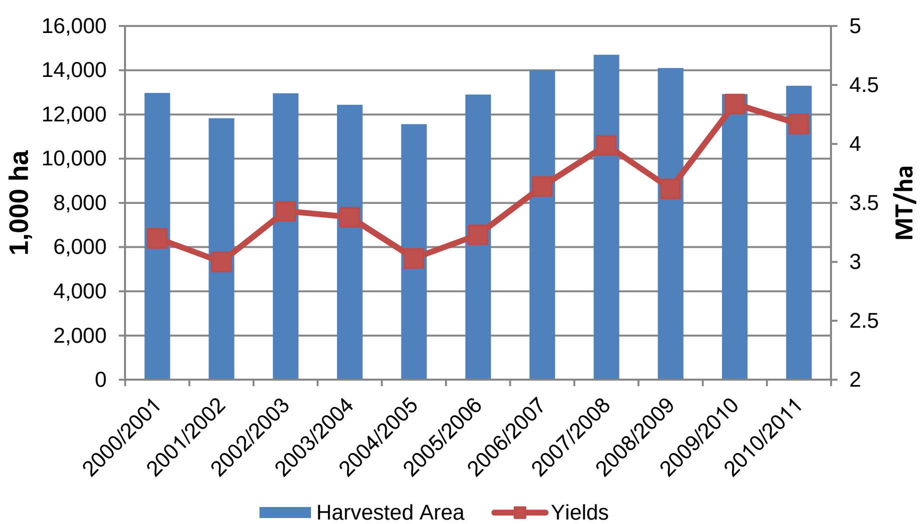
	2006/07	2007/08	2008/09	2009/10	2010/11	Average annual change 2006/07– 2010/11
			1,000 mt			Percent
United States	267,503	331,177	307,142	332,549	316,165	11
China	151,600	152,300	165,914	163,974	177,245	4
Brazil	51,000	58,600	51,000	56,100	57,500	3
EU-27	53,829	47,555	62,321	56,947	55,795	1
Argentina	22,500	22,017	15,500	23,300	22,500	0
Mexico	22,350	23,600	24,226	20,374	21,130	–1
India	15,100	18,960	19,730	16,720	20,500	8
South Africa	7,300	13,164	12,567	13,420	10,924	11
All other	122,849	127,325	140,751	135,850	145,593	4
Total	714,031	794,698	799,151	819,234	827,352	4

Source: USDA, FAS, PSD Online (accessed January 23, 2012).

Note: Totals may not add due to rounding.

Higher Brazilian corn production over the past 10 years can be primarily attributed to yields that rose by almost 30 percent between 2000/01 and 2010/11. Harvested area also trended upward, but to a lesser degree, contributing to the overall production growth (figure 7.1). Increased investment in seed and fertilizer improved yields and increased production, particularly in regions where corn is a secondary crop.[12] However, yields remain below the global average and below those of several major exporting countries.[13] Improving yields will be important for realizing the productive capacity of Brazil's corn industry and will be determined by multiple competitive factors addressed throughout this chapter.

FIGURE 7.1 Brazilian corn harvest area and yield, MY 2000/2001–2010/11



Source: USDA, FAS, PSD Online (accessed January 23, 2012).

[12] *Brazilian Meat Monitor*, "FEED News," June 10, 2011, 18.

[13] For example, between 2008/09 and 2010/11 yields in Canada (9.05 mt/hectare) and the United States (9.86) were more than double Brazil's yield (4.03). Yields in the EU-27 (6.98), neighboring Argentina (8.17), and China (5.32) were also higher. USDA, FAS, PSD Online (accessed May 12, 2011).

The growth in Brazil's livestock and poultry sectors is the most important factor driving Brazilian domestic corn demand and the amount available for export.[14] During 2006/07–2010/11, use of corn for feed rose by 23 percent, reflecting increased production of poultry and pork. During this period, feed prices (primarily corn and soybean meal) were sufficiently stable to facilitate expansion of the hog and broiler industries.[15] While cattle production primarily relies on pasture and forage, feedlots are becoming more common and, as a result, the use of corn in beef production is increasing.[16] However in late 2010, corn prices rose to the point where they have become a concern for the livestock and poultry industries, creating greater competition between Brazilian domestic needs and corn exports.[17]

Brazilian corn exports rose strongly over the past decade and were three times larger in 2010/11 than in 2000/01.[18] In 2010/11, Brazil was the world's third largest corn-exporting country, with almost 12 million mt exported. Brazil still accounts for only about 10 percent of global exports—far behind the United States, which supplies more than one-half of global exports. However, Brazil has almost closed the gap with Argentina, the world's second leading exporter (15 million mt in 2010/11) and is ahead of Ukraine (5 million mt).

Much like the increase in production, the dramatic rise in exports after 2006/07 coincided with a period of high world prices and low global inventories.[19] As domestic consumption continues to increase, it is uncertain whether Brazil will be able to sustain the same level of export growth in the future.[20] However, USDA expects that over the next 10 years Brazil's exports will at least remain relatively stable.[21]

In addition to increasing its overall exports, Brazil has increasingly diversified the markets it serves (table 7.4). Before 2007, Brazil did not have many well-developed relationships with overseas customers; corn was marketed overseas from year to year, depending on whether Brazil had product available and whether consuming countries faced supply shortfalls. However, as exports began to increase in 2006 and 2007, trade patterns shifted. Brazil began exporting to new markets and increased quantities to existing markets. For example, corn exports to Taiwan increased from zero in 2006 to $326 million in 2011, making Taiwan Brazil's third-largest export market that year.

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[14] USDA, FAS, PSD Online (accessed January 23, 2012).

[15] USDA, FAS, *Brazil: Poultry and Products; Annual Poultry Report*, September 27, 2009, 2; USDA, FAS, *Brazil: Livestock and Products Annual; Annual Livestock Report*, September 22, 2009, 8.

[16] USDA, FAS, *Brazil: Livestock and Products Annual*, August 16, 2011, 5.

[17] CEPEA, "Indicador de preços" [Price indicator] (accessed September 28, 2011); USDA, FAS, *Brazil: Livestock and Products Annual*, August 16, 2011, 5; *Brazilian Meat Monitor*, "FEED News," June 10, 2011, 2; see also chapter 9.

[18] USDA, FAS, PSD Online (accessed January 23, 2012).

[19] USDA, FAS, *Brazil: Grain and Feed; Grain Annual*, 2007, March 20, 2007, 4.

[20] USDA, FAS, *Brazil: Grain and Feed Annual; Annual Report*, March 16, 2011, 4.

[21] USDA, OCE, USDA Agricultural Projections to 2020, February 2011.

TABLE 7.4 Brazil: Corn exports to selected markets, 2006–11 (million $)

	2006	2007	2008	2009	2010	2011
Iran	205	436	90	283	276	526
Taiwan	0	0	35	120	220	326
EU-27	118	1,273	799	50	319	279
Japan	([a])	10	([a])	44	116	226
Algeria	0	0	14	44	86	192
Morocco	0	0	31	68	187	164
Malaysia	0	0	56	130	186	157
Colombia	3	1	55	128	152	113
Saudi Arabia	1	16	68	99	167	108
Indonesia	0	0	0	4	86	53
All other	154	183	258	332	63	573
Total	482	1,919	1,405	1,302	2,216	2,716

Source: GTIS, Global Trade Atlas database (accessed January 31, 2012).

Note: Totals may not add due to rounding.

[a]Less than $500,000.

Several factors underlie Brazil's increased role in international markets. First, higher global demand and world prices spurred increased corn production and exports worldwide in 2007/08, and Brazil was no exception. Second, domestic policy in the United States increased the amount of U.S. corn used for ethanol, decreasing the amount of U.S. supplies available for exports. Importing countries were interested in diversifying their suppliers to ensure domestic demands were satisfied, and Brazil was well positioned to serve those markets, with land and other resources enabling it to significantly increase its production.[22] Third, Brazil is able to provide non-GM exports, particularly to the EU-27, Korea, and Japan, owing to Brazil's relatively large use of non-GM seed and the availability of segregated marketing channels in Brazil similar to those it has for non-GM soybeans (see chapter 6).[23] Lastly, short-term weather-induced grain supply shortages in Eastern Europe and export bans in Russia created global grain shortages in late 2010.[24] This increased the value of Brazilian corn exports by raising the price and volume Brazil shipped as importers searched for new suppliers.

Industry Structure

Farm and Industry Organization

Corn production systems in Brazil differ by region within the country. For example, corn operations encompass the large-scale farming typically found in the Center-West states, the small and medium-scale farms in the South that are members of cooperatives, and the subsistence farming found primarily in the North and Northeast states.[25] Production

[22] USDA, FAS, *Brazil: Grain and Feed; Grain Annual, 2007*, March 20, 2007, 4–5; government official, interview by USITC staff, Brasilia, Brazil, August 2011.
[23] USDA, FAS, *Brazil: Grain and Feed; Grain Annual*, 2007, March 19, 2008, 5; USDA, FAS, *Brazil: Grain and Feed; Grain Annual*, 2007, March 20, 2007, 5.
[24] USDA, ERS, *Wheat Outlook*, September 14, 2010, 4.
[25] Government official, interview by USITC staff, Brasilia, Brazil, August 24, 2011.

growth centered in the Center-West region means that Brazilian corn is increasingly supplied by large-scale, efficient operations.[26]

Farms in the Center-West average more than four times the area of farms in Southern states, and commercial farms in the Center-West are significantly larger than most U.S. commercial farms.[27] For example, the average farm size in the Center-West state of Mato Grosso is 126 hectares (ha) (311 acres), compared with 24 ha (59 acres) in the Southern state of Paraná.[28] However, in the Center-West, large row-crop operations can have as many as 225,000 ha (556,000 acres) of owned, leased, and rented land in production.[29] These operations are generally independent, commercial operations with sophisticated management structures. Operations in Southern states are typically smaller, averaging under 100 ha (247 acres), and individually they are unable to acquire large-scale, efficient machinery and equipment.[30] However, by organizing into cooperatives, farmers in this region are able to achieve efficiencies of scale for their production and marketing.[31] In comparison, farms in the U.S. average about 180 ha (444 acres), with large commercial Midwestern farms typically operating on 400 to 800 ha (988 to 1,976 acres).[32]

Regional Production

As production spread from the South and Southeastern states to the Center-West, Brazil's export competitiveness in corn changed because of regional differences in productivity, transportation costs, and marketing (table 7.5).[33] The state of Paraná, located in the South, is still the single largest corn-producing state, generally supplying about one-quarter of Brazil's domestic production.[34] When the output of other traditional corn-producing states, including Minas Gerais, Rio Grande do Sul, and São Paulo, is included, southern Brazil accounted for nearly 60 percent of production in 2006/07. However, like soybean production, the production of corn grew strongly in the Center-West and the Northeastern state of Bahia, which together now account for more than one-third of national production.[35] By 2010/11, Mato Grosso had become the second-largest corn-producing state, accounting for 15 percent of national production and 70 percent of exports (figure 7.2).[36] However, the Center-West and Northeast production regions are further from ports than the traditional production areas and therefore have higher transport costs (see discussion later in the chapter).

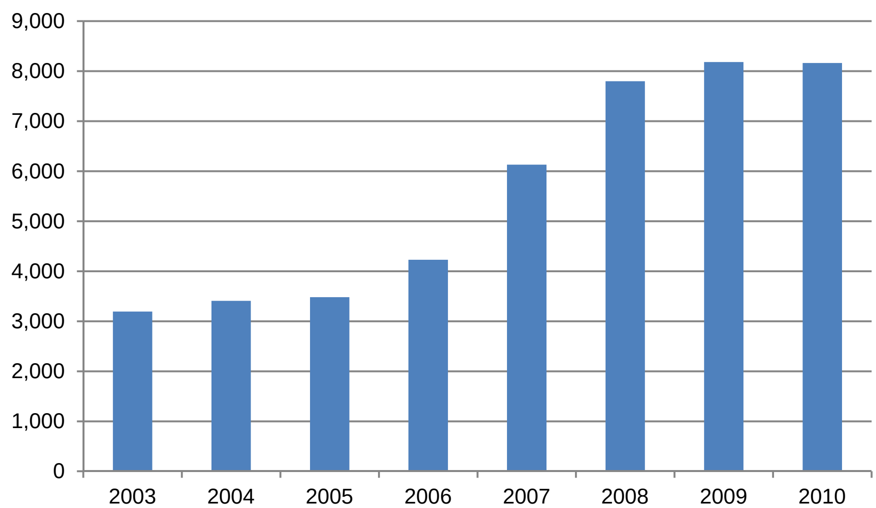
[26] Magalhaes and Diao, "Productivity Convergence in Brazil," April 2009, 3; Contini and Reifschneider, "Agribusiness: Innovation and Competitiveness in Brazil," 2009, 90.
[27] IBGE, Census of Agriculture 2006 (accessed October 4, 2011).
[28] Ibid.
[29] Industry representatives, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.
[30] Industry representatives, interview by USITC staff, Paraná, Brazil, August 29, 2011.
[31] Contini and Reifschneider, "Agribusiness: Innovation and Competitiveness in Brazil," 2009, 90.
[32] USDA, NASS, Farms, Land in Farms, and Livestock Operations: 2006 Summary, February 2007.
[33] IBGE, Municipal Agricultural Production and SIDRA databases.
[34] Ibid.
[35] Ibid.
[36] ANEC, "Evolucão das exportacões por estado, 2011" [Export trends by state, 2011], n.d. (accessed January 23, 2012).

TABLE 7.5 Brazil: Corn production by region, 2006–10

	2006	2007	2008	2009	2010	Average annual change 2006–10
	Million mt					Percent
South	18,733	24,112	25,029	18,816	22,927	5
Center-West	10,102	13,522	16,902	15,627	17,046	14
Southeast	9,556	10,279	11,312	11,096	10,646	3
Northeast	3,168	3,128	4,427	4,799	4,145	7
North	1,102	1,070	1,264	1,274	1,296	4
Total	42,662	52,112	58,933	51,612	56,060	7

Source: IBGE, Municipal Agricultural Production and SIDRA databases (access July 14, 2011).

FIGURE 7.2 Mato Grosso corn production, 2003–10 (1,000 mt)



Source: IBGE, Municipal Agricultural Production and SIDRA databases (accessed July 14, 2011).

The shift in regional production also affects national productivity rates because of lower yields in the expansion areas.[37] The best corn-yielding areas in the world are found at higher latitudes than the interior of Brazil and have relatively moderate climates and wide daily temperature ranges, as opposed to the Center-West of Brazil, which is more tropical, with hotter nights. Another reason that yields are higher in southern Brazil is that farms there have more experience growing and marketing corn than do the newer operations in the Center-West.[38]

Two-Harvest Production System

A major distinction between Brazilian and U.S. production is the ability of Brazilian farmers to grow corn as a second crop in many areas. This gives Brazil an important competitive advantage, because more food and fiber can be produced from a single unit

[37] For example, average yields in Paraná are about 20 percent higher than those in Mato Grosso. IBGE, SIDRA databases.

[38] Industry representatives, interview by USITC staff, Paraná, Brazil, August 29, 2011.

of land. As more corn is produced in the tropical Center-West, an increasing share of it is grown in this second harvest season (also known as the “safrinha” or “little harvest”).[39] Between 2006/07 and 2010/11, the share of annual corn output that was produced during the second harvest jumped from 26 percent to 41 percent.[40] As the expansion of Center-West cropland slows, future growth in Brazilian corn production will rely more on improving yields of safrinha corn.

Planting a second corn crop has important agronomic benefits to the soybean crop in Brazil.[41] Since the early 2000s, planting corn after the soybean harvest has helped to protect against soybean rust and improved productive soil capacity.[42] But soybeans are the primary source of revenue for many farmers, who make farm management decisions for corn—such as the timing of planting and harvest, or the timing and amount of fertilizer applications—while considering the needs of their soybean crop and the overall profitability of the farm operation.[43] Particularly in the Center-West, farmers maximize profits by applying fewer inputs to their corn crops, even though this practice leads to lower yields.

Corn also competes with cotton for acreage in some areas of the Center-West, and because world cotton prices have risen in recent years, Brazilian producers have allocated more planted area for cotton.[44] Cotton is most commonly planted during the second harvest season. However, when prices are high enough, some farmers plant cotton as their primary crop to ensure better yields, although in doing so, farmers forgo a second crop because cotton has a longer growing cycle than soybeans.[45] In either situation, cotton production supplants corn plantings.

Primary Factors Affecting Competitiveness

There are a number of factors that distinguish Brazil’s corn industry from that of the United States; these factors affect Brazil’s ability to supply the international market. On one hand, Brazil benefits from relatively low field costs, which are the primary reason Brazil is a growing exporter of corn in spite of high infrastructure costs and a strengthening currency. On the other hand, export demand for Brazilian corn must compete with domestic demand by Brazil’s livestock sector, which is growing rapidly and becoming more efficient. Ultimately, the competitiveness of Brazilian corn exports

[39] IBGE, SIDRA databases.

[40] IBGE, Municipal Agricultural Production and SIDRA databases.

[41] The Center-West region is the area where double-cropping is most heavily practiced with corn primarily planted as a second crop. A second crop is also commonly planted in northern Paraná and southwestern Bahia. In some expansion areas, closer to the Atlantic, the rainy season is too short to sustain a second harvest. On farms that practice double-cropping, the second crop is generally planted immediately after soybeans are harvested in January or February, and harvest is typically between June and July.

[42] USDA, FAS, *Brazil: Oilseeds and Products; Annual Soybean Report, 2008*, May 27, 2008, 20–22; Brazilian Meat Monitor, “FEED News,” May 27, 2011, 17.

[43] There are cases where soybean management decisions are influenced by the needs of corn production, such as farmers spraying defoliant on soybeans to speed their maturation so that they can be harvested in time for corn-planting season. The defoliation lowers soybean yields. The main objective for farmers is generally to maximize profits for the entire year, rather than one harvest versus the other. Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 2011.

[44] Industry representatives, interview by USITC staff, Mato Grosso, Brazil, August 2011; USDA, FAS, *Brazil: Cotton and Products Annual*, April 1, 2011, 2.

[45] CONAB, “Custo de produção: algodão em caroço” [Production costs: Cotton seed], 2011.

will depend on the development of infrastructure and marketing efficiencies that will allow Brazil to take full advantage of its low field costs.

Cost of Production

Compared with the United States, corn production in Brazil is cost-competitive at the farm gate level (table 7.6).[46] Internal transportation costs erode that competitiveness, particularly in Mato Grosso, which is further from Atlantic ports. Additionally, Brazil generally requires longer shipping routes to many third-country markets than the United States, adding to delivered costs. Particularly when world corn prices are high, however, Brazilian corn remains competitive, especially corn produced during the first crop in southern states because transportation costs are a smaller percentage of the final price.

TABLE 7.6 Corn: Average 2010/11 costs of production at various R$/$ exchange rates (¢/kg)

Product	United States Heartland[a]	Paraná (first crop)	Mato Grosso (second crop)	Paraná (first crop)	Mato Grosso (second crop)	Paraná (first crop)	Mato Grosso (second crop)
	(actual)	(actual) R$1.76/$1		(hypothetical) R$1.50/$1		(hypothetical) R$2.00/$1	
Seed	2.17	1.31	1.14	1.54	1.33	1.16	1.00
Fertilizer	2.70	1.84	1.68	2.16	1.97	1.62	1.48
Chemical inputs	0.77	0.80	0.85	0.93	1.00	0.70	0.75
Labor	0.62	0.24	0.20	0.29	0.24	0.22	0.18
Other operational	1.67	1.63	1.37	1.91	1.61	1.43	1.21
Total, variable costs	7.94	5.82	5.24	6.83	6.15	5.12	4.61
Land	3.75	1.41	2.20	1.65	2.59	1.24	1.94
Physical capital	2.04	2.28	1.34	2.68	1.57	2.01	1.18
Other fixed costs	0.19	0.58	0.86	0.68	1.01	0.51	0.76
Total, fixed costs	5.98	4.27	4.41	5.01	5.17	3.76	3.88
Total, costs	13.92	10.09	9.65	11.84	11.32	8.88	8.49
Farm-to-port freight[b]	2.99	3.45	11.50	3.45	11.50	3.45	11.50
Total cost to port	16.91	13.55	21.14	15.29	22.82	12.33	19.99

Source: CONAB, "Custo de Producão" [Production costs], 2011; USDA, ERS, "Commodity Costs and Returns Data," 2010; USDA, AMS, "Brazil Soybean Transportation Report," December 6, 2010; USDA, AMS, "Grain Transportation Indicators," December 30, 2010.

[a]This region includes Ohio, Indiana, Kentucky, Illinois, Missouri, Iowa, Nebraska, South Dakota, and Minnesota.
[b]Based on Brazil 4th-quarter 2010 freight rates; USDA, AMS, *Brazil Soybean Transportation Report*, 2010**.** For United States, based on December 6, 2010 price from USDA, AMS, *Grain Transportation Indicators*. Unit car rate from Champaign-Urbana, IL, to New Orleans, LA.

[46] Both the USDA and Brazil's National Food Supply Company (Companhia Nacional de Abastecimento, or CONAB) publish data on cost of production. The agencies' accounting procedures differ, but comparisons can provide broad insights about which factors are most important in driving production costs. The United States' costs reflect a sample farm that is assumed to produce 10.6 mt per ha. The yield assumption for a Paraná farm is 6.8 mt per ha; for Mato Grosso, 5.4 mt per ha. The examples are representative of the typical productivity of each region. Improved yields and higher production would further reduce land costs on a per kilogram basis. Changing certain variable input factors in Brazil, such as using higher-quality seed or more fertilizer, would affect both total per hectare costs and per hectare yields. It is important to consider both the cost and revenues produced by more intensive input use when analyzing how changing farm management strategies would affect overall competitiveness.

Overall, fixed production costs in Brazil are below those in the United States, and Brazil's farmland is an important reason. This factor benefits Brazilian corn producers in two important ways. First, Brazilian farmers face lower land costs than in the United States for productive land, whether purchased or rented. Second, the availability of inexpensive land for expansion offers significant investment opportunities for farmers.[47] Particularly for large operations in Mato Grosso, increasing scale through expansion helps to lower costs per unit of output for spending on physical capital, such as buying and maintaining machinery and equipment.

Variable costs are affected by different farming practices. Brazilian corn growers typically use lower-quality seeds and less fertilizer than in the United States, so their seed and fertilizer costs are much lower in absolute terms. Better seeds and more fertilizer use would raise yields, but the additional revenues generated may not be enough to justify the extra cost. On the other hand, costs of chemical inputs for pest and disease control are higher in Brazil, especially in tropical areas, than in the United States, owing to such environmental challenges as the lack of a winter freeze to kill pests and disease organisms. Labor cost shares in Brazil are about half those in the United States, although labor is a relatively small cost component in both countries.

Freight costs are a pivotal factor for corn destined for export. Lower field costs in Mato Grosso are eroded away by farm-to-port freight costs, which are nearly four times higher than those in the United States. This reflects poor infrastructure and a reliance on trucks and highways, as opposed to the more efficient system of rail and barges used in the United States.[48]

Table 7.6 is denominated in U.S. dollars for comparison purposes. But exchange rates are a dynamic factor that affect cost competitiveness in export markets. They are important particularly because Brazilian export sales are predominantly denominated in dollars, while costs are denominated in *reais*. Table 7.6 shows two different exchange rate scenarios, both of which have been witnessed in recent years, demonstrating that exchange rate fluctuations make a big difference in relative production costs in Brazil and the United States. A strong *real* takes Brazilian corn out of the international market by raising its cost above the global price.[49]

Land Expansion and Improvement of Farm-Level Inputs

Soybeans are the primary driver for agricultural expansion into new land.[50] Corn is expected to benefit from increased soybean production in the Center-West region, where double-cropping is prevalent. But there are limits to how far corn can expand along with soybeans. The Northern and Northeastern states of Maranhão, Tocantins, Piauí, and

[47] The areas of expansion are primarily found in the Center-West and Northeast regions of the country. Even in major producing states such as Mato Grosso, there is still new land being developed. CONAB land cost estimates are sampled from farms in developed regions within the state, where land values have increased over the past three years, and do not necessarily reflect areas that are newly developed or currently developing. This helps to explain why land costs are reportedly higher in Mato Grosso than Paraná, only a recent circumstance. In addition, lower yields in Mato Grosso compared to Paraná could also raise land costs per unit of output.

[48] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

[49] For more discussion on exchange rates, see chapter 4.

[50] Government official, interview by USITC staff, Brasilia, August 2011.

Bahia offer the most potential for soybean expansion because of their *cerrado* soils, suitable climate, and proximity to Brazil's northern Atlantic ports. However, the region also experiences a longer dry season, which limits the growing season and potential to double-crop.

The use of higher-quality corn seed varieties in Brazil has lagged behind that in the United States.[51] In the Center-West and Northeast, where production has expanded the most in recent years, using corn varieties adapted to the region, primarily through public-private partnerships, was crucial for production growth.[52] Private seed and biotechnology companies, such as Monsanto and Pioneer, now have strong presences as well, marketing products that are well suited for Brazilian conditions and farming practices.[53] The use of GM seed has risen dramatically in recent years, and in 2011/12 over half of the corn planted was of GM varieties.[54] Approved in Brazil in 2003, GM crops limit potential exports to certain markets, particularly the EU-27,[55] but have the ability to lower input costs and improve margins for growers.[56]

More intensive fertilizer use for corn, particularly during the second harvest season, is another important input that can improve yields and production. As mentioned in chapter 4, the majority of fertilizer in Brazil is imported, making it more expensive.[57] Additionally, high transportation costs limit farmers' ability to adjust fertilizer applications based on weather or economic conditions.[58] In the Center-West, fertilizer is applied only before soybeans are planted. Second-crop corn uses the nutrients remaining in the soil after the soybean harvest, lowering the cost of production but also lowering yields. However, high domestic and international prices for corn are encouraging increased fertilizer use. Increased corn production from higher-quality seeds and more intensive use of fertilizer would ease the competition for corn supplies between the domestic livestock sector and exports.[59]

Interaction with the Livestock Sector

Growth in domestic demand for corn may outstrip production growth and limit the supply of corn available for the export market.[60] Poultry and swine are particularly corn-intensive, with corn comprising about two-thirds of their rations.[61] The recent trend of livestock producers locating closer to corn production areas in the Center-West has

[51] Industry representative, e-mail to USITC staff, June 7, 2011.
[52] Contini and Reifschneider, "Agribusiness: Innovation and Competitiveness in Brazil," 2009, 90.
[53] USDA, FAS, *Brazil: Grain and Feed Annual; Annual Report*, March 16, 2011, 4; industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.
[54] Industry representative, e-mail to USITC staff, June 7, 2011.
[55] As noted in previous chapters, Brazil has segregated marketing channels for non-GM soybeans, which corn producers also use to segment their products. EIU, "The Global Power of Brazilian Agribusiness," November 2010, 11.
[56] USDA, FAS, *Brazil: Grain and Feed; Grain Update*, September 2008, September 30, 2008, 2.
[57] USDA, FAS, *Brazil: Grain and Feed Annual*, March 16, 2011, 5.
[58] Industry representative, interview by USITC, Mato Grosso, Brazil, August 28, 2011.
[59] *Brazilian Meat Monitor*, "FEED News," June 10, 2011, 18.
[60] Rabobank International, "Will There Be Any Corn Left?" December 2011.
[61] USDA, FAS, *Brazil: Grain and Feed Annual*, March 16, 2011, 4.

lowered transportation costs and made domestic livestock producers more able to compete with international markets for the region's corn.[62]

Prices determine whether Brazilian corn supplies are allocated to domestic or international markets. Higher international prices of corn are transmitted to the domestic market, resulting in lower margins for livestock producers, higher meat prices, or less meat production. In 2008, high international prices drew more corn to export markets, forcing livestock producers to pay higher prices to ensure they had enough feed supplies.[63] Government programs, such as the Premium for Marketing of Products program (see below), have been implemented to enable domestic users to buy Brazilian corn without being buffeted by severe fluctuations in price.[64]

Prices

The Brazilian market for corn is affected by both domestic and international prices.[65] In recent years, steep increases in global corn prices have led to higher domestic production and to surges in Brazilian exports. Price spikes within Brazil in 2006–07 and again in 2010 coincided with tight global inventories that triggered higher exports of Brazilian corn (figure 7.3). Increased exports disrupted a period of stable prices that benefited Brazilian livestock production growth between 2007 to 2010.[66] If world prices increase rapidly in the future, Brazil is likely to increase exports in response, lowering corn availability and raising production costs in the Brazilian livestock sector.

Although Brazilian producers are influenced by global market prices, because Brazilian corn has not been export-oriented historically, domestic prices are not fully integrated, as is the case with soybeans, into international markets such as the Chicago Board of Trade price. It is true that an increasing amount of corn is marketed through forward contracting (i.e., advance contracting, as opposed to a spot price), including 50–60 percent of the crop in 2011. However, there is little evidence that Brazilian corn producers use international exchanges to manage risk.[67] Large international logistics companies play a prominent role in marketing, whether as buyers or third-party contractors. Nonetheless, corn is still primarily marketed domestically or even regionally, with corn producers typically selling to livestock operators that are nearby or that have the capabilities to purchase and receive corn transported from further away.[68]

One distinguishing feature of the Brazilian corn market is the lack of price integration within the country. High transportation costs and structural differences in regional supply and demand create dramatic differences in corn prices among areas. For example, corn

[62] For more discussion on the regional livestock production shifts, see chapters 8, 9, and 10; USDA, FAS, *Brazil: Livestock and Products; Annual Livestock Report, 2006*, August 25, 2006, 8; USDA, FAS, *Brazil: Livestock and Products; Annual Livestock Report, 2006*, September 1, 2008, 3; USDA, FAS, *Brazil: Livestock and Products; Annual Livestock Report 2011*, August 16, 2011, 5.

[63] USDA, FAS, *Brazil: Grain and Feed; Grain and Feed Update*, July 2008, July 23, 2008, 2.

[64] *Brazilian Meat Monitor*, "Government Aims to Avoid Further Hikes in Corn and Meat Prices," May 6, 2011, 17; USDA, FAS, *Brazil: Grain and Feed; Grain Annual, 2007*, March 20, 2007, 6.

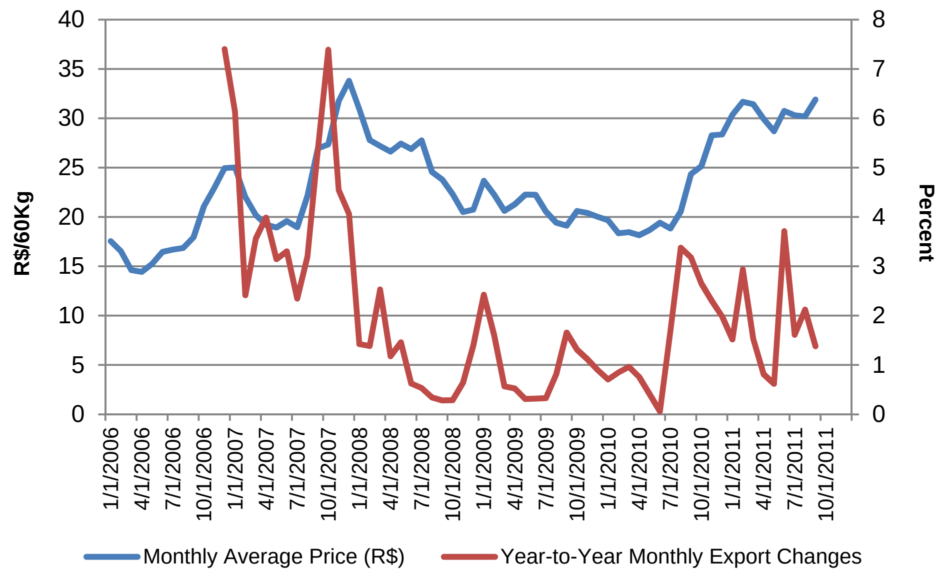
[65] CEPEA, Indicador de Preços [Price indicator].

[66] USDA, FAS, *Brazil: Poultry and Products Annual*, September 13, 2010, 2–4.

[67] *Brazilian Meat Monitor*, "FEED News," June 3, 2011, 2.

[68] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.

FIGURE 7.3 Export growth compared to monthly prices in Brazil, January 2006–October 2011



Source: GTIS, Global Trade Atlas database; CEPEA, BM&F Corn Prices.

prices in Mato Grosso can be as much as 25 percent lower than prices in Paraná and show very little correlation with each other.[69] The fragmented market structure may facilitate exports, since domestic buyers may be less competitive than international buyers if marketing channels are inefficient. Regional shifts in livestock production and improved infrastructure may improve market integration over time, but the timeline is uncertain.

Infrastructure

As noted earlier, the cost of transporting corn to ports for export is much higher in Brazil than in the United States, eliminating much of the field cost advantages of producers in interior states. The cost of shipping corn from Mato Grosso to the port of Santos can be three to four times higher than that of corn transported from Iowa to New Orleans.[70] Moreover, because of the capacity constraints of Brazil's infrastructure system, it is difficult to export corn at certain times of the year. Because of their higher value, soybeans have priority access to freight over corn. Corn shipments to ports typically increase in the second half of the calendar year, after soybean shipments ease.[71] As a result, most corn exports from Brazil are available only after soybean shipments have been concluded.

Corn also competes with soybeans for storage capacity, and as with freight, it loses out when capacity is tight.[72] Investors are preparing to build new storage for grains and oilseeds, primarily near ports, but access to low-interest capital will determine how soon new storage capacity is available, and it is uncertain how much of this storage will be

[69] *Brazilian Meat Monitor*, January 3, 2011, to September 12, 2011.
[70] Industry representative, interview by USITC staff, São Paulo, August 23, 2011.
[71] USDA, FAS, *Brazil: Grain and Feed Annual*, March 16, 2011, 7.
[72] *Brazilian Meat Monitor*, "Exchange Ratio Concerns Poultry and Pork Sectors," February 11, 2011, 9.

used for corn.[73] The lack of storage hurts farmers' profitability, as they have fewer marketing options. Increased storage capacity would raise the value of Brazil's corn and likely spur additional investment and production.

Government Policies

Most of Brazil's government policies regarding corn stem from the minimum price supports that CONAB establishes for corn production. This value represents the amount that the federal government pays for product placed into public inventories. In 2010, minimum prices ranged from R$13.98 per 60 kg in Mato Grosso and Rondônia, to R$20.10 in most other states, including Paraná.[74] In 2006, minimum prices ranged from R$11.00 to R$16.00 per 60 kg. Increases in the minimum price for corn occurred in 2009 and then again in 2010. Participation in the programs fluctuated during 2006/07–2010/11, but from 2008/09 to 2010/11, when minimum prices were increased, the percentage of Brazil's corn production benefiting from government payments rose from 2 percent to 22 percent.[75]

The Premium for Marketing of Products (PEP), Equalization Premium Paid to the Producer (PEPRO), and Risk Premium for Acquisition of Agricultural Products Deriving from Private Contracts of Sales Options (PROP) programs are the three most significant programs for corn distribution. These programs are run by CONAB, and are tied to minimum price supports and government-controlled stocks. These programs are described in more detail in chapter 3. All three programs are designed to alleviate the high transportation costs of shipping grain within the country and to help distribute grain from corn-surplus to corn-deficit regions.[76] Some product is exported, although the programs themselves are considered transportation programs by the Brazilian government, rather than export subsidies.[77]

The PEP program is the most commonly used and has been an important component of both domestic and export marketing.[78] The program increases margins on participating corn and makes it possible to market more corn, including for export. In 2010, CONAB spent R$760 million on PEP premiums for corn.[79] While participation in these programs involved significant shares of corn production between 2006 and 2010, some speculate that the participation rate will fall in the future. Even in 2011, auctions have been unable to generate the same level of interest from purchasers, primarily due to the limited freight options offered.[80] The programs have also been affected by administrative problems, such as failure to pay minimum prices to producers in a timely way.[81]

[73] Industry representative, interview by USITC staff, Paraná, Brazil, August 2011.
[74] CONAB, "Relatório de preço mínimo básico" [Report on basic minimum price] (accessed February 13, 2012).
[75] USDA, FAS, *Brazil: Grain and Feed Annual; Annual Report*, March 16, 2011, 21.
[76] Auctions can be targeted to specific regions and agents participating in the bidding process. Agents could include livestock operators, international traders, and other domestic users.
[77] Government official, interview by USITC staff, Brasilia, August 24, 2011.
[78] USDA, FAS, *Brazil: Grain and Feed Annual; Annual Report*, March 16, 2011, 21.
[79] CONAB, "Operações de PEP/2010" [PEP operations, 2010] (accessed November 9, 2011).
[80] *Brazilian Meat Monitor*, "FEED News," February 25, 2011, 14.
[81] Industry representative, interview by USITC staff, São Paulo, Brazil, August 25, 2011.

Key Export Markets

EU-27

Market characteristics

Corn consumption in the EU-27 has been relatively flat, averaging 62.0 million mt from 2006/07 to 2010/11 (table 7.7). The EU-27 was the third largest consumer of corn in the world and fourth largest importer in 2010/11. Feed use declined slightly, while industrial use for bioenergy increased slightly.[82] The livestock sector accounts for about 77 percent of corn consumption, although in the EU-27 wheat is more commonly used for feed than corn. The two grains compete in the feed market based on relative prices.[83]

TABLE 7.7 EU-27: Corn production, consumption, exports, and imports, MY 2006/07–2010/11

	2006/07	2007/08	2008/09	2009/10	2010/11	Average annual change 2006/07–2010/11
			1,000 mt			Percent
Production	53,829	47,555	62,321	56,947	55,795	1
Consumption	62,400	64,000	61,600	59,300	62,500	0
Exports	664	591	1,743	1,519	1,078	13
Imports	7,172	14,016	2,754	2,931	7,359	1
Trade balance	–6,508	–13,425	–1,011	–1,412	–6,281	([a])

Source: USDA, FAS, PSD Online database (accessed January 23, 2012).

[a]Not applicable.

Competition with the United States

The EU-27's corn production has also remained relatively stable, although more volatile than consumption.[84] Production averaged 55.3 million mt during 2006/07–2010/11, ranging from 47.6 million mt to 62.3 million mt.[85] Weather-induced production shortages in recent years have spurred import spikes to satisfy demand, particularly in 2007/08.[86] Gradually declining inventories, rising world prices, and neutral-to-deficit domestic production in recent years have increased EU-27 imports.[87] Brazil is the largest foreign supplier of corn for the EU-27 for most of the period, accounting for 36 percent of total imports from 2006 to 2011 (table 7.8).[88] Other important suppliers are Argentina, Ukraine, and Serbia. The United States was the fifth-largest supplier, accounting for about 6 percent of total EU-27 imports from 2006 to 2011.

[82] USDA, FAS, PSD Online (accessed October 24, 2011).
[83] USDA, FAS, *EU-27: Grain and Feed Annual, 2011*, April 21, 2011, 5.
[84] USDA, FAS, PSD Online (accessed October 24, 2011).
[85] Ibid.
[86] USDA, FAS, *EU-27: Grain and Feed; Annual, 2008*, April 30, 2008, 14.
[87] GTIS, Global Trade Atlas database (accessed October 5, 2011).
[88] Ibid.

TABLE 7.8 EU-27: Corn imports, by supplier, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
Ukraine	45	19	370	122	118	761	76
United States	36	41	75	83	100	304	53
Brazil	142	1,767	1,193	60	373	295	16
Serbia	184	74	42	251	133	268	8
Argentina	182	626	1,134	108	114	167	–2
All other	116	173	250	243	204	470	32
Total	705	2,700	3,063	865	1,043	2,265	26

Source: GTIS, Global Trade Atlas database (accessed April 18, 2012).

EU-27 has stricter regulations and stronger consumer preferences regarding GM varieties of corn than most markets.[89] There is only one GM variety of corn approved for cultivation in the EU-27, and GM corn is grown in only six member countries, with Spain and Portugal accounting for over 90 percent of the planted acreage.[90] Brazil has a competitive advantage over the United States and Argentina in this market because of its ability to segregate and certify non-GM varieties in its export shipments.[91] Although Brazil likely will continue producing increasing amounts of GM corn in the future, it will be better positioned than the United States and Argentina to meet the EU-27's demand for non-GM corn products due to these existing logistical channels.

Japan

Market characteristics

Japan is the world's largest corn-importing country, relying on imports for over 99 percent of its corn consumption (table 7.9).[92] About 72 percent of Japanese corn consumption is for energy-intensive livestock rations.[93] A declining population and lower per capita consumption of animal products have dampened demand for feed; total corn consumption fell 5 percent and corn use for feed fell nearly 8 percent from 2006/07 to 2010/11.[94]

TABLE 7.9 Japan: Corn production, consumption, exports, and imports, MY 2006/07–2010/11

	2006/07	2007/08	2008/09	2009/10	2010/11	Average annual change 2006/07–2010/11
	1,000 mt					Percent
Production	1	1	1	1	1	0
Consumption	16,500	16,600	16,700	16,300	15,600	–1
Exports	2	0	0	0	0	([a])
Imports	16,713	16,614	16,533	15,979	15,655	–1
Trade balance	–16,711	–16,614	–16,533	–15,979	–15,655	([a])

Source: USDA, FAS, PSD Online database (accessed January 23, 2012).

[a]Not applicable.

[89] USDA, FAS, *EU-27: Agricultural Biotechnology Annual*, July 29, 2011.
[90] USDA, FAS, *EU-27: Agricultural Biotechnology Annual*, July 29, 2011, 6.
[91] USDA, FAS, *EU-27: Grain and Feed Annual, 2011*, April 30, 2011, 8.
[92] USDA, FAS, PSD Online (accessed January 23, 2012).
[93] USDA, FAS, *Japan: Grain and Feed Annual*, March 11, 2011, 13.
[94] USDA, FAS, PSD Online (accessed January 23, 2012).

Competition with the United States

Japan and the United States are long-standing trading partners with regard to corn (table 7.10). Between 2006 and 2011, nearly 94 percent of Japanese corn imports, with an average annual value of nearly $4 billion, came from the United States.[95] While Japanese corn imports from Brazil are only a fraction of those from the United States, they have increased exponentially, from a mere $4,000 in value in 2006 to $299 million in 2011. In part this was because of the wheat export ban in Russia in 2010 that extended into 2011, which limited the supply of wheat for animal feed and increased demand for corn. Brazil is also able to serve the market for non-GM corn in Japan.[96] With a greater share of the U.S. crop going to ethanol production, Japan is likely to continue to expand its purchases from Brazil. However, the United States likely will remain the dominant supplier of Japanese corn imports in the foreseeable future.

TABLE 7.10 Japan: Corn imports, by supplier, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
United States	2,488	3,589	5,525	3,623	3,510	4,821	14
Brazil	0	9	1	10	149	299	([a])
Argentina	12	92	34	46	214	157	67
South Africa	0	0	0	0	4	44	([a])
EU-27	6	6	6	18	9	26	35
Ukraine	0	0	0	47	47	0	([a])
All other	78	147	32	13	17	13	–30
Total	2,584	3,842	5,599	3,757	3,950	5,361	16

Source: GTIS, Global Trade Atlas database (accessed January 31, 2012).

Note: Totals may not add due to rounding.

[a]Not applicable.

Taiwan

Market characteristics

Despite the increase between 2006/07 and 2009/10, demand for corn imports in Taiwan in 2010/11 did not change significantly from 2006/07 levels, remaining at approximately 4.2 million mt. Total consumption increased to 4.7 million mt in 2009/10 before falling due to higher world prices (table 7.11).[97] However, Taiwan was still the sixth largest corn importer in 2010/11. Their poultry and hog sectors are the country's primary users of imported corn, and 96 percent of corn consumption is used as livestock feed.[98]

[95] GTIS, Global Trade Atlas database (accessed October 5, 2011).
[96] USDA, FAS, *Brazil: Grain and Feed; Grain Annual*, March 20, 2007, 5.
[97] USDA, FAS, PSD Online (accessed October 25, 2011).
[98] USDA, FAS, *Taiwan: Grain and Feed Annual*, May 3, 2011, 7.

TABLE 7.11 Taiwan: Corn production, consumption, exports, and imports, MY 2006/07–2010/11

	2006/07	2007/08	2008/09	2009/10	2010/11	Average annual change 2006/07–2010/11
	1,000 mt					Percent
Production	37	37	32	27	38	1
Consumption	4,425	4,500	4,650	4,700	4,325	0
Exports	0	0	0	0	0	([a])
Imports	4,283	4,527	4,532	4,521	4,200	0
Trade balance	–4,283	–4,527	–4,532	–4,521	–4,200	([a])

Source: USDA, FAS, PSD Online database (accessed January 23, 2012).

Note: Totals may not add due to rounding.

[a]Not applicable.

Taiwan relies on imports for over 99 percent of its domestic supply. Between 2006 and 2011, annual average Taiwanese imports of corn were over $1 billion (table 7.12).[99] While the United States provided the majority of Taiwan's corn imports, U.S. market share slipped from 99 percent ($756 million) in 2006 to 64 percent ($884 million) in 2011. Brazil began exporting to Taiwan in 2009 and immediately became Taiwan's second-largest supplier in both 2009 ($123 million), 2010 ($314 million), and 2011 ($335 million).

TABLE 7.12 Taiwan: Corn imports, by supplier, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
United States	756	925	1,024	789	797	884	3
Brazil	0	0	0	123	314	335	([a])
Argentina	0	13	0	0	117	52	([a])
South Africa	0	0	0	0	0	70	([a])
India	0	6	199	36	8	8	([a])
All other	1	1	63	6	1	1	55
Total	758	945	1,287	954	1,237	1,385	13

Source: GTIS, Global Trade Atlas database (accessed April 18, 2012).

Note: Totals may not add due to rounding.

[a]Not applicable.

Competition with the United States

Decreased price competitiveness and an effort to diversify suppliers as the United States exports a smaller proportion of its crop are the primary reasons the United States has lost its role supplying 99 percent of corn for Taiwan (table 7.12).[100] However, the United States maintains a reputation as a reliable supplier of high-quality corn, which Brazil has yet to establish. Nonetheless, Brazil is likely to continue to be a competitive supplier if

[99] GTIS, Global Trade Atlas database (accessed October 5, 2011).
[100] USDA, FAS, *Taiwan: Grain and Feed Annual*, May 3, 2011, 7.

world prices of corn remain high and Taiwanese importers seek less expensive alternatives to U.S. corn.[101]

Colombia

Market characteristics

Colombia's consumption of corn rose by 11 percent between 2006/07 and 2010/11, from 4.7 million mt to 5.2 million mt (table 7.13).[102] This is primarily because of increased investment in the domestic poultry industry that led to more feed-intensive production systems.[103] Annual corn demand for food and industrial use in Colombia has remained stable at approximately 1.2 million mt. Colombia was the seventh largest corn importer in 2010/11.

TABLE 7.13 Colombia: Corn production, consumption, exports, and imports, MY 2006/07–2010/11

	2006/07	2007/08	2008/09	2009/10	2010/11	Average annual change 2006/07–2010/11
	1,000 mt					Percent
Production	1,531	1,655	1,635	1,610	1,450	–1
Consumption	4,700	5,100	4,900	5,100	5,200	2
Exports	3	2	1	1	0	([a])
Imports	3,386	3,267	3,068	3,651	3,504	1
Trade balance	–3,383	–3,265	–3,067	–3,650	–3,504	([a])

Source: USDA, FAS, PSD Online database (accessed January 23, 2012).

Note: Totals may not add due to rounding.

[a]Not applicable.

Colombia is a corn-deficit country, requiring imports to satisfy its growing demand. Domestic production accounted for only 28 percent of its total consumption in 2010.[104] On average, between 2006 and 2010 Colombia imported $743 million of corn (table 7.14). Up to 2008, the United States held a large majority of that market share, peaking at 94 percent in 2007. From 2009 to 2011, however, Argentina and Brazil provided most of Colombia's imported corn. Imports from Brazil reached $122 million in 2011, compared with just $5 million in 2006.

Competition with the United States

Colombia protects its corn producers through a tariff-rate quota (TRQ) and the Andean Community's price band system, which applies a variable duty on imports relative to world prices.[105] Colombia began implementing trade preferences on goods from Mercosul countries in 2009. This made Argentine and Brazilian corn more price-competitive than U.S. corn and has taken substantial market share away from the

[101] USDA, FAS, *Taiwan: Grain and Feed Annual*, May 3, 2011, 8.
[102] USDA, FAS, PSD Online (accessed October 25, 2011).
[103] USDA, FAS, *Colombia: Grain and Feed Annual*, March, 2010, 3.
[104] USDA, FAS, PSD Online (accessed October 25, 2011).
[105] USDA, FAS, *Colombia: Grain and Feed Annual*, March 15, 2011, 6–7.

TABLE 7.14 Colombia: Corn imports, by supplier, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
Argentina	36	26	106	191	482	596	75
United States	396	626	746	250	147	184	–14
Brazil	5	2	72	179	155	122	89
Paraguay	4	4	2	14	2	14	–29
Mexico	4	1	0	30	17	4	0
All other	8	7	9	8	3	7	–18
Total	453	666	935	671	806	927	15

Source: GTIS, Global Trade Atlas database (accessed April 18, 2012).

Note: Totals may not add due to rounding.

United States.[106] In 2010, Colombia imposed a duty of at least 15 percent ad valorem on the import of U.S. corn, while the imposed duty on imports from Mercosul countries was reduced by 8.1 percent. However, the projected entry into force of the U.S.-Colombia Free Trade Agreement in 2012 is expected to improve the competitiveness of U.S. corn by expanding duty-free access through an increase in the TRQ and a phaseout of out-of-quota duties over the next 12 years.[107]

Wheat

Industry Overview

There are two major economic and geographic forces shaping Brazil's wheat industry. First, Brazil's wheat production is smaller than that of corn or soybeans, and does not have the same potential for expansion. This is primarily because Brazil's warm, wet climate is less favorable to wheat than to corn and soybeans. Because of the climate, Brazil grows only soft winter wheat, with production limited to the South and Southeastern regions of the country. Although improved wheat yields over the past several decades have raised domestic production, production has been unable to meet the country's domestic demand. As a result, Brazil imports over half of the wheat it consumes, mostly higher-quality milling wheat from Argentina or North America.

Second, although Brazil exports substantial amounts of wheat, most of the export volumes are consumed as animal feed because its low quality makes it unsuitable for milling.[108] As a result, Brazilian wheat exports compete more with corn and other feed grains than they do with wheat for human consumption. Overall, Brazilian wheat exports are uncompetitive with U.S. wheat both in quality and in the quantities shipped to third-country markets.

[106] USDA, FAS, *Colombia: Grain and Feed Annual*, March 15, 2011, 5.
[107] The White House, "U.S.-Colombia Trade Promotion Agreement," April 6, 2011.
[108] USDA, FAS, *Brazil: Grain and Feed Update; Wheat Update*, April 30, 2010, 9.

Brazilian Production, Consumption, and Trade

Production

Wheat production trends in Brazil have been relatively flat over the past five to seven years, with the exception of one weather-related downturn in 2006/07 (table 7.15 and figure 7.4).[109] Owing to drought and an early freeze, production in 2006/07 plunged, falling by 54 percent from the previous year's level due to lower yields and harvested acreage.[110] After production recovered in 2008/09, levels remained between 5 million mt and 6 million mt. In the past, the Brazilian government established goals for increases in domestic wheat production, but these were not met because of various economic, government policy, and agronomic constraints.[111]

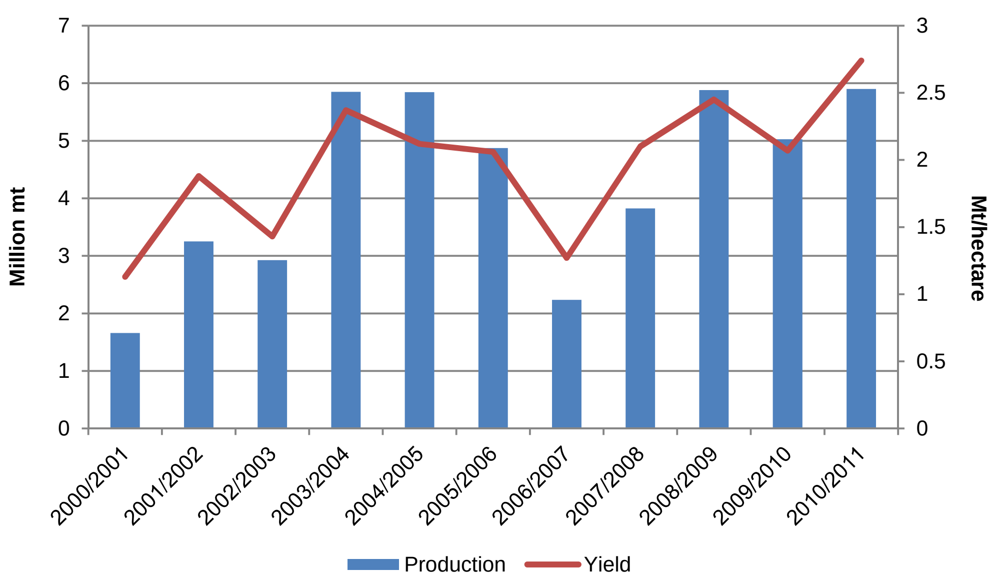
TABLE 7.15 Brazil: Wheat production, consumption, exports, and imports, MY 2006/07–2010/11

	2006/07	2007/08	2008/09	2009/10	2010/11	Average annual change 2006/07–2010/11
			1,000 mt			Percent
Production	2,234	3,825	5,880	5,026	5,900	28
Consumption	10,300	10,300	10,700	11,000	10,800	1
Exports	40	767	369	1,195	2,539	182
Imports	7,743	7,076	6,762	6,667	6,710	–4
Trade balance	–7,993	–6,002	–6,003	–5,964	–4,200	([a])

Source: USDA, FAS, PSD Online database (accessed November 2, 2011).

[a]Not applicable.

FIGURE 7.4 Brazilian wheat production and yields, MY 2000/2001–2010/11



Source: USDA, FAS, PSD Online (accessed Janaury 23, 2012).

[109] USDA, FAS, PSD Online (accessed May 12, 2011).
[110] USDA, FAS, *Brazil: Grain and Feed; Grain Annual*, March 20, 2007, 2.
[111] USDA, FAS, *Brazil: Grain and Feed; Grain and Update*, July 23, 2008, 9.

Wheat yields in Brazil are within the range of other exporting countries. Between 2006 and 2010, average yields in Brazil were 2.13 mt/ha, much lower than yields in the EU-27 (5.24), China (4.69), United States (2.89), Argentina (2.81), and India (2.78), but better than those in Russia (2.00) and Australia (1.44).[112] Wheat production trends in Brazil are driven more by yield than by area harvested, and aside from the recovery in acreage after the poor 2006/07 crop, wheat area has remained fairly stable.[113] Expansion in area is constrained both by climate and by competition for land from more profitable crops, such as corn and soybeans.[114]

Domestic wheat is predominantly milled into flour for human consumption in Brazil, and on average between 2006–11, 98 percent of wheat consumption was for food or seed use.[115] Although each state has at least one flour mill, the milling sector in Brazil is concentrated in the South and Southeast states.[116] Paraná, São Paulo, and Rio Grande do Sul are the three largest milling states, respectively. Flour production fluctuated from 2006/07 to 2010/11, but increased overall.[117]

As noted, Brazil produces predominantly soft classes of wheat.[118] Flour milled from these types of wheat lacks the characteristics preferred for bread making. As a result, Brazil imports higher-quality wheat, which is blended with domestic wheat by millers to produce bread-quality flour (table 7.16). Brazil is one of the world's largest wheat-importing countries, importing more than half of its total supply.[119] Historically, nearly all of Brazil's wheat imports came from Argentina, owing to its proximity and its eligibility for lower tariffs as a Mercosul member.[120] However, Argentine export policies and low production years in both Argentina and Brazil required Brazilian millers to source high-quality wheat from other countries, including the United States and Canada.[121] Wheat imports from non-Mercosul members face a 10 percent tariff, as well as the merchant marine tax that is 25 percent of the cost of freight, which increases the delivered price significantly.[122]

Wheat exports from Brazil fluctuated each year from 2006 to 2011 (table 7.17). Brazilian wheat is vulnerable to wet weather immediately before harvest, which often diminishes

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112 USDA, FAS, PSD Online (accessed January 23, 2012).

113 Ibid.

114 USDA, FAS, *Brazil: Grain and Feed Annual; Annual Report*, March 16, 2011, 9.

115 In Brazil, corn is the primary grain for animal feed; domestic animal producers are not likely to use wheat as a feedstuff, primarily because wheat supplies are erratic due to inconsistent production volumes and qualities. Corn production is typically located closer to livestock herds, and the supply is more reliable. Moreover, using wheat would require a reformulation of livestock rations. Instead, wheat of this quality is largely exported to foreign markets, utilizing the Brazilian government's PEP program. In 2011/12, approximately 10 percent of Brazil's wheat production was used for animal feed in the domestic market, a five-year high. USDA, FAS, *Brazil: Grain and Feed; Grain Annual, 2012/2013 Forecast*, March 15, 2012, 2.

116 ABITRIGO, "Moagem de trigo, 2010 por estado/regiõ" [Wheat milling, 2010, by state/region], n.d. (accessed January 24, 2012).

117 ABITRIGO, "Evolução do mercado de trigo" [Wheat market trends], n.d. (accessed January 24, 2012).

118 Industry representative, interview by USITC staff, Washington, DC, June 7, 2011.

119 USDA, FAS, PSD Online (accessed July 25, 2011).

120 USDA, FAS, *Brazil Grain and Feed: Opportunities for U.S. Wheat*, February 10, 2009.

121 USDA, FAS, *Brazil: Grain and Feed; Grain Annual, 2008*, March 19, 2008, 10.

122 USDA, FAS, *Brazil: Grain and Feed; Brazil Temporarily Lowers Wheat Import Tariff*, February 8, 2008, 2.

TABLE 7.16 Brazil: Wheat imports, by supplier, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
Argentina	910	1,167	1,264	707	893	1,481	10
Uruguay	21	29	32	210	292	212	59
Paraguay	45	38	152	168	132	95	16
United States	3	86	318	46	118	30	59
Canada	10	72	107	71	86	15	8
All other	0	([a])	([a])	6	8	17	([b])
Total	989	1,392	1,874	1,209	1,528	1,832	13

Source: GTIS, Global Trade Atlas database (accessed January 31, 2012).

Note: Totals may not add due to rounding.

[a]Less than $500,000.
[b]Not applicable.

TABLE 7.17 Brazil: Wheat exports to selected markets, 2006–11 (million $)

	2006	2007	2008	2009	2010	2011
Algeria	0	12	20	4	0	207
Egypt	5	0	0	5	16	55
Tunisia	0	0	8	0	7	54
South Africa	2	0	0	8	23	29
Morocco	0	7	33	0	0	26
EU-27	17	([a])	([a])	([a])	([a])	([a])
United States	([a])	([a])	([a])	17	42	0
Vietnam	8	0	23	0	37	0
Philippines	26	0	0	0	35	0
Pakistan	0	0	81	11	0	0
All other	6	11	40	19	66	328
Total	64	30	204	63	227	699

Source: GTIS, Global Trade Atlas database (accessed January 31, 2012).

Note: Totals may not add due to rounding.

[a]Less than $500,000.

its quality to feed-grade wheat.[123] As noted earlier, most of the wheat Brazil sells in international markets is of feed quality, competing more with corn and other feed grains than with milling-quality wheat.[124] These exports often depend on government programs, such as PEP, to be competitive.[125] Wheat is primarily exported shortly after the harvest season, generally beginning in November or December, peaking during February and March, and concluding by May.[126] The majority of wheat exports are shipped before the soybean export season begins in February to avoid competing with soybeans for freight and storage capacity.

[123] USDA, FAS, *Brazil: Grain and Feed Update; Wheat Update*, April 30, 2010, 2.
[124] Industry representative, interview by USITC staff, Washington, DC, June 7, 2011.
[125] USDA, FAS, *Brazil: Grain and Feed Annual; Annual Report*, March 16, 2011, 12.
[126] GTIS, Global Trade Atlas database (accessed October 13, 2011).

Regional Summary and Industry Structure

Wheat production is focused in the Southern region of the country (table 7.18), with over 90 percent of the production from three Brazilian states—Paraná (53 percent on average from 2006 to 2010), Rio Grande do Sul (37 percent), and Santa Catarina (5 percent).[127] Wheat is grown during Brazil's winter season. In Paraná and Santa Catarina, planting takes place between April and May, while harvest occurs between September and November.[128]

TABLE 7.18 Brazil: Wheat production by state, 2006–10 (mt)

State	2006	2007	2008	2009	2010
Paraná	1,236,294	1,927,216	3,068,116	2,482,776	3,442,660
Rio Grande do Sul	823,062	1,723,007	2,198,902	1,912,138	1,974,800
Santa Catarina	146,146	203,334	323,617	275,193	241,093
São Paulo	102,690	105,159	169,888	111,224	131,891
Minas Gerais	58,335	51,253	97,129	100,979	84,902
All other	118,321	104,088	169,479	173,215	161,444
Total	2,484,848	4,114,057	6,027,131	5,055,525	6,036,790

Source: IBGE, Municipal Agricultural Production and SIDRA databases (accessed July 15, 2011).

Total crop area in the South has remained stable, so increased wheat production in the region has relied on higher yields. Wheat varieties that perform well in the *cerrado* have been developed, primarily from investments and research by the Empresa Brasileira de Pesquisa Agropecuária (Embrapa).[129] Historically, small amounts of wheat were grown in the Center-West states of Mato Grosso and Bahia, but production has stopped in recent years owing to better returns from soybeans, sugar, cotton, and corn.[130]

The structure of wheat production in the Southern states of Brazil does not differ much from that of corn. Farms are typically smaller than in the Center-West, but similar to those in the Midwestern United States.[131] Like other commodity producers, wheat farmers in this part of the country benefit from cooperatives that provide competitive scale and efficiencies.[132]

Primary Factors Affecting Competitiveness

Cost of Production

The overall costs of producing wheat in Brazil and the United States are similar, although a comparison of data for the state of Paraná in Brazil and the Heartland region of the

[127] USDA, FAS, *Brazil: Grain and Feed; Grain Update, July 2008*, July 23, 2008, 3.

[128] In Rio Grande do Sul, plantings take place in May or June, while harvest begins in October and can last through December. USDA, OCE, Joint Agricultural Weather Facility, "Major World Crop Areas," n.d. (accessed January 24, 2012).

[129] Government official, interview by USITC staff, August 25, 2011.

[130] IBGE, Municipal Agricultural Production and SIDRA databases.

[131] IBGE, Census of Agriculture 2006, n.d.

[132] Industry representative, interview by USITC staff, Paraná, Brazil, August 29, 2011.

United States shows significant differences in cost structures (table 7.19).[133] Comparisons between Brazilian and U.S. wheat production costs should also factor in quality and class differences, since Brazilian wheat is likely to receive lower returns than U.S. wheat.[134]

TABLE 7.19 Wheat: Average 2010/11 costs of production at various R$/$ exchange rates (¢/kg)

	United States Heartland	Brazil: Paraná		
Products	(actual)	(actual) R$/US$= 1.76	(hypothetical) R$/US$= 1.5	(hypothetical) R$/US$= 2.0
Seed	1.69	2.14	2.51	1.89
Fertilizer	5.77	3.32	3.89	2.92
Chemical inputs	0.40	1.70	2.00	1.50
Labor	1.41	0.57	0.67	0.51
Other operational	2.65	2.60	3.05	2.29
Total, variable costs	11.93	10.34	12.13	9.10
Land	7.48	3.66	4.29	3.22
Physical capital	4.32	6.38	7.48	5.61
Other fixed costs	0.56	1.59	1.86	1.40
Total fixed costs	12.35	11.62	13.63	10.23
Total, costs	24.29	21.96	25.77	19.33
Farm-to-port freight[a]	2.99	3.45	3.45	3.45
Total cost to port	27.28	25.41	29.22	22.78

Source: CONAB, "Custo de Producão" [Production costs], 2011; USDA, ERS, "Commodity Costs and Returns Data," 2010; USDA, AMS, *Brazil Soybean Transportation*, December 6, 2010; USDA, AMS, *Grain Transportation Indicators*, December 30, 2010.

[a]Based on Brazil 4th-quarter 2010 freight rates; USDA, AMS, "Brazil Soybean Transportation Report," 2010**.** For the United States, based on December 6, 2010, price from USDA, AMS, *Grain Transportation Indicators*. Unit car rate from Champaign-Urbana, IL, to New Orleans, LA.

Brazil benefits from generally lower field costs of production than in the United States. Brazil's cost advantage is especially marked when it comes to land and labor costs. Fertilizer costs are also less in Brazil, likely reflecting lower application levels rather than lower unit costs. However, capital equipment and financing costs are much higher in Brazil than in the United States. Additionally, over the past five years the Brazilian *real* has strengthened against the dollar (see chapter 4); as the *real* appreciates, Brazilian wheat production cost becomes less competitive against U.S. wheat. As table 7.19 illustrates, in 2011, the exchange rate was approximately R$1.76 per dollar, which still delivers a cost advantage to Brazil of 1.87¢/kg. But at a rate of R$1.50 per dollar, Brazil would face a cost disadvantage of 1.9¢/kg.

Government Policies

Like corn, wheat is eligible for many of CONAB's programs. CONAB sets a minimum price level at which it can purchase production when local prices fall below the set

[133] The "Heartland" is a region defined by USDA, ERS, "Commodity Costs and Returns Data." It includes Illinois, Indiana, and Iowa, as well as parts of Ohio, Missouri, Kentucky, South Dakota, and Minnesota. This region, particularly the southern portion, produces a fair amount of soft-class wheat, similar to Brazil.

[134] Industry representative, interview by USITC staff, São Paulo, Brazil, August 22, 2011.

amount. Although price levels are set by each Brazilian state, there have been two effective price levels for wheat throughout the country: one for the major producing Southern states and one for the rest of the country. Between 2006 and 2010, minimum price levels increased from R$331 per mt to R$370 per mt in the Southern region, and from R$372 per mt to R$411 per mt elsewhere.[135] As it did for corn, the increase in the minimum price reflects higher world prices and production costs. CONAB also increased the amount of production eligible for participation in government marketing programs, such as PEP.

Minimum price policies are an important factor influencing farmers' decisions whether to plant corn or wheat.[136] Participation by wheat growers in the PEP fluctuates from year to year. In 2007, the government reported no participation by the wheat industry, while in 2008 participation reached 1.4 million mt, equivalent to nearly 35 percent of total production.[137] In 2010, only 11 percent of wheat production was marketed through PEP. The government states that the program's benefits to wheat, like those to corn, are a transportation subsidy as opposed to an export subsidy; however, the PEP benefits internationally marketed wheat, particularly lower-quality wheat that is marketed as animal feed.[138]

Key Export Markets

Between 2006 and 2010, Brazil wheat exports were highly volatile, with spikes in 2008 and 2010 caused by unique market conditions (table 7.17). Brazil's export volumes are only a small fraction of those reached by large-scale exporters, such as the United States, Russia, Ukraine, Australia, and the EU-27.[139] Nonetheless, in 2008 and 2010, Brazil's export values increased dramatically, partly owing to tight global supplies that raised international prices and partly to poor harvest conditions in Brazil that led to an oversupply of lower-quality wheat unsuited for domestic milling.[140] Brazil's wheat does not directly compete with U.S. wheat due to quality; it is more likely to compete with corn or other feed grains in third-country markets.

In 2008/09, world wheat inventories fell to a 30-year low, spurring record high prices.[141] Higher prices and a larger volume of exports resulted in wheat export values of $204 million for Brazil in 2008, a nearly 600 percent increase from the previous year. Brazil's top 4 markets (out of 19 total) were Pakistan ($81 million), Morocco ($33 million), Vietnam ($23 million), and Algeria ($20 million).[142] By comparison, Brazil exported to 14 countries in 2007, with sales to the largest market, Algeria, coming to only $12 million. Brazil's prices for exported wheat that year were lower than those of

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[135] CONAB, "Relatório de preço mínimo básico" [Report on basic mínimum price] (accessed October 4, 2011).

[136] Industry representative, interview by USITC staff, São Paulo, Brazil, August 22, 2011.

[137] USDA, FAS, *Brazil: Grain and Feed Annual; Annual Report*, March 19, 2011, 22.

[138] USDA, FAS, *Brazil: Grain and Feed Update; Wheat Update*, April 30, 2010, 2.

[139] GTIS, Global Trade Atlas database (accessed November 1, 2011).

[140] USDA, ERS, *Wheat Outlook*, October 12, 2010; USDA, ERS, *Wheat Year in Review (International)*, May 2008.

[141] USDA, ERS, *Wheat Year in Review (International)*, May 2008.

[142] GTIS, Global Trade Atlas database (accessed September 30, 2011).

the United States, EU-27, Canada, and Australia, making Brazil an attractive supplier for more price-sensitive developing country buyers.[143]

In 2009, Brazil's wheat exports fell to $63 million, but surged again in 2010/11 to $227 million, primarily because of wet harvest conditions that diminished the crop's quality for milling.[144] The United States ($42 million), Vietnam ($37 million), Philippines ($35 million), and South Africa ($23 million) were Brazil's largest markets for wheat that year. As in 2008/09, production shortfalls led to tight global supplies in 2010/11.[145] Severe drought in Eastern Europe led to harvest shortfalls in several of the world's leading wheat-exporting countries, including Russia and Ukraine.[146] This benefited the 2010/11 Brazilian wheat crop, which was available for exports at the end of 2010 and continued into 2011.[147]

As noted, Brazil typically exports wheat when global supplies are tight and prices are high or when domestic harvest conditions result in an oversupply of feed-quality wheat. Nevertheless, Brazil remains a net importer of wheat—globally as well as from the United States—and is likely to remain one of the biggest importers in the world.[148] Geographic production constraints, better returns from competing crops, and quality limitations are likely to keep Brazil as only a minor supplier in the global market.

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[143] GTIS, Global Trade Atlas database (accessed November 1, 2011).
[144] USDA, FAS, *Brazil: Grain and Feed Update; Wheat Update*, April 30, 2010, 2.
[145] USDA, ERS, *Wheat Outlook*, October 12, 2010, 3.
[146] USDA, ERS, *Wheat Outlook*, September 14, 2010, 4.
[147] GTIS, Global Trade Atlas database (accessed November 1, 2011).
[148] Ibid.

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CHAPTER 8
Poultry

Overview

Poultry is an important and growing industry in the Brazilian agricultural sector. In 2011, Brazil was the world's third leading producer of broiler meat, behind the United States and China, and the largest exporter (table 8.1).[1] Brazil's broiler industry is highly export-oriented, with one-quarter of its production exported in 2011, compared with 18 percent in the United States. However, the share of Brazilian production exported has fallen in recent years because of both growing domestic consumption and a weak global economy that has reduced poultry demand globally.[2]

Export competitiveness in the poultry industry is affected by several factors, including cost of production, product differentiation, market access, transportation, and exchange rates. Because the cost structure of Brazilian and U.S. live-bird production is similar (largely because feed costs are closely linked to global corn and soybean prices), other factors have a greater influence on differences in export competitiveness between Brazil and the United States.

Brazil's export competitiveness in third-country markets is enhanced by its success in differentiating its poultry products based on the preferences of its customers, such as halal production to serve Middle Eastern markets. This allows Brazil to maintain a strong market share in countries which have very specific product requirements, such as Japan and Saudi Arabia. Brazil's product differentiation also limits direct competition between Brazil and the United States in most third-country markets because the United States primarily exports standard dark meat cuts.

Increases in Brazilian labor rates, high transportation costs, and the appreciation of the *real* all threaten the competitiveness of Brazilian poultry in third-country markets. In the future, rising labor costs could reduce the ability of Brazilian producers to make specialized products cost-effectively. As explained in detail below, specialized products and packaging normally require more labor to produce than standard cuts. While customers who are less price-sensitive are more likely to continue to pay a premium for a specialized product, even as prices rise, at some point escalating costs are likely to lower the overall export volumes of Brazil's broiler meat.

[1] A broiler is a chicken raised for its meat. Broiler meat is the most commonly produced, consumed, and traded poultry in the world. Other types of poultry include turkey, goose, and duck. This chapter covers only broiler meat, which is also referred to as chicken. Broiler meat comes in many forms, including whole birds and cuts such as breasts, legs, and wings.

[2] USDA, FAS, PSD Online (accessed February 6, 2012).

TABLE 8.1 Broiler meat: Production, consumption, and trade, selected producers and markets, 2011 (1,000 mt)

	Production	Consumption	Imports	Exports	Trade balance
Producers					
United States	16,757	13,890	47	2,966	2,919
China	13,200	13,020	230	410	180
Brazil	12,954	9,655	1	3,300	3,299
EU-27	9,500	9,100	700	1,100	400
Mexico	2,922	3,492	590	20	-570
All other	25,700	30,744	6,431	1,357	-5,074
Total	81,033	79,901	7,999	9,153	([b])
Selected Major Importers					
Russia	2,520	2,907	390	3	-387
Japan	1,235	2,060	840	5	-835
Thailand	1,350	870	0	460	460
Saudi Arabia	590	1,410	830	10	-820
Hong Kong	12	262	250	([a])	([a])
Subtotal	5,707	7,509	2,310	478	([b])

Source: USDA, FAS, PSD Online (accessed February 6, 2012).

[a]Not available.
[b]Not applicable.

Brazilian Production, Consumption, and Trade

Between 2006 and 2011, Brazil was the world's third-largest producer of broiler meat (measured in metric tons (mt)), accounting for 15 percent of global production.[3] The United States and China respectively accounted for 22 percent and 16 percent of global production during this period.[4] Brazilian production grew 38 percent between 2006 and 2011, exceeding the growth of both China (28 percent) and the United States (5 percent) (table 8.2).[5] If the rates of growth in Brazil and China continue along this path, Brazil may soon become the world's second-largest producer of broiler meat.

TABLE 8.2 Brazil: Broiler meat production, consumption, exports, and imports, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	1,000 mt						Percent
Production	9,355	10,305	11,033	11,023	12,312	12,954	7
Consumption	6,853	7,384	7,792	8,032	9,132	9,655	7
Exports	2,502	2,922	3,242	2,992	3,181	3,300	6
Imports	0	1	1	1	1	1	([a])
Trade balance	2,502	2,921	3,241	2,991	3,180	3,299	6

Source: USDA, FAS, PSD Online (accessed February 6, 2012).

[a]Not applicable.

[3] USDA, FAS, PSD Online (accessed February 6, 2012).
[4] USDA, FAS, PSD Online (accessed February 6, 2012). While Brazil and China's share of global production was relatively stable through the period, the U.S. share fell from 25 percent in 2006 to 21 percent in 2010.
[5] USDA, FAS, PSD Online (accessed February 6, 2012).

Brazil accounted for 11 percent of global poultry consumption by volume between 2006 and 2011. During this period, Brazilian consumption grew 41 percent; by 2010, Brazil had surpassed the European Union (EU-27) to become the world's third-largest consumer of broiler meat, behind the United States and China.[6] On a per capita basis, Brazilian poultry consumption grew from 36.5 kilograms (kg) in 2006 to 44.0 kg in 2010, a 21 percent increase.[7] Brazil's sharp rise in poultry consumption is associated primarily with rising incomes and a trend toward the consumption of a wider variety of foods, especially meat.[8] Poultry consumption also benefits from its relatively low price compared with beef and pork.[9] In general, Brazilian consumers prefer large whole birds, although there is growing demand, especially among the middle and upper- classes, for processed products, such as precooked meals and chicken nuggets.[10] Because Brazil is self-sufficient in broiler meat production, its annual imports are negligible.

Over one-quarter of Brazilian poultry production was exported during 2006–11. For most of this period, Brazil was the world's largest broiler meat exporter by volume, accounting for about 37 percent of global exports.[11] During this period, growth in Brazilian broiler exports was driven by growing chicken demand globally (table 8.3).[12] Brazilian exports are highly concentrated in the Middle East and Asia.[13] The share of Brazilian poultry exports going to the Middle East rose from 27 percent in 2006 to 37 percent in 2011 by value. Exports to Asia were relatively stable during this period at about 28 percent.[14]

Exports to the EU-27, the fourth largest destination market, declined over the period because of tariff-rate quotas (TRQs) that restricted access to this market.[15] On the other hand, exports to a number of countries, including Angola, China, and Iraq, rose by more than 150 percent during 2006–11 by volume.[16]

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[6] EU-27 consumption grew 19 percent during 2006–11. USDA, FAS, PSD Online (accessed February 6, 2012).

[7] Per capita consumption had its highest year-to-year growth (12 percent) in 2010 because of strong domestic demand and increased domestic supply. These in turn resulted from strong domestic prices and weak export demand owing to poor economic conditions in some export markets. Knight, "Brazil Turning to Buoyant Domestic Market," April 1, 2011; industry representatives, interview by USITC staff, Paraná, Brazil, August 30, 2011.

[8] USDA, FAS, *Brazil: Poultry Annual 2011*, September 2, 2011, 1, 3; USDA, FAS, *Brazil: Poultry; Semi-annual*, February 3, 2011, 2; USDA, *USDA Agricultural Projections to 2020*, February 2011, 13, 18.

[9] USDA, FAS, *Brazil: Poultry Annual 2011*, September 2, 2011, 1, 3; USDA, FAS, *Brazil: Poultry; Semi-annual*, February 3, 2011, 2; USDA, FAS, *Brazil: Poultry Annual*, September 22, 2009, 2.

[10] USDA, FAS, *Brazil: Annual Poultry Report 2008*, September 3, 2011, 5.

[11] The exception was in 2009, when it was the second-largest exporter after the United States. Brazilian exports surpassed those from the United States for the first time in 2004. USDA, FAS, PSD Online (accessed July 20, 2011; February 6, 2012).

[12] PwC, "Sectorial Analysis; Poultry," July 2011, 15.

[13] For the purposes of trade data in this chapter, the "Asia" region does not include the Middle East or former Soviet republics. GTIS, Global Trade Atlas database (accessed February 7, 2012).

[14] GTIS, Global Trade Atlas database (accessed February 7, 2012).

[15] The EU-27 maintains TRQs to control the entry of poultry meat imports. These include TRQs on cooked chicken and turkey and on uncooked salted poultry, which were established in 2007. European Commission, Commission Regulation (EC) No. 616/2007, June 4, 2007; EC, Commission Regulation (EC) No. 580/2007, May 29, 2007; USDA, FAS, *EU: Poultry Sector Growth to Slow in 2011*, September 1, 2010, 1–2, 6; USDA, FAS, *EU: Poultry and Products; Semi-Annual*, April 9, 2010, 4; U.S. government official, e-mail to USITC staff, April 4, 2011.

[16] GTIS, Global Trade Atlas database (accessed February 6, 2012).

TABLE 8.3 Brazil: Broiler exports to selected markets, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	1,000 mt						Percent
Saudi Arabia	339	380	400	496	551	623	13
Japan	323	332	422	308	386	444	7
Hong Kong	295	357	415	428	331	339	3
EU-27	415	438	318	299	271	286	–7
United Arab Emirates	147	195	208	212	208	215	8
China	27	12	1	24	122	196	48
South Africa	195	193	147	161	181	195	0
Venezuela	123	160	317	165	164	177	8
Kuwait	100	123	164	205	175	155	9
Iraq	4	32	56	142	104	133	102
All other	745	940	988	997	1,135	987	6
Total	2,713	3,162	3,437	3,438	3,630	3,750	7

Source: GTIS, Global Trade Atlas database (accessed February 6, 2012).

Note: Totals may not add due to rounding.

In 2009, 51 percent of Brazil's poultry exports were sold as cuts, 39 percent were whole, 5 percent were processed, and 5 percent were salted.[17] Brazil's whole birds are favored in Middle Eastern markets, while specific cuts are preferred by customers in Japan and Hong Kong. The United States largely exports to other third-county markets, in particular its North American Free Trade Agreement (NAFTA) partners Mexico and Canada. Brazil and the United States compete most directly in China (including Hong Kong) (figure 8.1).

Industry Structure

Brazil's broiler flock is heavily concentrated in the South and Southeast regions of the country (table 8.4). In 2010, about one-half of Brazil's poultry was located in the South and 27 percent in the Southeast.[18] That year, Paraná, a southern state, had the largest poultry flock size, accounting for 24 percent of the country's broilers. The South and Southeast are the major poultry-producing regions because of their favorable climate and proximity to major cities (including São Paulo and Rio de Janeiro).[19] Poultry producers in these regions also reportedly benefit from access to specialized labor.[20]

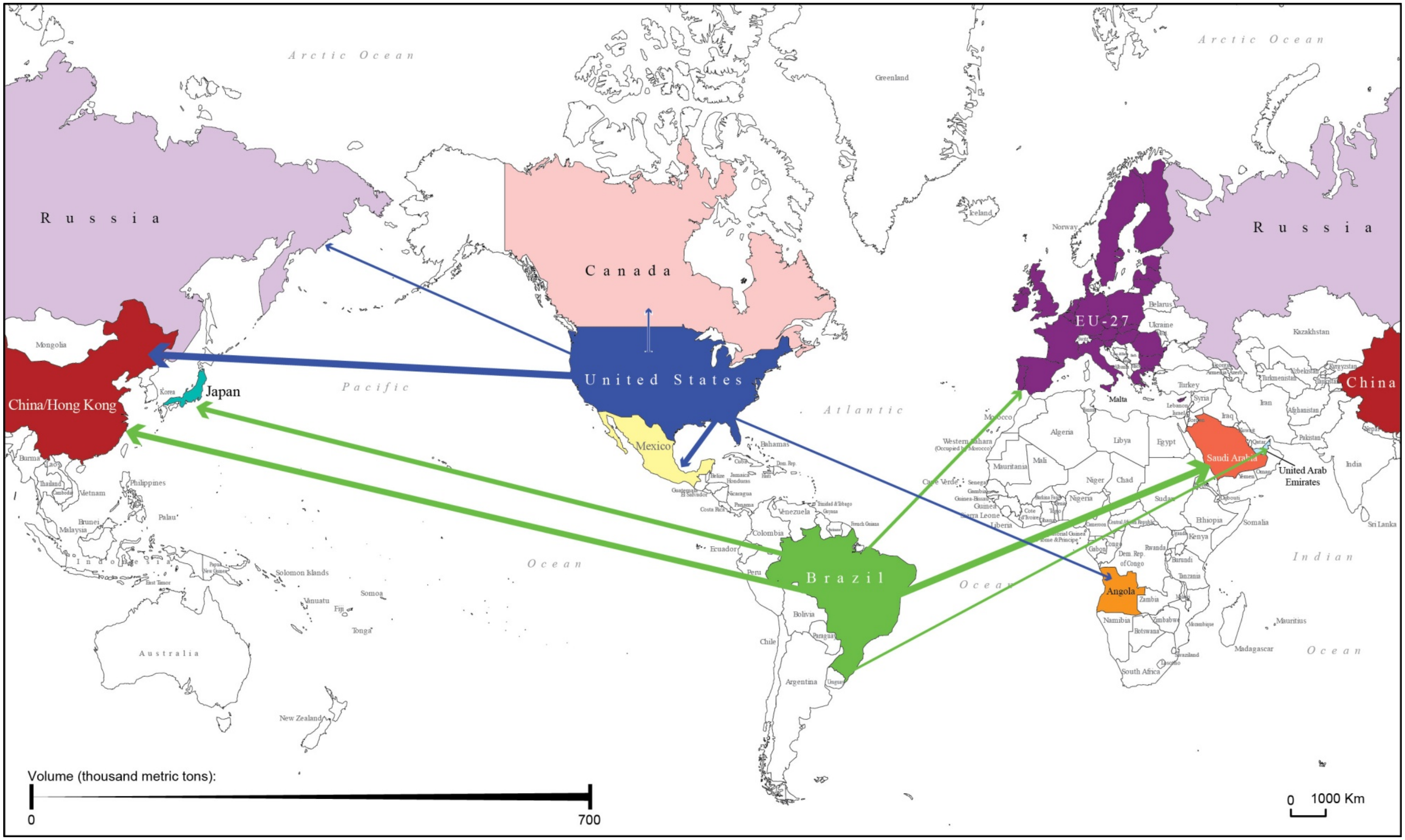
[17] UBABEF, *Relatório Annual 09/10* [Annual Report 09/10], 20 (accessed June 14, 2011). This source also has a breakdown of the cuts of poultry (whole, processed, salted, etc.) sold to each market.

[18] IBGE, SIDRA; IBGE, *Produção da pecuária muncipal* 2009 [Municipal livestock production 2009], 2009. IBGE bases its flock and herd estimates on a census. Flock size serves only as a snapshot of production because of the short life cycle of poultry, such as broilers, which have a typical lifespan of 45 days. Desouzart, "Structural Changes in the Brazilian Poultry Sector," 2007, 30.

[19] Desouzart, "Structural Changes in the Brazilian Poultry Sector," 2007, 33–35.

[20] Industry representatives, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

FIGURE 8.1 Brazil and the United States largely exported broilers to different markets in 2011



Source: Compiled by USITC staff using data from GTIS, Global Trade Atlas database (accessed February 6 and 13, 2012).

TABLE 8.4 Brazil: Flock size by region and top six producing states, various years

	1995	2000	2005	2010	Average change 1995 to 2010
	1,000 birds				Percent
South	273,485	326,616	402,957	527,170	93
Southeast	145,545	186,289	223,621	279,238	92
Center-West	28,517	50,864	82,852	104,903	268
Northeast	71,128	76,504	84,818	98,561	39
North	22,488	18,973	18,220	17,696	–21
Total	541,163	659,246	812,468	1,027,568	90
Paraná	89,020	123,293	151,815	242,077	172
São Paulo	78,765	106,465	133,672	177,660	126
Santa Catarina	73,718	111,562	142,412	157,359	113
Rio Grande do Sul	110,747	91,761	108,731	127,734	15
Minas Gerais	44,235	63,560	67,619	75,211	70
Goiás	9,638	18,664	31,801	44,124	358

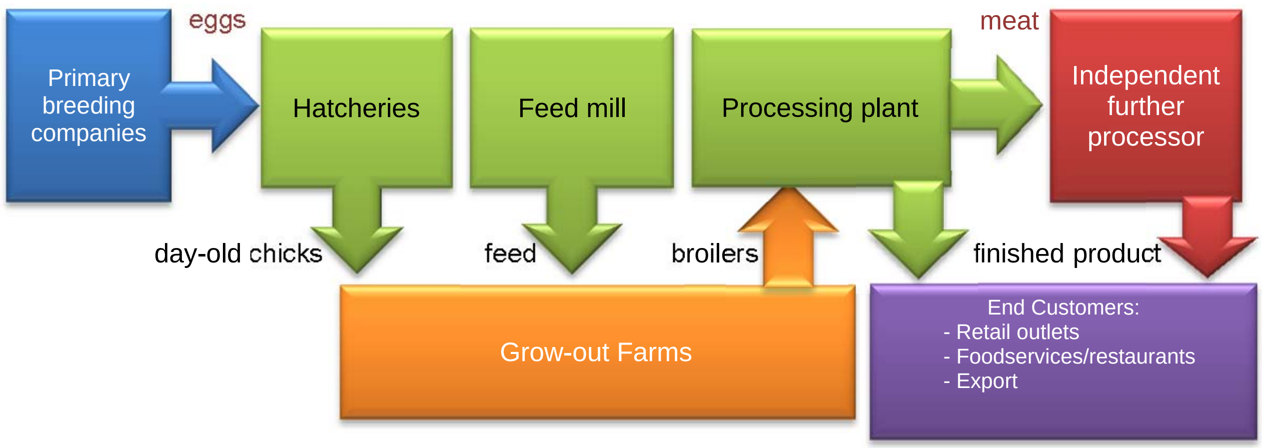
Source: IBGE, SIDRA; IBGE, *Produção da pecuária muncipal 2009* [Municipal livestock production 2009], 2009.

Between 1995 and 2010, the size of the national flock rose by 90 percent. This expansion was driven by rising domestic consumption and exports, which increased 152 percent and 643 percent, respectively, over that period (table 8.4).[21] Since 1995, the largest increase in flock size has occurred in the Center-West.[22] The expansion of poultry production toward the Center-West states is attributed to increased availability of feed, as production of soybeans and corn (the two main ingredients) expanded into the region.[23] However, a shortage of labor is causing production growth to slow in the Center-West.[24] Reportedly, some companies are changing their business models by transporting grain from the Center-West region to poultry facilities in the South and Southeast, where labor is more abundant.[25] Some industry representatives believe that significant improvements in infrastructure are needed for the expansion of poultry production to the Center-West to continue.[26]

Brazilian and U.S. industrial structures and production processes for poultry are very similar, resulting in some of the most efficient and low-cost production in the world (for more detail, see "Primary Factors Affecting Competitiveness," below) (figure 8.2).[27] Both countries have similar stages of production, including hatcheries, where birds are incubated and born; farms, where birds are "grown out" to market weight;[28] feed mills, where corn, soybean meal, and other inputs (such as minerals and vitamins) are combined

[21] Based on metric tons. USDA, FAS, PSD Online (accessed September 21, 2011).
[22] IBGE, SIDRA; IBGE, *Produção da pecuária muncipal 2009* [Municipal livestock production], 2009.
[23] Desouzart, "Structural Changes in the Brazilian Poultry Sector," 2007, 39–45.
[24] Industry representatives, interview by USITC staff, Paraná, Brazil, August 22, 2011.
[25] Ibid.
[26] Industry representatives, interview by USITC staff, São Paulo, Brazil, August 23, 2011.
[27] Industry representative, interview by USITC staff, Washington, DC, June 22, 2011; industry representative, interview by USITC staff, Paraná, Brazil, August 31, 2011.
[28] About 70 percent of Brazilian chicks are raised by contract farmers. The remaining 30 percent are raised in barns owned and operated by the integrators themselves, mostly in the states of Minas Gerais and São Paulo. PwC, "Sectorial Analysis; Poultry," July 2011, 11. In the United States, 99 percent of broiler chicks are grown out by contract farmers. MacDonald, *The Economic Organization of U.S. Broiler Production*, June 2008, 7; industry representative, telephone interview by USITC staff, July 5, 2011; Martinez, *Vertical Coordination of Marketing Systems*, May 2002, 3.

FIGURE 8.2 The United States and Brazil have similar vertically integrated broiler production and marketing processes



Source: Compiled by USITC staff.

into feed;[29] processing plants, where birds are slaughtered and processed into a finished product; and further processing plants, where meat is processed into such products as ready-to-cook meals and marinated items.[30] In Brazil, as in the United States, vertically integrated companies, known as "integrators," normally own hatcheries, feed mills, and processing plants.[31] Integrators typically contract to independent "grow-out" farmers for raising day-old chicks to market weight. In such arrangements, the integrators provide the chicks, feed, and veterinary care, while the contract farmers provide housing, water, and care for the broilers.

However, the production systems in both countries have differences, most notably in processing plants and chick procurement, which affect Brazil's competitiveness. Processing plants in Brazil tend to be more labor-intensive than those in the United States, with greater volumes cut and packaged by hand; this characteristic gives Brazilian integrators a greater ability to produce specialized products.[32] Brazilian integrators also use air-chilling, a technology in which cold air in tunnels is used to lower the product temperature.[33] U.S. plants typically use water or immersion chilling, where cold water is

[29] For feed, while corn and soybean meal are the main ingredients, some Brazilian integrators use other ingredients, such as palm by-products and sorghum, based on availability and price. Industry representative, interview by USITC staff, Paraná, Brazil, August 31, 2011.The use of substitutes for corn and soybean meal is uncommon in the United States.

[30] It is possible to have a stand-alone slaughterhouse, but most integrators have combined slaughterhouse/processing plants.

[31] MacDonald, *The Economic Organization of U.S. Broiler Production*, June 2008, 3.

[32] Industry representatives, interviews by USITC staff, Paraná, Brazil, August 30–31, 2011; industry representatives, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

[33] Carroll and Alvarado, "Comparison of Air and Immersion Chilling," 2008; USDA, FAS, *China: Sales of Chicken Paws*, December 15, 2006, 12; Encyclopedia Britannica, "Poultry Processing," 2011; Meyn, "Air Chilling" (accessed September 26, 2011).

used to lower carcass temperature before the meat is placed in a chiller.[34] These systems result in higher water content in some U.S. packaging, which is a competitive disadvantage for U.S. products compared to Brazil. In addition, in Brazilian plants, it is illegal to use chlorine rinses or other pathogen reduction treatments (PRTs), the use of which are common in the United States. This rule can result in waste if pathogens are detected;[35] however, it helps facilitate Brazilian exports to the EU-27, where poultry treated with PRTs is banned, and Russia, where chlorine rinses are banned. Finally, many medium-sized Brazilian poultry producers purchase at least some day-old chicks from other integrators, rather than sourcing them all from company-owned hatcheries, as is normal in the United States.[36] As discussed in the "Cost of Production" section below, this results in higher Brazilian chick costs.

Companies producing poultry meat in Brazil can be broadly classified into one of three types: (1) large, multinational poultry producers, all of which consistently export in large quantities; (2) medium-sized companies, which export on a much smaller scale; and (3) a large number of smaller producers, which only supply the domestic market.[37] An increasing share of Brazilian poultry production is accounted for by the largest firms.

Three major companies, Brasil Foods (BRF), Marfrig Frigoríficos e Comércio de Alimentos S.A. (Marfrig), and Doux Frangosul S/A Agro Avícola Industrial (Doux Frangosul), jointly accounted for about one-half of national exports in 2009. All three operate vertically integrated production facilities, and BRF and Marfrig are also horizontally integrated into other meat, egg, and processed-food activities. As described in detail in chapter 5, during 2006–11, BRF[38] and Marfig[39] became the two largest poultry producers in Brazil, through mergers and acquisitions, and both companies have production facilities outside of Brazil. Doux Frangosul is a subsidiary of the French poultry integrator Doux Group and only produces broilers.[40]

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[34] Carroll and Alvarado, "Comparison of Air and Immersion Chilling," 2008; USDA, FAS, *China: Sales of Chicken Paws*, December 15, 2006, 12; Encyclopedia Britannica, "Poultry Processing," 2011.

[35] Instead of PRTs, Brazilian plants have a "critical control point" where all birds are inspected for imperfections. Those imperfections are cut out of the birds. However, a batch of chicken will be destroyed if a pathogen is found in many of the chickens. As a result, Brazilian plants typically have a higher percentage of waste than U.S. plants. Industry representatives, interview by USITC staff, São Paulo, Brazil, August 23, 2011; industry representatives, interview by USITC staff, Paraná, Brazil, August 30, 2011.

[36] Industry representatives, interview by USITC staff, São Paulo, Brazil, August 25, 2011; industry representatives, interview by USITC staff, Paraná, Brazil, August 30, 2011; industry representatives, telephone interview by USITC staff, June 15, 2011.

[37] Industry representatives, telephone interview by USITC staff, June 15, 2011.

[38] BRF was created by the merger of Sadia S.A. and Perdigão S.A., which was finalized in July 2011. Reuters, "Brazil Foods to Sell Excelsior Stake," July 21, 2011; industry representatives, interview by USITC staff, Paraná, Brazil, August 22, 2011; Moser, "Brasil Foods Starts Putting Properties Up for Sale," July 26, 2011.

[39] Marfrig first entered the poultry market in 2008 by acquiring Moinhos Cruzeiro do Sul Ltda. and three other Brazilian poultry companies from the OSI Group. The Poultry Site, "Marfrig Buys OSI in Brazil and Europe," June 24, 2008. Marfrig established itself as Brazil's second-largest poultry producer and exporter by acquiring Seara Alimentos S.A. (Seara). Watt Poultry, "Watt Poultry Top Companies: Brazil," June 23, 2011; Marfrig, "Group History," http://marfoodusa.com/historyAccordian.html (accessed July 27, 2011).

[40] Doux Group entered the Brazilian market in 1998 with the purchase of Frangosul, which was a top-five Brazilian poultry producer at the time. Watt Poultry, "Watt Poultry Top Companies: Brazil," June 23, 2011.

Half of all Brazilian poultry exports are conducted by medium-sized companies. While the majority of these are Brazilian companies, some, such as Tyson do Brasil, are foreign-owned.[41] Some medium-sized poultry producers are co-operatives, such as Coop Agroindustrial Consolata (Copacol), that operate vertically integrated poultry processing facilities for their member farmers.[42] In contrast to the top three companies, not all medium-sized companies are entirely vertically integrated. For example, they may not produce enough day-old chicks from their own hatcheries for all their needs and must therefore purchase some of their chicks from other parties, which increases their delivered cost.[43] Although the Brazilian poultry industry is becoming increasingly concentrated, a large number of small poultry producers continue to serve only the domestic market.[44]

Primary Factors Affecting Competitiveness

Several factors affect the competitiveness of Brazil's broiler industry in third-country export markets. One of the most important factors affecting competiveness generally is production cost. A comparison of the cost of production data for live birds in 2011 shows little difference between Brazil and the United States, mostly because of comparable costs for feed—by far the most important cost component in live bird production. Both Brazilian and U.S. producers have seen profitability squeezed in recent years because of rising feed costs, driven by higher global prices of soybeans and corn. The most notable cost difference between the two countries in 2011 was the higher cost of chicks in Brazil compared to the United States. Overall, however, the cost of production for live birds does not currently give Brazilian or U.S. exports a significant competitive advantage against each other in third-country markets. Despite rising feed costs, Brazil and the United States are the most efficient and lowest-cost broiler producers in the world, giving both countries a competitive advantage against producers in third-country markets.

The competitiveness of Brazilian broiler exports is bolstered by product differentiation and efforts by Brazilian authorities to overcome sanitary and other barriers that exclude Brazilian products from certain overseas markets. Brazil's willingness to differentiate its exports by offering a wide range of poultry products for different importing countries has helped Brazil gain market share in a number of third-country markets. Actions by the government to mitigate concerns over the safety of Brazilian poultry in global markets also enhance Brazilian export competitiveness. For example, the Brazilian government certifies its poultry as free of avian influenza (AI), in many cases giving it an advantage over U.S. poultry, which faces bans related to low-pathogen AI (LPAI) in certain foreign markets.

Offsetting the competitive advantages enjoyed by Brazilian poultry exporters are high transportation costs, the relatively high value of the *real*, and rising labor costs. These factors negatively affect all agricultural sectors in Brazil and are not specific to poultry.

[41] Tyson do Brasil is a subsidiary of Tyson Food Inc., a U.S.-owned multinational company. UBABEF, *Relatório Annual 09/10* [Annual Report 09/10], 7–9 (accessed June 14, 2011),

[42] Industry representatives, interview by USITC staff, Paraná, Brazil, August 29, 2011.

[43] Industry representatives, interview by USITC staff, São Paulo, Brazil, August 25, 2011; industry representatives, interview by USITC staff, Paraná, Brazil, August 30, 2011.

[44] Industry representative, telephone interview by USITC staff, June 15, 2011.

Transportation costs encompass delivery of the finished products from the factory to the port, usually by refrigerated truck, as well as port and shipping expenses. High transportation costs, largely resulting from poor Brazilian infrastructure, continue to be a long-term challenge for Brazilian poultry exporters (see chapter 3). Both Brazilian and U.S. broiler industry representatives acknowledge that the competitiveness of Brazil's broiler meat exports is weakened by the *real's* appreciation (see chapter 4).[45] This is because export prices are set in U.S. dollars, and many of Brazil's important poultry export markets have currencies pegged to the dollar. Historically, labor costs were lower in Brazil than the United States, which enhanced Brazilian competitiveness. However, this advantage for poultry production is being eroded as Brazilian labor costs rise, due to a general increase in wages for most Brazilian industries and labor shortages in certain Brazilian poultry-producing regions (see chapter 4).[46]

Cost of Production

The cost of the live bird is the main component of broiler meat production costs[47] and a major determinant of international competitiveness. The cost of raising live birds to slaughter weight encompasses spending on feed (the single largest input cost),[48] chicks, grower payments, and a variety of other smaller expenses, such as veterinary expenses and delivery of the birds to the processing plants (table 8.5). Grower payments capture the costs of raising birds.[49] Production costs vary both between countries and between regions within a country. The most recently available live bird production costs information for the United States is a national estimate based on June and July 2011 data.

These data were compared with Brazilian data from June and July 2011 for conventional grow-out houses. Since Brazilian data are available only on a state basis, two states were chosen as representative of Brazil.[50] Paraná (in the South region) was chosen because it is the largest poultry producing and exporting state in Brazil, and Goiás because it the largest producing state in the Center-West region, the area with the most rapid production growth. Since Brazilian data were denominated in *reais*, they were converted into U.S. dollars to allow a cost comparison between the two countries. For this conversion, the actual average exchange rate for June and July 2011 (R$1.58 per dollar) was used. Also,

[45] Industry representatives, interview by USITC staff, São Paulo, Brazil, August 25, 2011; industry representatives, interview by USITC staff, Washington, DC, November 3, 2011.

[46] Industry representatives, interview by USITC staff, São Paulo, Brazil, August 25, 2011; industry representatives, interview by USITC staff, Washington, DC, June 22, 2011; industry representatives, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

[47] Other costs, such as processing and transportation to the port, will affect the price of the product actually exported (e.g., broiler meat), but these costs are not available for both Brazil and the United States for comparison purposes.

[48] In both Brazil and the United States, feed is the most expensive input in broiler meat production, generally accounting for about 65–75 percent of production costs. The Poultry Site, "High Feed Prices," January 2009; The Poultry Site, "Formulating Feed for Broiler Performance," August 2005; The Poultry Site, "What Does 2009 Hold for Feed Prices?" December 5, 2006; Desouzart, "Structural Changes in the Brazilian Poultry Sector," 2007, 45.

[49] Grower payments include the cost of labor, housing, and water. A grower payment in the United States is the lump sum that integrators pay to contract farms. To construct a grower payment for Paraná and Goiás, we took total producer costs plus water (a cost covered by U.S. contract farmers). CONAB, "Custo de Produção de Frangos" [Production cost of chicken], June and July 2011 (accessed September 8, 2011); IMF, exchange rates (accessed September 22, 2011).

[50] A national Brazilian average is not available; however, state data are available. CONAB, "Custo de Produção de Frangos" [Production cost of chicken], June and July 2011 (accessed September 8, 2011).

TABLE 8.5 Live broilers: Average costs of production at various R$/$ exchange rates, mid-year 2011[a] ($/kg)

	United States National	Brazil[b]					
		Paraná	Goiás	Paraná	Goiás	Paraná	Goiás
	(actual)	(actual) R$1.58/$1		(hypothetical) R$1.50/$1		(hypothetical) R$2.00/$1	
Chicks	0.11	0.19	0.26	0.20	0.27	0.15	0.20
Feed	0.69	0.67	0.70	0.70	0.73	0.53	0.55
Grower payment[c]	0.12	0.13	0.14	0.13	0.15	0.10	0.11
All other	0.08	0.07	0.09	0.07	0.09	0.05	0.07
Total	1.01	1.05	1.19	1.10	1.25	0.83	0.94

Source: CONAB, "Custo de Produção de Frangos" [Production cost of chicken], June and July 2011(accessed September 8, 2011); Industry official, e–mail to USITC staff, September 4, 2011; IMF, Exchange rates (accessed November 4, 2011).

[a]Based on the average of June and July 2011.
[b]Based on conventional grow-out houses.
[c]Brazilian grower's payment is constructed based on producer (grow-out farmer) total costs plus water.

because the cost comparison is sensitive to the chosen exchange rate, Brazilian costs are shown for a weak (R$2.00 per dollar) and strong (R$1.50 per dollar) value of the *real*. These rates are within the range of the highest and lowest exchange rates for 2006–10.[51]

Based on mid-year 2011 data, Brazil and the United States had similar live broiler production costs (using the actual average exchange rate of R$1.58 per dollar). Paraná's production costs were 4 percent above the United States' cost of production; those in Goiás were 18 percent higher. Brazil and the United States had similar overall costs of production largely because of comparable feed costs ($0.69 per kg of live bird for the United States compared to $0.67–$0.70 for Brazil), by far the largest cost component in poultry production. Feed costs in both countries were similar because of the increasing globalization of corn and soybean prices:[52] owing to the integration of the global market and the large volume of soybeans sold globally, soybean prices in Brazil closely align with the Chicago Board of Trade prices.[53] However, Brazilian soybean prices are adjusted for domestic transportation, which contributes to the differences in feed prices between Brazilian states. Brazilian corn prices are reportedly less closely aligned with international prices because corn is primarily marketed regionally within the domestic market in Brazil.[54] In 2011, both Brazilian and U.S. poultry producers faced high feed

[51] IMF, Exchange Rates database (accessed November 4, 2011).
[52] Poultry feed is normally made of corn and soybean meal, along with different minerals and additives. The exact composition of feed varies depending on the country, the age of the broiler chick, and the company, as integrators formulate their own mixes. Generally, about 68 percent of feed is made of corn and 26 percent from soybean meal. USDA, FAS, *Oilseeds: World Markets and Trade*, October 2011, table 30. Crop year is October through September.
[53] Industry representative, interview by USITC staff, Paraná, Brazil, August 29, 2011; industry representatives, telephone interview by USITC staff, June 15, 2011; industry representatives, interview by USITC staff, June 22, 2011.
[54] Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 2011.

costs that eroded industry profitability (box 8.1).[55] Brazilian costs of production were slightly higher than in the United States owing to higher chick costs in Brazil.[56] Chicks cost are higher in Brazil primarily because many Brazilian integrators purchase at least some day-old chicks from breeders, as opposed to buying eggs for their own hatcheries, as is common in the United States. Buying the day-old chicks can raise costs as much as 30 percent compared to raising eggs from company-owned hatcheries.[57]

BOX 8.1 The Rise in Global Feed Prices

High feed costs raise the cost of production for meat producers. If producers are not able to pass on their rising feed costs by increasing prices, the profitability of meat erodes. This was the case for poultry producers for parts of 2006–11, when a weak global economy reduced poultry demand and kept poultry prices low even though animal feed costs were generally high. The cost of animal feed is driven largely by the prices of corn and soybeans, which are affected by such factors as weather, fuel and energy prices, demand levels, and government policies. Globally, corn and soybean prices were volatile during 2006–11. They rose between the 2005/06 and 2007/08 crop years and rose again in 2010/11 after declines in 2008/09 and 2009/10, which were caused by the worldwide recession of 2008–09 and by higher production.[a]

Global corn and soybean prices were high for much of 2006–11 because of both long-term trends that began in 2002 and short-term phenomena that caused price spikes in some years. Factors that helped to raise prices since 2002 were (1) growth in both world population and per capita incomes, which increased demand;[b] (2) expanding biofuel production, further increasing demand;[c] (3) the depreciation of the U.S. dollar, which lowered relative prices and increased global demand, especially for products with prices denominated in U.S. dollars; (4) increasing worldwide energy prices that inflated the cost of energy-intensive crop production inputs, especially fertilizer; and (5) a decline in the growth rate of agricultural productivity, which restricted supply.[d] Between 2006 and 2011, short-term factors contributing to the increase in corn and soybean prices were[e] (1) bad weather, primarily droughts, in major grain- and oilseed-producing countries, including Russia, Ukraine, Australia, and the United States, which reduced world supply; (2) export controls established by some governments to combat domestic food price inflation, which further reduced supply;[f] (3) government purchases to replenish depleted public stores, which increased demand; and (4) price controls set by governments in some countries, which further increased demand for artificially cheaper commodities.

[a] Trostle et al., *Why Have Food Commodity Prices Risen Again?* June 2011, 9; USITC, *Shifts in U.S. Merchandise Trade 2008*, July 2009, AG-13; USDA, ERS, Data Sets: Feed Grains Database; Yearbook; Feed Yearbook Table 12 (accessed April 28, 2011); USDA, ERS, Data Sets: Feed Grains Database; Yearbook; Oil Crops Yearbook Table 4 (accessed April 28, 2011). Corn price is the average of the cash price of number 2 yellow corn in all principal markets for the year.

[b] In particular, there is strong Chinese demand for soybeans.

[c] For example, increased use of corn for ethanol; use of U.S. corn for ethanol use rose from 10 to 24 percent of production between crop years 2002/03 and 2007/08. USITC, *Shifts in U.S. Merchandise Trade 2008*, July 2009, AG-7 and AG-13; Trostle, *Global Agricultural Supply and Demand*, July 2008, 16.

[d] Trostle et al., *Why Have Food Commodity Prices Risen Again?* June 2011; USITC, *Shifts in U.S. Merchandise Trade 2008*, July 2009, AG-7, AG-13; Trostle, *Global Agricultural Supply and Demand*, July 2008, 16; Asian Development Bank, *Soaring Food Prices: Response to the Crisis*, 2010.

[e] Trostle, *Global Agricultural Supply and Demand*, July 2008, 20–21; USDA, ERS, *Oil Crops Outlook*, June 10, 2011, 1–3; Trostle et al., *Why Have Food Commodity Prices Risen Again?*, June 2011.

[f] For example, Argentina raised the export taxes on corn and soybeans, and China imposed an export tax on grains. Trostle, *Global Agricultural Supply and Demand*, July 2008, 23–24.

[55] O'Keefe, "Coping with High Feed Prices," June 2008, 18–20, 5; USDA, ERS, *Livestock, Dairy, and Poultry Outlook*, December 17, 2009, 13; Thornton, "Tyson Foods Focuses on Chicken Pricing," August 11, 2011; Johnston, "Butterball to Close Plant Due to High Input Costs," September 15, 2011; Kavilans, "U.S. Places $40 Million Chicken Order," August 16, 2011; Thornton, "Chicken Executives Seek Profitability," November 14, 2011; World Bank, "Food Price Watch," February 2011; industry officials, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

[56] Chick costs were 68 percent higher in Paraná and 128 percent higher in Goiás (Table 8.5).

[57] Industry representative, e-mail to USITC staff, November 9, 2011.

Exchange rates have a major effect on Brazilian competitiveness, which weakens vis-à-vis the United States as the *real* appreciates against the dollar. Two theoretical exchange rates (R$2.00 and R$1.50 per dollar) can be used to show how exchange rates affect Brazil's live broiler production costs (table 8.5). Given current cost structures, if the *real* depreciated to R$2.00 per dollar, broiler production costs would be lower in Paraná and Goiás than in the United States by 18 percent and 7 percent, respectively. But if the *real* appreciated to R$1.50 per dollar, U.S. costs would be 9 percent lower than in Paraná and 24 percent lower than in Goiás, giving U.S. exporters a substantial cost advantage.[58]

As mentioned earlier, while the overall Brazilian and U.S. costs of production for live broilers are very similar, they are low by international standards. This is because the broiler sectors of both countries are the most highly efficient, and thus competitive, producers in the world.[59] A 2009 study compared live broiler production costs in the Netherlands with those in Germany, France, the United Kingdom, Poland, the United States, Brazil, and Thailand.[60] The study found that U.S. and Brazilian production costs were 32 and 33 percent lower, respectively, than those in the Netherlands, largely due to lower feed costs resulting from an abundant local supply of feed ingredients. They were also lower than broiler production costs in all comparison countries. This study projected that by 2012, new EU-27 rules in several areas—stocking densities (the number of birds permitted to be housed in a specified area), emissions standards, and diseases—will increase live broiler costs in the EU-27 even further, compared to the United States and Brazil.

Product Differentiation

Product differentiation is an important competitive advantage for Brazilian poultry exporters. Brazil's poultry industry is highly export-oriented, with firms willing to modify production and packaging to meet customer needs.[61] This export orientation arose because historically domestic demand was relatively low compared with supply, with consumption limited by low incomes and a historical preference for beef.[62] This is in contrast to the poultry industry in the United States, which is primarily focused on supplying the large domestic market. Moreover, U.S. producers operate plants that, unlike those in Brazil, are not designed for producing specialized items.[63] Therefore, U.S. producers have limited ability to differentiate their products and to comply with the production, processing, and labeling requirements of multiple countries.[64] As a result of

[58] For this exercise, no changes were made to the current cost structure, nor were adjustments made to account for any direct or indirect dynamic effects that exchange rate fluctuations would have (such as lowering the cost of imported inputs such as fertilizer, which would indirectly affect feed costs).

[59] For example, the EU-27 has a high cost structure, which hurts its competitiveness. High costs are caused by a number of regulations and laws (many of which reflect societal preferences), as well as high costs for feed, energy, labor, land, and capital. EC, *Prospects for Agricultural Markets and Income*, December 2010, 27.

[60] Data are from 2007. Van Horne, *Production Costs of Broiler Meat*, 2009.

[61] See, for example, Shane, "Has the 'Brazilian Giant' Stumbled?" January 2007, 21; industry representatives, telephone interview by USITC staff, June 15, 2011; The PoultrySite.com, "BRF Starts Further Processing Plant in the Middle East," August 15, 2011; industry representatives, interview by USITC staff, São Paulo, Brazil, August 25, 2011.

[62] Industry representatives, telephone interview by USITC staff, June 15, 2011; industry representatives, interview by USITC staff, Washington, DC, June 22, 2011; industry representatives, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

[63] Shane, "Has the 'Brazilian Giant' Stumbled?" January 2007.

[64] Ibid.

these factors, the United States mostly exports dark meat products.[65] While dark meat generally commands higher prices abroad, the limited ability to meet foreign market requirements and preferences restricts export opportunities, and thus potential profits, in some markets.

Specialized Production and Packaging

Brazil has developed export-oriented production processes[66] that focus on “feed formulation” and bird size to meet specific preferences in different overseas markets.[67] Conversely, U.S. plants are set up in a way that gives them limited scope to differentiate their products or to comply with multiple countries’ production, processing, and labeling requirements.[68] For example, Brazilian integrators operate complete halal[69] production systems, allowing Brazil to be a major supplier to Islamic countries. According to Brazilian poultry industry officials, it is expensive to have multiple production lines in a factory (i.e., halal and non-halal). Therefore, production lines at most exporting Brazilian poultry facilities meet halal requirements.[70] This is advantageous because producers can always sell halal product to non-halal markets, but not the reverse.[71] Differences between halal and conventional production include special slaughter requirements, such as confirming that the bird is alive and having a Muslim say an invocation before slaughter.[72] The slaughter must also be certified as halal by certifying bodies approved by the importing country.[73] Brazil also meets the requirements of individual Islamic countries, such as having an Iranian commission oversee the slaughter of chickens destined for Iran.[74] The United States has much more limited halal production for a number of reasons, including (1) an orientation towards the domestic market, where demand for halal broiler products is low; (2) the cost of trying to meet the different halal requirements of Muslim countries, especially if plants must be separately certified by each destination country; and (3) concerns about profitability, because sales prices to some major Islamic countries are lower than those to other markets.[75]

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[65] U.S. consumers favor white meat products, such as breast meat and wings. During 2006–10 about 93 percent of U.S. broiler exports consisted of various cuts, and 53 percent of U.S. broiler exports were chicken leg quarters, a dark meat cut. In comparison, during that five-year period only about 57 percent of Brazil’s broiler meat exports were of cuts and 38 percent were of whole birds. GTIS, Global Trade Atlas database (accessed September 26, 2011).

[66] Feed mills, grow-out farms, and processing facilities.

[67] Shane, “Has the ‘Brazilian Giant’ Stumbled?” January 2007, 21.

[68] Shane, “Has the ‘Brazilian Giant’ Stumbled?” January 2007.

[69] Halal is an Arabic word meaning lawful or permitted. There are currently no universal halal food production standards or certifications. See, for example, USDA, FAS, *Indonesia: Approved U.S. Halal Certifying Bodies*, March 22, 2011; USDA, FAS, *Malaysia: Poultry and Products Annual*, September 2, 2005, 7–9; USDA, AMS, *International Egg and Poultry Review*, June 26, 2007.

[70] Industry representative, interview by USITC staff, Paraná, Brazil, August 22, 2011. The Brazilian Chicken Producers and Exporters Association notes that of the 33 members that are responsible for about 94 percent of Brazilian exports, 30 have halal production lines. BRChicken, “Brazil’s Rigorous Production of Halal Chicken,” February, 2010, 8-e.

[71] Industry representative, interview by USITC staff, Paraná, Brazil, August 22, 2011.

[72] BRChicken, “Brazil’s Rigorous Production of Halal Chicken,” February, 2010, 4-e to 5-e.

[73] BRChicken, “Brazil’s Rigorous Production of Halal Chicken,” February, 2010, 4-e to 5-e; government official, interview by USITC staff, Washington, DC, November 3, 2011. Brazil, like the United States, has a number of certifying organizations, the largest of which are the Brazilian Islamic Center for Halal Food (CIBAL) and the Center for Islamic Information in Latin America (CDI-AL).

[74] BRChicken, “Brazil’s Rigorous Production of Halal Chicken,” February, 2010, 5-e.

[75] World Perspectives, *Developing a Competitive U.S. Halal Food Industry Export Sector*, August 2005, 6; government official, interview by USITC staff, Washington, DC, November 3, 2011.

In addition, Brazilian integrators are willing to supply specific types of products that are in demand in certain export markets. For the Arab market, for example, Brazilian exporters produce a “griller,” which is a small whole chicken weighing between 0.9 and 1.3 kg (about 2.0 to 2.8 lbs.), and a “shawarma,” which is a boneless whole bird.[76] Brazilian integrators also make products specifically for other markets, such as Japan, where there is demand for specialized boneless leg cuts that requires the deboning to be done by hand.[77]

Brazilian export packaging is commonly considered to be superior to that of the U.S. industry.[78] Brazilian packaging may differ in several respects. For example, as noted earlier, Brazilian integrators air-chill poultry products and freeze them immediately after packaging, resulting in a lower moisture content than water-chilled U.S. products.[79] Excess moisture in broiler packaging can lower meat quality and damage packaging. Additionally, Brazilian producers often hand-pack meat, which allows them to group uniformly sized pieces and align them very precisely in a package.[80] Customers in many markets, such as Japan and the Middle East, reportedly prefer or even require this type of packaging, and many are willing to pay a premium for it.[81] The United States, on the other hand, generally does bulk packaging for exports.[82] In order to sell to individual customers, the bulk shipment must be partially defrosted, repackaged into smaller containers, and refrozen, which results in a product that looks less presentable, especially compared to Brazilian broiler meat.[83]

Rising wage rates in Brazil are making specialized production and packaging more expensive. Historically, in addition to allowing Brazil to differentiate its products, higher levels of labor use (as opposed to machinery) was a cost advantage for Brazilian integrators because wage rates were lower than the United States. However, that advantage is being eroded by rising wages (see chapter 4). According to industry representatives, in response to rising labor costs the Brazilian poultry industry is increasing its mechanization, often purchasing high-speed processing equipment.[84]

[76] BRChicken, “Brazil’s Rigorous Production of Halal Chicken,” February, 2010, 9-e. The smallest whole chicken produced commercially in the United States is generally about 1.6 kg (3.6 lb.) live weight. In 2010, the average live weight of a chicken in the United States was 2.5 kg (5.59 lb). Industry representative, interview by USITC staff, Washington, DC, June 22, 2011; USDA, AMS, *Weekly Fast Food Fax Report*, June 13, 2011; USDA, AMS, *Weekly Fast Food Fax Report*, September 26, 2011; USDA, NASS, *Poultry Slaughter 2010 Summary*, February 2011, 2.

[77] Industry representatives, interview by USITC staff, Washington, DC, June 22, 2011; USDA, FAS, *Japan: Broiler Annual; 2008*, October 1, 2008, 3–4.

[78] Industry representatives, interview by USITC staff, Washington, DC, June 22, 2011; USDA, FAS, *China: Sales of Chicken Paws*, December 15, 2006, 7, 13; industry representatives, presentation attended by USITC staff, Washington, DC, December 9, 2009.

[79] USDA, FAS, *China: Sales of Chicken Paws*, December 15, 2006, 7, 13; Encyclopedia Britannica, “Poultry Processing,” 2011; industry representatives, presentation attended by USITC staff, Washington, DC, December 9, 2009. Lower moisture content results in less “purge” (moisture) leaking into the packaging, which creates a more attractive package.

[80] Industry representatives, interview by USITC staff, São Paulo, Brazil, August 25, 2011; USDA, FAS, *China: Sales of Chicken Paws*, December 15, 2006, 7, 13.

[81] Ibid.

[82] Industry representatives, interview by USITC staff, Washington, DC, June 22, 2011.

[83] Industry representatives, presentation attended by USITC staff, Washington, DC, December 9, 2009. The U.S. industry is aware of the problems with its packaging and is considering a number of recommendations for making improvements.

[84] Industry representatives, interview by USITC staff, Washington, DC, June 22, 2011; industry representatives, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

Brazilian industry representatives have stated that, despite higher labor costs, they will continue to do hand cutting and/or packing for customers willing to pay a premium.[85] However, if prices for specialized products become too high, importers, especially in price-sensitive countries, may reduce their purchases from Brazil.

Government Action to Improve Market Access

Global meat trade is highly affected by nontariff measures (NTMs)—market access barriers associated with concerns over consumer health and safety. Brazil, like other exporters, has limited influence over such restrictions, but these measures are an important factor in their ability to supply a market. However, in some instances Brazil's government has been able to mitigate or avoid NTMs by issuing certifications addressing importers' concerns. An example of this is the issue of AI, a major sanitary and phytosanitary (SPS) issue affecting the poultry industry.[86] U.S. poultry products are partially banned by a number of countries, including China, Japan, and Russia, because of outbreaks of LPAI in the past few years.[87] Brazilian exporters have avoided these bans because the Brazilian government certifies that Brazil is free of LPAI, thereby gaining a competitive advantage over the United States.[88] Such a certification is impossible for the U.S. government to issue because of the presence of LPAI in the country. However, in general, the U.S. government is reported to issue fewer SPS certifications to avoid or reduce the effects of NTMs than other countries. U.S. regulators generally see this as an advantage, implying that the United States has higher standards for certification and that a certification from a U.S. government agency means more than certification from an agency that may be willing to bend its standards.[89] However, some traders think it is a disadvantage, claiming that U.S. regulators have been unwilling to adjust to a changing trade environment.[90]

Key Export Markets

Poultry is widely produced throughout the world; however, the global poultry trade is much more concentrated. The world's largest producers—the United States, China, Brazil, and the EU-27—are also the largest consumers, which limits international broiler trade.[91] Brazil and the United States are by far the largest exporters of broiler meat, accounting for about three-quarters of global exports during 2006–11.

As noted above, Brazil and the United States largely supply different markets because of a number of factors, including geographic location, trade restrictions, and product differentiation. They compete most directly in China (including Hong Kong) and Russia.

[85] Industry representatives, interview by USITC staff, São Paulo, Brazil, August 23, 2011.
[86] Industry representatives, interview by USITC staff, Washington, DC, June 22, 2011.
[87] USDA, FSIS, "Export Requirements for the People's Republic of China," December 23, 2010; USDA, FSIS, "Export Requirements for Hong Kong," July 6, 2011; USDA, FSIS, "Export Requirements for Japan," July 12, 2011; USDA, FSIS, "Export Requirements for Russia," March 29, 2011. The U.S. government contends that imposing a ban on the basis of the presence of LPAI appears to be contrary to the internationally accepted standard. USTR, *2009 National Trade Estimate Report*, March 2009, 95.
[88] Industry representatives, interview by USITC staff, Washington, DC, June 22, 2011.
[89] Government official, telephone interview by USITC staff, October 18, 2010.
[90] Industry representative, interview by USITC staff, Shanghai, China, September 14, 2010.
[91] USDA, FAS, PSD Online (accessed February 6, 2012).

Other major export destinations for Brazil are Saudi Arabia, Japan, and the EU-27; for the United States, other major export destinations are NAFTA partners Mexico and Canada.

China and Hong Kong

Market Characteristics

China was the second-largest broiler consumer in the world in 2011, accounting for about 16 percent of global consumption during 2006–11.[92] Chinese consumption increased in each year of the period, growing at an average rate of 5 percent annually, primarily because of increased urbanization and rising incomes (table 8.6).[93] Hong Kong was the 29th-largest global broiler consumer in 2011.[94] Its consumption fell in 2007 and then rose again until it reached its highest level of the period in 2010. On average, about 3 percent of Chinese consumption and 93 percent of Hong Kong's consumption was filled by imports during 2006–11.

TABLE 8.6 China and Hong Kong: Broiler meat production, consumption, exports, and imports, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	1,000 mt						Percent
China							
Production	10,350	11,291	11,840	12,100	12,550	13,200	5
Consumption	10,371	11,415	11,954	12,210	12,457	13,020	5
Exports	322	358	285	291	379	410	5
Imports	343	482	399	401	286	230	–8
Trade balance	–21	–124	–114	–110	93	180	([a])
Hong Kong							
Production	29	26	18	10	10	12	–16
Consumption	269	252	254	263	305	262	–1
Exports	([b])	([b])	([b])	([b])	([b])	([b])	([b])
Imports	243	215	236	253	295	250	1
Trade balance	([b])	([b])	([b])	([b])	([b])	([b])	([b])

Source: USDA, FAS, PSD Online (accessed February 6, 2012).

[a]Not applicable.
[b]Not available.

In 2011, China was the 12th-largest importer of broiler meat in the world.[95] During 2006–11, the United States and Brazil were China's primary suppliers, with Argentina the third-largest except when imports of U.S. or Brazilian poultry were restricted for reasons of health or subject to trade remedy actions (table 8.7). For example, in 2008, following a temporary ban on Brazilian imports (caused by China's concerns that imports had entered

[92] Ibid.
[93] USITC, *China's Agricultural Trade*, March 2011, 3-1 to 3-13.
[94] USDA, FAS, PSD Online (accessed February 6, 2012). Hong Kong consumption accounted for less than 1 percent of world broiler meat consumption annually in 2006–11.
[95] China received 5 percent of global poultry imports during 2006–11. China's imports for a number of agricultural products, including poultry, are reportedly understated, because official government statistics do not reflect "gray market" shipments—trade which typically enters through neighboring countries. Gray market imports may enter a country outside normal customs channels or through normal customs channels with modifications made to the product, such as changing the country-of-origin label to that of a third country unaffected by a given trade barrier.

TABLE 8.7 China and Hong Kong: Broiler meat imports, by supplier, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
China							
Brazil	119	195	0	43	529	595	38
Argentina	25	134	240	92	229	109	34
United States	298	589	763	792	129	58	–28
All other	9	0	30	19	32	42	36
Total	452	918	1,033	947	920	804	12
Hong Kong							
United States	71	70	125	159	580	748	60
Brazil	303	481	643	667	599	634	16
China	130	171	197	190	231	271	16
EU-27	35	48	43	57	131	216	44
All other	64	74	87	111	156	176	22
Total	603	844	1,095	1,185	1,696	2,045	28

Source: GTIS, Global Trade Atlas database (accessed February 6, 2012).

Note: Totals may not add due to rounding.

the country from unapproved Brazilian facilities), imports of poultry from the United States and Argentina sharply increased to offset the steep drop in imports from Brazil. Similarly, when China imposed anti-dumping (AD) and countervailing duties (CVD) on imports of U.S. poultry in 2010, imports from the United States plunged, while imports from Brazil and Argentina rose dramatically.

During 2006–11, over 99 percent of China's imports were frozen chicken cuts and offal, which are classified for tariff purposes as Harmonized Schedule (HS) code 0207.14.[96] Chicken paws,[97] a popular snack food, were the single largest imported item, normally accounting for over one-half of all poultry imports by value and volume.[98] Demand for chicken paws is unique to China and Hong Kong and a boon for exporters who would otherwise sell the bulk of chicken paws at very low prices, normally as remnants (often used in such products as pet food). China also imports wing tips and chicken leg quarters.[99]

In 2011, Hong Kong was the seventh-largest importer of broiler meat and a major export market for the United States and Brazil.[100] Hong Kong imports for its own consumption and reportedly serves as a re-export point for other markets, especially in Asia. During 2006–09, Brazil was Hong Kong's largest supplier, with 56 percent of broiler meat imports; the United States supplied about 11 percent of imports.[101] However, during 2010–11, imports from the United States accounted for 35 percent of Hong Kong's broiler meat imports. Between 2008 and 2011, direct U.S. shipments to Hong Kong increased for a number of reasons, including the competitiveness of U.S. prices compared

[96] By both volume and value. GTIS, Global Trade Atlas database (accessed February 6–7 2012).

[97] A paw is a broiler cut that includes the foot and part of the chicken leg. USDA, FAS, *China: Sales of Chicken Paws*, December 15, 2006, 3.

[98] GTIS, Global Trade Atlas database (accessed February 7, 2012).

[99] Most imported chicken leg quarters are used for further processing in China and eventual re-export, owing to foreign buyers' aversion to the possibility of harmful residues in Chinese broiler meat. Industry representative, interview by USITC staff, Hong Kong, September 20, 2010.

[100] USDA, FAS, PSD Online (accessed February 6, 2012).

[101] By value. GTIS, Global Trade Atlas database (accessed February 6, 2012).

to other suppliers and a sharp decline in imports from the EU-27 (for part of this period) and Argentina, raising the demand for U.S. and Brazilian product.[102] In addition, while the Commission is aware of reports of re-exporting from Hong Kong to China, it is not in a position to evaluate these reports absent conclusive data. During 2006–10, the largest imports consisted of frozen chicken paws and chicken wings, which made up about 40 percent and 30 percent of total broiler meat imports, respectively.[103]

Government Policies Affecting Trade

China and Hong Kong have separate customs regimes and tariff schedules. China's tariff rates on poultry vary by product.[104] The vast majority of the poultry meat China imported entered under HS 0207.14, which in 2011 had duty rates ranging between 500 and 1,000 renminbi (RMB) per mt (about $75–$155 per mt).[105] In addition to tariffs, two taxes are assessed on imports: a consumption tax of 2 to 3 percent based on cost, insurance, and freight (c.i.f.) value (the specific rate depends on the province), and a value-added tax (VAT) of 13 percent of the c.i.f. value plus the tariff.[106] As of 2010, U.S. broiler meat directly entering China is also subject to CVD rates ranging from 5.1 to 30.3 percent and AD rates ranging from 50.3 to 105.4 percent.[107] Product re-exported through Hong Kong (or another country) to China should be subject to the same requirements that product from the country of origin would face if it were directly entering China. However, some observers suggest that this may not always happen, especially if products are repackaged by parties in countries where re-exports occur.[108]

China has imposed a number of NTMs, some only temporarily, which affect access for imports. Many of those with the biggest impacts are SPS measures. For example, the Chinese government maintains a zero-tolerance policy for bacteria such as salmonella, E. coli, and listeria in imports of poultry without having presented supporting scientific risk assessments.[109] The zero-tolerance levels appear to be intermittently enforced against imports but not against China's domestic production. In 2008, because of concerns about

[102] Industry representative, e-mail to USITC staff, November 11, 2009; industry representative, interview by USITC staff, Hong Kong, China, September 20, 2010. Argentina's broiler exports to China increased at the same time as its exports to Hong Kong declined. GTIS, Global Trade Atlas database (accessed March 15, 2012).

[103] GTIS, Global Trade Atlas database (accessed September 9, 2011).

[104] APEC, China tariff schedule (accessed April 14, 2009).

[105] WTO, Tariff Download Facility (accessed August 30, 2011); IMF, Exchange Rates database (accessed November 14, 2011).

[106] USAPEEC, "China: Tariff and Quantitative Restrictions for Poultry" (accessed September 15, 2009); USITC, *China's Agricultural Trade*, March 2011, 4-13, 4-18.

[107] The investigation included the following HS codes: 0207.11.00, 0207.12.00, 0207.13.11, 0207.1319, 0207.1321, 0207.1.329, 0207.14.11, 0207.14.19, 0207.14.21, 0207.14.22, 0207.14.29, and 0504.00.21. USDA, FAS, *China, Poultry and Products Semi-Annual 2010,* April 14, 2010, 4. As permitted under the World Trade Organization (WTO), the United States asked China for consultation about these determinations. USTR, "United States Files WTO Case against China," September 20, 2011. After concluding that consultations were unable to resolve the dispute, the United States requested a formal WTO dispute settlement panel in late 2011. USTR, "To Protect American Jobs, United States Announces Next Step," December 2011.

[108] Industry representative, interview by USITC staff, Hong Kong, September 20, 2010. To help China's efforts to prevent illegal trade, Hong Kong is expected to start issuing voluntary certificates for non-U.S. poultry being transshipped to China. Entries with these certificates are expected to clear Chinese customs faster than those without. USDA, FAS, *Hong Kong: HKG to Issue Original Certification*, August 17, 2011.

[109] USTR, *National Trade Estimate Report*, March 2009, 95; USITC, *China's Agricultural Trade*, March 2011, 9-7.

poultry entering the country from unapproved Brazilian facilities, China banned all shipments from Brazil, including product from facilities that had been approved previously.[110] Brazil's direct shipments to China essentially stopped during 2008. China also imposed bans following outbreaks of LPAI through 2006–11; these bans affected several countries, including the United States. U.S. officials claim that such bans are inconsistent with World Organization for Animal Health (OIE) standards.[111]

Other mechanisms, such as China's Automatic Registration Forms for poultry imports, have also reportedly been used to restrict market access during periods of trade tension.[112] Overall, China's SPS policies and use of certain certifications make consistent market access uncertain for both Brazil and the United States. For a discussion of how China's NTMs on poultry affect trade, see chapter 11.

Hong Kong imposes no tariffs, TRQs, surcharges, or VAT on imported poultry.[113] There have been some bans on poultry imports from certain counties (rather than entire states) in the United States in response to outbreaks of LPAI. For example, poultry exported from Edmonson County, Kentucky, during April 14–October 21, 2009, was ineligible to be imported into Hong Kong; poultry exported from Wright County, Minnesota, on or after July 4, 2011, is likewise ineligible.[114]

Competition with the United States

Paws

Consumer demand for paws is high in China and Hong Kong, but domestic supplies, which are essentially a byproduct of poultry production, are insufficient to meet demand. As a result, there is strong demand for imports from both Brazil and the United States, which likely will continue for the foreseeable future. Of the total paws imported by Hong Kong and China during 2006–11, about 43 percent came from the United States and 36 percent from Brazil.[115] While annual growth rates have been somewhat volatile, overall Hong Kong and China's combined paw imports from Brazil increased by 46 percent during 2006–11; imports from the United States grew 107 percent over the period.[116] Brazilian and U.S. product differentiation plays a role in determining each respective country's overall market share and the customer base to which they are most attractive. With regard to paw size, Chinese buyers reportedly like the medium-sized and large paws that Brazil supplies.[117] The medium-sized paws are typically sold to lower-income customers. However, U.S. paws are even larger and meatier than Brazilian

[110] USDA, FAS, *China: Poultry Annual; 2008*, September 1, 2008, 6.

[111] USTR, *National Trade Estimate Report*, March 2009, 95; USDA, FSIS, "Export Requirements for China," December 23, 2010; USTR, *2010 Report on Sanitary and Phytosanitary Measures*, 2010, 35.

[112] The Chinese government purportedly uses these forms to keep track of the volume of imported poultry. However, licenses for poultry imports were reportedly delayed following U.S. imposition of duties on Chinese tire imports in 2009. Industry representative, interview by USITC staff, Hong Kong, September 20, 2010; USITC, *China's Agricultural Trade*, March 2011, 9-11.

[113] APEC, "APEC Customs Guide: Hong Kong" (accessed April 14, 2009).

[114] USDA, FSIS, "Export Requirements for Hong Kong," July 6, 2011 (accessed August 15, 2011).

[115] Based on volume. GTIS, Global Trade Atlas database (February 7, 2012).

[116] Based on imports statistics by volume. GTIS, Global Trade Atlas database (February 7, 2012).

[117] USDA, FAS, *China: Sales of Chicken Paws*, December 15, 2006, 7, 13.

or locally produced paws.[118] According to industry officials, their large size makes U.S. paws popular in larger cities and with wealthier customers.[119] On the other hand, Brazil's packaging is preferred to U.S. packaging because Brazilian paws are packed in smaller bags and are more uniformly sized.[120] Reportedly, Chinese and Hong Kong importers also dislike excessive moisture content (a result of water chilling) in U.S. packages and the fact that U.S. producers are not flexible about the package sizes they make available.[121] U.S. officials in China have expressed concern that by not modifying production lines to improve paw quality, U.S. integrators are not maximizing the profitability of U.S. paws and have been vulnerable to competition from Brazil.[122]

Broiler meat

Since 2010, U.S. exports of broiler meat (including paws) have been at a significant price disadvantage in the Chinese market relative to Brazilian supplies because of the high AD/CVD duties imposed that year. Because of these duties, China's direct imports from the United States declined 86 percent (by quantity) between 2009 and 2010, while Brazilian direct exports to China surged, substantially replacing the decline in U.S. imports.[123] In 2011, China's direct imports of U.S. broiler meat further declined.[124] While China's market continues to be important for U.S. and Brazilian exporters because of its large consumer base and rising incomes, Chinese government actions, such as those in 2008 and 2010, pose uncertainties for firms that export directly to China.[125]

Russia

Market Characteristics

During 2006–11, Russian poultry consumption grew 22 percent as a result of rising incomes (table 8.8). Russia was the sixth-largest global consumer of poultry in 2011, and consumers there prefer dark chicken meat.[126] In 2006, about 50 percent of domestic consumption was supplied by imports. However, owing to efforts by the Russian government to promote self-sufficiency through increased domestic production, only 13 percent of consumption was filled by imports in 2011.[127]

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[118] USDA, FAS, *China: Sales of Chicken Paws*, December 15, 2006, 13; industry representative, interview by USITC staff, Hong Kong, September 20, 2010.

[119] Ibid.

[120] USDA, FAS, *China: Sales of Chicken Paws*, December 15, 2006, 7, 13.

[121] USDA, FAS, *China: Sales of Chicken Paws*, December 15, 2006, 12.

[122] USDA, FAS, *China: Chicken Paw, Wing and Wing Tip Exports*, February 7, 2007, 1.

[123] GTIS, Global Trade Atlas database (accessed July 20, 2011). Overall, Chinese imports fell 29 percent by quantity between 2009 and 2010.

[124] Between 2010 and 2011, China's imports of U.S. broiler meat fell 38 percent, by volume. GTIS, Global Trade Atlas database (accessed February 7, 2012).

[125] Industry representatives, interview by USITC staff, Washington, DC, June 22, 2011; industry representative, interview by USITC staff, Hong Kong, September 20, 2010; USITC, *China's Agricultural Trade*, March 2011, 9-11.

[126] USDA, FAS, PSD Online (accessed February 6, 2012); EIU, "Russia Food, Beverages and Tobacco Profile," January 14, 2008.

[127] Clements, "Russia Invests in Poultry's Future," August 6, 2009; Wattagnet.com, "Russia to Decrease Poultry Imports," May 21, 2009; USDA, FAS, *Russian Federation: Big Moves to Self-Sufficiency*, April 6, 2010.

TABLE 8.8 Russia: Broiler meat production, consumption, exports, and imports, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	1,000 mt						Percent
Production	1,180	1,410	1,680	2,060	2,310	2,520	16
Consumption	2,382	2,637	2,840	2,976	2,938	2,907	4
Exports	2	2	5	7	5	3	8
Imports	1,204	1,229	1,165	923	633	390	–20
Trade balance	–1,202	–1,227	–1,160	–916	–628	–387	([a])

Source: USDA, FAS, PSD Online (accessed February 6, 2012).

[a]Not applicable.

Russian imports have declined each year since 2007 and, as a result of market access restrictions, they were 68 percent lower in 2011 than in 2006. Russia went from being the world's largest importer in 2006 to being the fifth largest in 2011.[128] During the period 2006–10, Russia imported the majority of its poultry from the United States (table 8.9).[129]

TABLE 8.9 Russia: Broiler meat imports, by supplier, 2006–10

	2006	2007	2008	2009	2010	Average annual change 2006–10
	Million $					Percent
United States	512	607	811	715	331	–10
Brazil	202	246	267	123	242	5
EU-27	117	133	177	180	233	19
All other	4	8	12	10	17	44
Total	836	993	1,267	1,027	822	0

Source: GTIS, Global Trade Atlas database (accessed November 3, 2011).

Note: Totals may not add due to rounding.

However, because of trade disruptions (discussed in more detail below), the U.S. share of imports fell sharply to 40 percent in 2010, its lowest level of the period. Most other imports in the period were supplied by Brazil and the EU-27. The largest category of total broiler imports was uncooked frozen chicken halves and quarters (HS 0207.14.20).[130]

Government Policies Affecting Trade

Traditionally, Russia has been an attractive market for global poultry suppliers because its domestic production does not meet consumer demand. Rising incomes have led to greater overall demand for food, but persistent food price inflation has driven consumers

[128] USDA, FAS, PSD Online (accessed February 6, 2012).

[129] Data on Russia's country-specific imports in 2011 were not available from GTIS in time for the publication of this report. Export data are available for Brazil and the United States. These data show that between 2010 and 2011, Brazilian poultry exports to Russia declined 51 percent by value, and U.S. poultry exports fell 21 percent. GTIS, Global Trade Atlas database (February 7 and 14, 2012).

[130] GTIS, Global Trade Atlas database (accessed September 9, 2011). During 2007–10, about three-quarters of imports were listed under HS 0207.14.20. Before 2007, the majority of poultry entered under a more general frozen cuts category, HS 0207.14.70, whose use declined rapidly starting in 2007. GTIS, Global Trade Atlas database (accessed September 9, 2011).

towards cheaper meats, especially poultry.[131] Russian consumers of poultry largely favor dark meat, which makes Russia a prime destination for exporting countries with surplus dark meat, such as the United States.[132]

However, the Russian government has acted to limit imports in recent years in order to promote poultry self-sufficiency.[133] Russian poultry production has been expanding because of assistance from government programs (such as credit subsidies) as well as the increasing adoption of new equipment and techniques in order to compete with imports.[134]

The Russian government took direct action to limit imports by lowering its TRQ levels for poultry imports after 2008 (figure 8.3). In 2006–09, about three-quarters of the TRQ was allocated to the United States and about a fifth to the EU-27, with the remaining 5 percent allocated to other countries, including Brazil.[135] In that period, the TRQ was usually filled, except in 2010, when a ban on imported poultry washed with chlorinated water kept U.S. poultry from entering Russia for over six months.[136]

Despite a portion of the U.S. quota being reallocated to "other countries," the TRQ fill rate was only 79 percent in 2010.[137] In 2011, Russia announced that its TRQ no longer had country-specific allocations, so that U.S. shippers now face increased competition from other global suppliers.

The Russian government also imposed a number of bans on the use of certain poultry in other products that effectively restrict access to part of the Russian market for U.S. and Brazilian exporters. These bans are ostensibly for health and safety reasons, but Brazilian and U.S. poultry industry representatives believe the bans are motivated by Russia's drive to become self-sufficient in poultry.[138] In 2010 and 2011, Russia phased in bans on the

[131] USDA, FAS, *Russian Federation: Poultry Annual Report, 2008*, September 15, 2008, 8; USDA, FAS, *Russian Federation: Poultry Semi-Annual Report, 2009*, May 13, 2009, 3; Clements, "Russia Invests in Poultry's Future," August 6, 2009.

[132] EIU, "Russia Food, Beverages and Tobacco Profile," January 14, 2008.

[133] See, e.g., Clements, "Russia Invests in Poultry's Future," August 6, 2009; Wattagnet.com, "Russia to Decrease Poultry Imports," May 21, 2009; USDA, FAS, *Russian Federation: Big Moves to Self-Sufficiency*, April 6, 2010.

[134] The domestic industry is supported by government programs, such as the National Priority Project in Agriculture, which supplies credit subsidies. A major component of government policy is interest rate subsidies, aimed at increasing access to commercial capital to fund expansion and improvements. Between 2006 and 2009, the Russian government invested $2.6 billion in the poultry industry through its various programs. See, e.g., Clements, "Russia Invests in Poultry's Future," August 6, 2009; USDA, FAS, *Russian Federation: Poultry Semi-Annual Report; 2009*, March 13, 2009, 3; USDA, FAS, *Russian Federation: Big Moves to Self-Sufficiency*, April 6, 2010, 5.

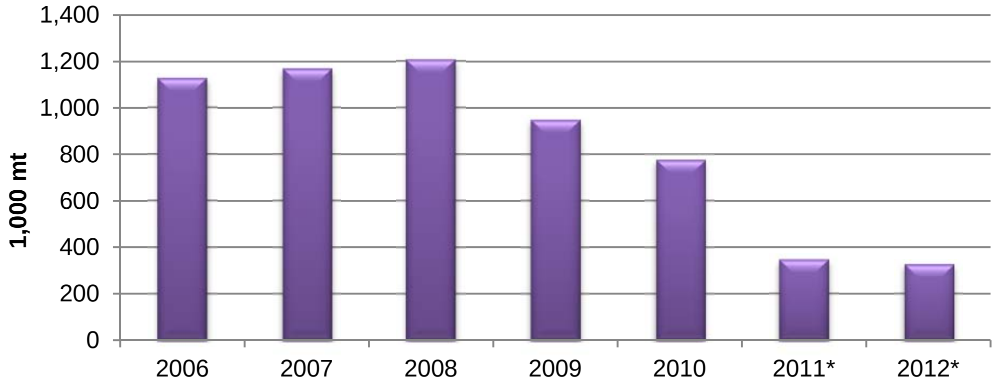
[135] USDA, FAS, *Russian Federation: Big Moves to Self-Sufficiency*, April 6, 2010, 7.

[136] USDA, FAS, *Russian Federation: Consumption Falls*, March 2, 2011, 5. In mid-2010, an export certification was approved for U.S. poultry treated with alternatives to chlorine. Bottemiller, "Russia Agrees to Lift Ban," June 25, 2010; USDA, FAS, *Russian Federation: Russia Resumes Imports*, September 21, 2010.

[137] USDA, FAS, *Russian Federation: Consumption Falls*, March 2, 2011, 5; USDA, FAS, *Russia Resumes Imports of U.S. Poultry*, September 21, 2010, 7.

[138] USDA, FAS, *Russian Federation: Big Moves to Self-Sufficiency*, April 6, 2010; Johnson and Becker, *U.S.-Russia Meat and Poultry Trade Issues*, April 2, 2010, 1; industry representatives, interview by USITC staff, Paraná, Brazil, August 22, 2011; industry representatives, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

FIGURE 8.3 Russia's poultry TRQ has been falling since 2008



Source: USDA, FAS, *Russian Federation: Big Moves to Self-Sufficiency*, April 6, 2010; USDA, FAS, *Russia Announces 2011 TRQ Quantities,* December 27, 2010; USDA, FAS, *Putin Declares 2012 Tariff-Quota Levels*, July 30, 2011.

*Projected.

use of frozen poultry in a number of products, including certain specialty food products and baby foods, thus limiting the use of poultry imports, most of which are frozen.[139] For a discussion of how these and other Russian NTMs on poultry affect trade, see chapter 11.

As noted, in 2010 Russia banned imports of poultry treated with a chlorine rinse that is used to reduce pathogens. The ban primarily affects poultry from the United States, where the practice is standard.[140] U.S. broiler exports did not enter Russia for over six months in 2010. In mid-2010, an export certification was approved for U.S. poultry treated with alternatives to chlorine.[141] Currently U.S. producers who use alternative PRTs will be able to export to Russia, but producers who do not or cannot switch to alternative PRTs will continue to be excluded from the market. Russia also banned poultry imports from some U.S. states because of outbreaks of LPAI.[142]

In 2011, a number of Brazilian poultry and other meat plants were delisted (i.e., lost their eligibility to export) on the grounds that they do not meet Russian food safety requirements.[143] It is expected that these plant delistings will limit Brazil's ability to export to Russia at least into 2012.

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[139] USDA, FAS, *Russian Federation: Frozen Poultry Use*, December 29, 2010.

[140] The maximum level of chlorine approved by the Russian government in such washes was set at the levels found in U.S. drinking water. Johnson and Becker, *U.S.-Russia Meat and Poultry Trade Issues*, April 2, 2010, 9.

[141] Bottemiller, "Russia Agrees to Lift Ban on U.S. Poultry Imports," June 25, 2010; USDA, FAS *Russian Federation: Russia Resumes Imports*, September 21, 2010.

[142] USDA, FSIS, "Export Requirements for Russia," March 29, 2011.

[143] As of August 2011, 126 Brazilian plants were affected. Among other complaints, Russia alleged that Brazil's safety record had been declining, that meat tested in Russian labs was contaminated with a number of bacteria (including salmonella and listeria), and that Brazilian poultry had been found to contain antibiotic residues. USDA, FAS, *Brazil; Poultry Annual 2011*, September 2, 2011, 5; Moser, "Russia Slams Brazil Meat Safety Standards," May 2, 2011; Moser, "Russian Trade Embargo on Brazil Extended," August 2, 2011.

Competition with the United States

Both Brazil and the United States have found it difficult to supply the Russian market on a regular basis in recent years because of market access issues. By lowering its TRQ since 2008, the Russian government has reduced the quantity of imports that can enter Russia. As described above, NTMs affect imports from both countries by banning certain uses of frozen poultry, delisting Brazilian plants, and banning U.S. poultry rinsed with chlorine. Reportedly, these limitations likely will remain in place as Russia pursues its policy of self-sufficiency in poultry production.[144] Both Russia's president, Dmitri Medvedev, and its prime minister, Vladimir Putin, have made statements indicating that the Russian government is not willing to change its meat production subsidies or TRQs as part of Russia's World Trade Organization (WTO) accession negotiations.[145] Indeed, when details of Russia's WTO accession agreement were released, they showed that the TRQ for broiler meat was set at 350,000 mt,[146] which is less than half the level of the total poultry 2010 TRQ.[147] According to some Brazilian industry officials, owing to the uncertain nature of the Russian market, Brazil is not looking to invest in the Russian market or expend market development resources in the country.[148]

Even with the problems of market access, the United States consistently has had a greater share of the Russian market than Brazil. This is because Russia is a major importer of the types of dark meat cuts that the U.S. industry produces in significant volumes for the export market because of higher U.S. market demand for white meat.[149] Moreover, U.S. chicken halves and quarters are very price competitive: U.S. average unit values (AUVs) were about 20 percent below Brazil's AUVs during 2006–10.[150]

[144] USDA, FAS, *Russian Federation: Big Moves to Self-Sufficiency*, April 6, 2010; Johnson and Becker, *U.S.-Russia Meat and Poultry Trade Issues*, April 2, 2010, 1; industry representatives, interview by USITC staff, Paraná, Brazil, August 22, 2011; industry representatives, interview by USITC staff, São Paulo, Brazil, August 23, 2011; USDA, FAS, *Russian Federation: Consumption Recovers Strong in 2012*, August 16, 2011, 5.

[145] USDA, FAS, *Russian Federation: Consumption Recovers Strong in 2012*, August 16, 2011, 5.

[146] The TRQ for select turkey products is 14,000, bringing Russia's poultry TRQs to a total of 365,000 mt. U.S. government official, e-mail to USITC staff, February 14, 2012.

[147] Of the total chicken TRQs, one category of 250,000 tons is for chicken leg quarters and halves and has no country-specific allocations; 100,000 tons are reserved for mechanically deboned chicken, 80 percent of which is allocated to the EU-27. Industry representative, e-mail to USITC staff, January 9, 2012; U.S. government official, e-mail to USITC staff, February 14, 2012.

[148] Industry representatives, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

[149] Shane, "Has the 'Brazilian Giant' Stumbled?" January 2007, 21; GTIS, Global Trade Atlas database (accessed September 26, 2011).

[150] Based on Russian import data. GTIS, Global Trade Atlas database (accessed September 26, 2011). The United States has competitive export prices for chicken leg quarters (CLQs) in Russia compared with Brazil. However, the prices of U.S. CLQs for Russia have recently risen because the lower TRQ cut exports to Russia. In 2006, the AUVs of U.S. exports of CLQs to Russia were the lowest among the top five U.S. export markets and were below the U.S. average world AUV for CLQs. In 2009 and 2010, by contrast, the AUVs of U.S. exports of CLQs to Russia were the highest of any in the top five export markets and were higher than the U.S. average world AUV. GTIS, Global Trade Atlas database (accessed December 16, 2011).

Japan

Market Characteristics

Japan was the eighth-largest consumer of poultry in the world in 2011; between 2006 and 2011, total consumption grew 5 percent (table 8.10).[151] In 2011, Japan was the 14th-largest global producer, but only produced enough poultry to supply about two-thirds of domestic demand during 2006–11. Imports filled the supply gap.

TABLE 8.10 Japan: Broiler meat production, consumption, exports, and imports, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	1,000 mt						Percent
Production	1,258	1,250	1,255	1,282	1,290	1,235	0
Consumption	1,970	1,945	1,926	1,978	2,075	2,060	1
Exports	2	6	7	9	11	5	20
Imports	716	696	737	645	789	840	3
Trade balance	–714	–690	–730	–636	–778	–835	([a])

Source: USDA, FAS, PSD Online (accessed February 6, 2012).

[a]Not applicable.

Japan was the largest chicken importer in the world in 2011 and accounted for 10 percent of global imports annually in 2006–11.[152] The Japanese food service sector was a major consumer of imported poultry.[153] On average during 2006–11, Japan imported 38 percent of its chicken meat from Brazil, 30 percent from Thailand, 28 percent from China, and 2 percent from the United States (table 8.11). However, in 2011, Japan's imports of frozen chicken cuts (HS 0207.14) from the United States reached their highest level (by volume) since 2003.[154] This was largely because of an overall increase in imports from many countries to compensate for the 2011 decline in Japanese production caused by a major outbreak of high-pathogen AI (HPAI) and the natural disasters that struck Japan that year.[155] Japan imported frozen chicken cuts, such as boneless leg meat, primarily from Brazil, and cooked chicken products, such as skewered grilled chicken, mostly from China and Thailand.[156]

[151] Japan averaged about 3 percent of world consumption, by volume. USDA, FAS, PSD Online (accessed February 7, 2012).

[152] USDA, FAS, PSD Online (accessed February 6, 2012).

[153] USDA, FAS, *Japan: Broiler Annual; 2008*, October 1, 2008, 3; USDA, FAS, *Japan: Poultry Annual 2009*, September 8, 2009, 3. Domestically produced poultry dominates the retail markets.

[154] Highest volumes both in absolute terms and the share of Japan's total broiler meat imports. GTIS, Global Trade Atlas database (accessed February 7, 2012).

[155] USDA, FAS, *Japan; Poultry and Products Annual*, September 26, 2011.

[156] USDA, FAS, *Japan: Broiler Annual; 2008*, October 1, 2008, 3–4; USDA, FAS, *Japan: Broiler Annual 2007*, November 2, 2007, 4; USDA, FAS, *Japan Broiler Market Outlook*, July 2, 2010, 3.

TABLE 8.11 Japan: Broiler meat imports, by supplier, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
Brazil	630	634	1,239	774	1,008	1,480	19
Thailand	493	485	788	807	860	1,047	16
China	639	679	526	564	716	981	9
United States	36	40	50	33	67	121	27
All other	16	18	28	28	31	59	29
Total	1,815	1,855	2,632	2,206	2,683	3,688	15

Source: GTIS, Global Trade Atlas database (accessed February 6, 2012).

Note: Totals may not add due to rounding.

Government Policies Affecting Trade

Japan imposes a tariff of 0 to 20 percent on uncooked chicken meat (HS 0207) depending on the country and product.[157] The two most heavily imported uncooked items are frozen leg with bone in (HS 0207.14.21), which has a most-favored nation (MFN) tariff of 8.5 percent, and frozen cuts or offal (HS 0207.14.22), which has a MFN tariff of 11.9 percent. In addition to tariffs, Japan imposes a 5 percent consumption tax on poultry imports, calculated on the basis of the duty-paid value.[158]

Japan bans imports from markets with outbreaks of AI. Poultry from some U.S. states have been banned because of outbreaks of LPAI.[159] The length of these bans have ranged from a few months to about a year. Poultry products from at least 18 U.S. states have faced temporary bans since 2007, including Missouri since February 28, 2011, North Carolina since February 9, 2011, and Pennsylvania between November 15, 2009, and May 17, 2010. For a discussion of how these AI-related NTMs affect trade, see chapter 11. Japan also restricts imports of uncooked poultry from Thailand and China owing to HPAI outbreaks in those countries.[160]

Competition with the United States

Brazil and the United States directly compete in the Japanese market for frozen cuts (HS 0207.14), which made up just over half of Japanese broiler meat imports during 2006–11.[161] During 2006–11, Brazil supplied 91 percent of Japan's imports of frozen cuts

[157] JMF, Japan's Tariff Schedule as of April 1, 1010 (accessed August 17, 2011). For all poultry products, the zero percent tariffs are only available for imports from the least-developed countries in the world or from one of 10 specified countries or groups. Other countries, such as Thailand, also have country-specific tariffs for some items.

[158] USAPEEC, Japan: Tariffs and Quantitative Restrictions for Poultry (accessed September 15, 2009).

[159] USDA, FSIS, "Poultry Export Requirements for Japan," July 12, 2011 (accessed August 17, 2011). Japan also has certification requirements for U.S. poultry that is shipped through U.S. states banned from exporting to Japan because of AI outbreaks. In September 2011, the requirements for this certification were changed to make shipping through banned states easier. USDA, FAS, *Japan: Poultry and Products Annual*, September 26, 2011, 4.

[160] USDA, FAS, *Japan; Poultry Annual 2004,* September 13, 2004; USDA, FAS, *Japan Broiler Market Outlook*, July 2, 2010, 5.

[161] By volume. GTIS, Global Trade Atlas database (accessed February 7, 2012). In that six-year period, just under half of broiler meat exports were cooked broiler meat, which was almost exclusively supplied by China and Thailand and will not be discussed here.

of broiler meat (HS 0207.14), by volume, and the United States supplied 7 percent.[162] Reportedly, the Japanese have expressed an interest in diversifying their sources of broiler meat imports.[163] If Japanese importers act on this, the move could benefit sales of U.S. broilers, which are viewed positively by Japanese customers, especially in comparison to other suppliers like China.[164] However, the ability to meet Japan's specific product requirements is currently an obstacle for U.S. producers and an advantage for Brazil's producers. Japanese customers prefer hand-cut products, especially boneless leg meat, and Brazil's more extensive use of labor for hand cutting and packaging products allows it to meet these exacting requirements.[165] The Japanese are willing to pay a premium to obtain these cuts.[166]

A number of U.S. companies are attempting to develop premium dark meat products for Japan that could compete with Brazil's hand-cut products, with varying degrees of success.[167] Some U.S. companies attempted to do so using leg deboning equipment, but these attempts failed to meet Japanese requirements. At least one U.S. company has successfully modified its production to make a specialized cut meeting Japanese size and packing specifications.[168] However, there has not been a widespread move in the U.S. industry to meet Japanese specifications, possibly restricting further growth in U.S. poultry exports to Japan.[169] Nonetheless, U.S. government officials predict that Japanese imports from the United States will maintain their 2011 levels in 2012 because of their competitive prices.[170]

Compared with China and Russia, Japan has relatively few NTMs. However, Brazil's AI-free status has given it a distinct advantage over the United States. In 2000, Brazil supplied 20 percent of Japan's imports of frozen chicken cuts; the United States, 16 percent.[171] U.S. market share was eroded in the first half of the decade because of bans, beginning in 2002, resulting from outbreaks of LPAI in the United States.[172] In 2002, the first AI ban reduced U.S. market share to 10 percent; by 2004, it had fallen to 8 percent. However, Brazil's market share grew to 84 percent by 2004, and during 2006–11 it averaged 91 percent of Japan's imports of frozen chicken cuts. While Japan now

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162 By volume. GTIS, Global Trade Atlas database (accessed February 7, 2012).

163 Industry representatives, presentation attended by USITC staff, Washington, DC, December 7, 2011.

164 Ibid.

165 USDA, FAS, *Japan: Broiler Annual 2007*, November 2, 2007, 4; USDA, FAS, *Japan: Broiler Market Outlook*, July 2, 2010, 3; industry representatives, interview by USITC staff, Paraná, Brazil, August 30, 2011.

166 Industry representatives, interview by USITC staff, São Paulo, Brazil, August 25, 2011; Knight, "Brazil Turning to Buoyant Domestic Market," April 1, 2011; industry representatives, interview by USITC staff, Washington, DC, June 22, 2011; USDA, FAS, *Japan: Broiler Market Outlook*, July 2, 2010, 3; industry representatives, interview by USITC staff, Paraná, Brazil, August 30, 2011.

167 Industry representatives, telephone interview by USITC staff, June 15, 2011; industry representatives, interview by USITC staff, Washington, DC, June 22, 2011.

168 Ibid.

169 As noted above, U.S. broiler plants are not conducive to producing specialized products and, because U.S. labor costs are high, hand cutting is expensive (compared to Brazil), likely discouraging a widespread move to adapt production methods in order to meet Japanese standards.

170 These government officials also predict that Japanese imports from Brazil may decline because Brazilian poultry prices are higher than those of its competitors, such as the United States. USDA, FAS, *Japan; Poultry and Products Annual*, September 26, 2011.

171 GTIS, Global Trade Atlas database (accessed September 26, 2011).

172 USDA, FAS, *Japan: Poultry and Products*, March 7, 2002, 4; USDA, FAS, *Japan: Poultry Annual 2004*, September 13, 2004.

enacts state-specific bans for LPAI outbreaks instead of countrywide ones, the United States has not regained market share; it averaged 7 percent of imports of frozen chicken cuts during 2006–11. Brazil has enough supplies to satisfy the Japanese export market and has been able to maintain its market share.

Saudi Arabia

Market Characteristics

Saudi Arabia was the 13th-largest global poultry consumer in 2011, consuming about twice as much chicken as it produced in 2006–11 (table 8.12). As a result, it relied heavily on imports to supply demand, as consumption continued to increase and production levels remained stable.[173] Broiler meat consumption grew because of its competitive price (compared to other meats), a growing preference for chicken by health-conscious consumers, and increased official and business travel to Saudi Arabia, which raised food demand. Middle Eastern consumers prefer smaller birds that can be eaten in one sitting.[174]

TABLE 8.12 Saudi Arabia: Broiler meat production, consumption, exports, and imports, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	1,000 mt						Percent
Production	548	559	564	570	575	590	1
Consumption	961	1,019	1,064	1,165	1,246	1,410	8
Exports	10	10	10	10	10	10	0
Imports	423	470	510	605	681	830	14
Trade balance	–413	–460	–500	–595	–671	–820	([a])

Source: USDA, FAS, PSD Online (accessed February 6, 2012).

[a]Not applicable.

In 2011, Saudi Arabia was the world's second-largest importer of broiler meat. Between 2006 and 2011, Saudi Arabia accounted for about 8 percent of global imports.[175] Imports of broilers rose by 96 percent during 2006–11, while Saudi domestic production increased by only 8 percent. Growing consumption makes Saudi Arabia an attractive market for global poultry suppliers, and imported poultry is attractive to Saudi consumers because it is usually less expensive than domestic poultry.[176]

[173] USDA, FAS, PSD Online (accessed February 6, 2012).
[174] Industry representative, meeting with USITC staff, Washington, DC, June 22, 2011.
[175] USDA, FAS, PSD Online (accessed July 14, 2011 and December 19, 2011).
[176] USDA, FAS, *Saudi Arabia: Poultry and Products; Annual,* September 12, 2006, 5; ThePoultrySite, "Brazilian Produce: Saudis Want It All," February 29, 2008.

Brazil supplied almost 80 percent of Saudi Arabia's imports on average during 2006–10; the EU-27 was second with 17 percent (table 8.13).[177] U.S. poultry made up less than one-half of 1 percent of Saudi broiler imports over the last five years.[178] In 2010, imports from the United States were almost evenly divided between prepared chicken (HS 1602.32) and chicken cuts (HS 0207.14), although about 4 percent of US imports were whole birds (HS 0207.12).[179] Saudi Arabia's largest import category by value was whole frozen chickens (HS 0207.12), primarily from Brazil, which supplied 79 percent of this type of chicken during 2006–10.[180]

TABLE 8.13 Saudi Arabia: Broiler meat imports, by supplier, 2006–10

	2006	2007	2008	2009	2010	Average annual change 2006–10
	Million $					Percent
Brazil	443	531	761	837	1,013	23
EU-27	94	122	196	165	202	21
United Arab Emirates	9	9	0	0	15	14
Argentina	5	11	17	14	10	19
United States	2	1	0	0	5	26
All other	3	7	1	2	11	38
Total	554	681	975	1,018	1,256	23

Source: GTIS, Global Trade Atlas database (accessed November 3, 2011).

Note: Totals may not add due to rounding.

Government Policies Affecting Trade

Saudi Arabia now assesses import duties of 5 percent on poultry, having reduced duty levels in March 2008.[181] Previously, poultry tariffs were the higher of 20 percent or 0.267 cents per kilogram.[182] No additional import taxes are levied.

Saudi Arabia requires certain certifications and maintains some bans that affect which countries can supply poultry. Most important is the requirement that all poultry entering Saudi Arabia be certified as meeting halal standards.[183] Additionally, Saudi Arabia requires certification that poultry imports are from chicken that have not been fed animal ruminate, and another certification that the poultry are free from hormones.[184] These certifications require modifications to production processes which Brazil has made on a

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[177] Percentage are based on value. GTIS, Global Trade Atlas database (accessed November 3, 2011). Almost all (99 percent) of EU-27 imports came from France. Data on Saudi Arabia's country-specific imports for 2011 were not available from GTIS in time for the publication of this report. Available export data show that between 2010 and 2011, Brazilian poultry exports to Saudi Arabia increased 32 percent by value and U.S. poultry exports rose 65 percent. GTIS, Global Trade Atlas database (February 7 and 14, 2012).

[178] GTIS, Global Trade Atlas database (accessed September 23, 2011).

[179] Percentages are based on value. GTIS, Global Trade Atlas database (accessed November 7, 2011).

[180] By value, HS 0207.12 accounted for 89 percent of Saudi imports on average during 2006–10. GTIS, Global Trade Atlas database (accessed December 19, 2011).

[181] USTR, *2009 National Trade Estimate Report*, March 2009, 431; Allen F. Johnson & Associates, "Saudi Arabia: Poultry Import Requirements and Market Information," November 2, 2010, 6; WTO, WTO Tariff Download Facility (accessed November 14, 2011); USAPEEC, "Saudi Arabia: Tariffs and Quantitative Restrictions for Poultry" (accessed September 15, 2009).

[182] USDA, FAS, *Saudi Arabia: Poultry and Products; Annual*, September 12, 2006, 5.

[183] Saudi Arabia is an Islamic country, and eating halal food is a religious requirement.

[184] USDA, FAS, *Saudi Arabia: Poultry and Products; Annual*, September 12, 2006, 5–6.

large scale, while the United States has not.[185] In addition, Saudi Arabia requires that in the area of production there can have been no outbreaks of HPAI or a lethal strain of exotic Newcastle disease.[186] Brazil has had outbreaks of exotic Newcastle disease in the past, most recently in 2006, so it could lose access to the Saudi market if an outbreak of a lethal strain occurs.[187]

Competition with the United States

An exporter's ability to enter the Saudi market is dependent on its ability and willingness to make a halal product. Saudi Arabia does not have any major SPS barriers or TRQs restricting market access for Brazil or the United States. But while Brazil has widespread halal production meeting Saudi Arabia's import requirements, the United States generally has much lower levels of halal poultry production, estimated at around 5 percent of total production.[188] As a result, Brazil is the largest source of Saudi Arabian broiler imports (see the "Product Differentiation" section above for more detail).

Although Saudi Arabia approved U.S automatic slaughter methods in 1999,[189] most U.S. poultry producers do not meet other Saudi Arabian requirements. For example, they do not meet Muslim religious requirements involving an invocation prior to slaughter that would allow poultry to be certified halal.[190] They also do not meet a Saudi Arabian requirement for company certification that all broilers have been fed a vegetarian diet at the grow-out stage. Since it is expensive to replace animal proteins in feed with other proteins such as soy, few U.S. integrators are willing make the needed changes and are therefore unable to certify that their animal feed is free from animal protein.[191]

According to U.S. industry representatives, only one major U.S. producer currently meets Saudi feed requirements and exports to Saudi Arabia.[192] However, in December 2011, a U.S. organic poultry producer, Guttenberg Farms, signed a contract to export $40 million worth of whole frozen chickens to Othaim Markets, a Saudi Arabian grocery store chain.[193] This contract is worth more than all Saudi imports of U.S. poultry during 2006–10 and will likely make the United States the third-largest supplier of poultry to Saudi Arabia.[194] Nonetheless, unless more conventional U.S. integrators are willing to change

[185] Two additional certifications are required for U.S. poultry: (1) U.S. Food Safety Inspection Service export certification and (2) a producer "self-certification to cover any additional requirements not related to foods or animal health issues." USTR, *2009 National Trade Estimate Report*, March 2009, 433.

[186] USDA, FAS, *Saudi Arabia: Poultry and Products; Annual*, September 12, 2006, 4; Allen F. Johnson & Associates, "Saudi Arabia: Poultry Import Requirements and Market Information," November 2, 2010, 3.

[187] USDA, ERS, "Brazil's Booming Agriculture Faces Obstacles," November 2006.

[188] BRChicken, "Brazil's Rigorous Production of Halal Chicken," February, 2010; World Perspectives, *Developing a Competitive U.S. Halal Food Industry Export Sector*, August 2005; industry representative, e-mail to USITC staff, November 15, 2011.

[189] Abdullah Alathel (commercial attaché and head of Saudi Arabian Committee for Meat Export Council), letter to Mostafa Eldakdoky (USDA, FAS), April 29, 1999.

[190] Government official, interview by USITC staff, Washington, DC, November 3, 2011.

[191] Industry representative, e-mail to USITC staff, November 28, 2011; industry representative, e-mail to USITC staff, November 29, 2011.

[192] U.S. industry representative, e-mail to USITC staff, November 28, 2011.

[193] Williams, "$40 Million Poultry Deal Announced at Saudi Conference," December 12, 2011. The time frame in which these exports would be made was not specified.

[194] As stated above, U.S. broiler exports rose between 2010 and 2011 (65 percent by value and 30 percent by volume). GTIS, Global Trade Atlas database (accessed February 13–14, 2012).

their feed composition, U.S. market share in Saudi Arabia is likely to remain small, despite having a product industry representatives believe could be popular and price-competitive, especially in the hotel and restaurant industries.

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CHAPTER 9
Beef

Overview

The Brazilian cattle herd is the world's second-largest, after India's. Brazil is also the world's second-largest producer of beef, after the United States, and the largest beef exporter. Brazil's extensive pastureland and relatively low labor costs make it a competitive producer of grass-fed beef. Major export markets for beef in 2011 were Russia, the European Union (EU-27), Iran, Hong Kong, and Egypt (figure 9.1).

Relative to other major beef producers, such as the United States and the EU-27, Brazil exports a greater share of its production, but it also produces less beef for the size of its cattle herd. The limited use of feedlots and low investment by ranchers in fertilizers, seeds, and lime to improve their pasture reduces productivity. However, the size of Brazil's cattle herd, together with ongoing efforts to improve genetics, pastureland, and management practices (described in greater detail below), suggest that Brazil has the potential to significantly increase its beef production.

The presence of diseases, most notably foot-and-mouth disease (FMD), restricts Brazil's opportunities for fresh and frozen beef exports, and limits competition between U.S. and Brazilian beef in third-country markets. Fresh/chilled, and frozen beef from Brazil are not eligible for import into Japan, Korea, or North America. Other markets such as the EU-27 have imposed strict sanitary and traceability requirements on imports of beef from Brazil that have limited, and sometimes halted, imports from Brazil.[1]

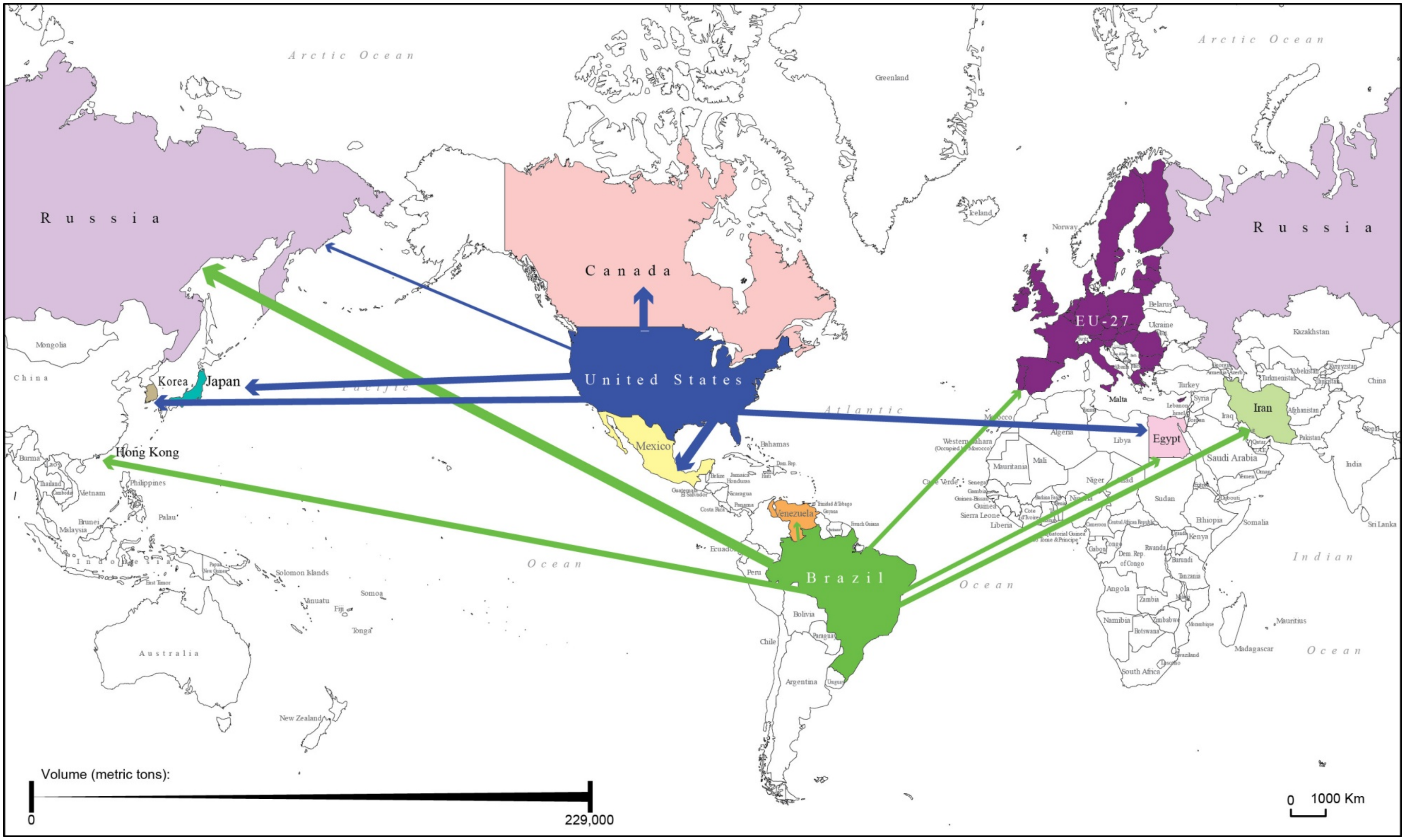
Most beef produced in Brazil is not closely substitutable with beef produced in the United States, lessening the competition between U.S. and Brazilian beef in some export markets. Most beef produced in the United States is well-marbled, grain-fed beef from steers and heifers. By contrast, most beef from Brazil is from grass-fed animals and is more closely substitutable for U.S. beef produced from culled dairy cows and breeding animals, which is likely to be less well marbled.[2]

Differences in the type of beef produced and in the ability to meet sanitary requirements limit competition between U.S. and Brazilian beef in third-country markets in the short run. However, in the long run, Brazil has the potential to improve its competitive position. While few cattle in Brazil are grain-fed now, Brazil is a major producer of grains, with the potential to expand. Brazil is also making efforts to improve its disease status. The state of Santa Catarina has been recognized by the World Animal Health Organization (OIE) as FMD-free without vaccination, and five zones within Brazil have

[1] USDA, FAS, *EU-27: Livestock and Products*, February 1, 2008, 2–3; *Meat and Livestock Australia*, "EU Rejects Brazil's 'Hilton' Modification Request," June 20, 2011.

[2] In 2010, cows and bulls accounted for approximately 21 percent of the cattle slaughtered in the United States. USDA, NASS, *Livestock Slaughter: 2010 Summary*, April 2011, 17.

FIGURE 9.1 Brazil and the United States largely exported beef to different countries in 2011



Source: Compiled by USITC staff using data from GTIS, Global Trade Atlas database (accessed February 13, 2012).

been recognized as FMD-free with vaccination. Brazil's Ministry of Agriculture, Livestock, and Supply (MAPA) plans to petition the OIE to recognize the entire country as FMD-free with vaccination in 2013.[3] Any lifting of sanitary restrictions on Brazil's beef exports would increase global competition between U.S. and Brazilian beef.

Brazilian Production, Consumption, and Trade

Brazil's large domestic market competes with its export markets and gives Brazil's beef producers some protection from shifts in export demand or market access restrictions (discussed in greater detail below). The share of Brazilian beef production consumed domestically rose from 77 percent to 85 percent during 2006–11, with total domestic consumption increasing 11 percent in volume. In 2011, Brazil's beef exports were equivalent to approximately 15 percent of production (table 9.1).[4] Brazil's cattle herd expanded throughout 2006–11, as the calf crop exceeded the number of cattle slaughtered every year. The number of cattle in Brazil increased 11 percent between 2006 and 2011, while beef production was almost unchanged setting the stage for future increases in beef production.

TABLE 9.1 Beef: Production, consumption, and trade, selected producers and markets, 2011 (1,000 mt)

	Production	Consumption	Imports	Exports	Trade balance
Producers					
United States	12,048	11,750	911	1,241	330
Brazil	9,030	7,750	45	1,325	1,280
EU-27	8,050	7,945	370	475	105
China	5,550	5,532	42	60	18
India	3,060	1,960	0	1,100	1,100
All other	14,728	14,073	2,804	3,444	640
Total	56,848	55,834	6,862	7,870	([a])
Selected Major Importers					
Russia	1,405	2,451	1,050	4	–1,046
Japan	505	1,208	725	0	–725
Korea	262	670	410	1	–409
Iran	380	605	225	0	–225
Mexico	1,830	1,890	280	220	–60
Subtotal	4,382	6,824	2,690	225	–2,465

Source: USDA, FAS, PSD Online (accessed February 6, 2012).

Note: Totals may not add due to rounding.

Production in Brazil

Over the six years during 2006–11, the global cattle population declined slightly, while Brazil's share of the global cattle herd increased. Of the top six cattle producers, only Brazil and India experienced increases in the cattle herd between 2006 and 2011. The United States, China, the EU-27, and Argentina all experienced declines.

[3] *Brazilian Meat Monitor*, "Mendes Wants Brazil Free from Foot-and-Mouth," October 14, 2011, 9.

[4] On a carcass-weight basis, according to data from the USDA, FAS, PSD Online. The Instituto Brasileiro de Geografia e Estatística (IBGE) estimates that in 2009, 14 percent of beef produced in 2009 was exported. IBGE, *Municipal Livestock Production, 2009*, (2010) 14.

Brazil produces primarily grass-fed beef, although some cattle are fed in feedlots, particularly during the winter months.[5] Brazil's cattle are grazed on approximately 101 million hectares (ha) (250 million acres) of cultivated pasture land and another 55 million ha (136 million acres) of unimproved pasture.[6] Beef production in Brazil is primarily from the Nelore breed of Bos indicus, or zebu cattle.[7] They are generally more heat- and insect-tolerant than Bos taurus cattle derived from European breeds, but generally mature later and produce less meat per animal, with less intra-muscular fat. Cattle that are grain-fed in Brazilian feedlots are more often cross-breeds with Bos taurus cattle.[8] In addition to beef, Brazil's cattle herd also produces a large volume of hides. See box 9.1 for a discussion of hides and leather production and exports.

Brazil's beef production is much less intensive than in the United States. Differences in productivity are likely due to both genetics and nutrition. With a cattle herd of 190.9 million, Brazil produced 9.0 million metric tons (mt) of beef in 2011. The United States, with a cattle herd of 92.6 million cattle, produced 12 million mt of beef.[9] Beef production in Brazil is lower both because a smaller share of cattle reach slaughter weight each year and because the yield of beef per animal is lower (table 9.2). Brazil's beef packers are reportedly running at low capacity and would be able to increase beef production if more fed cattle were available.[10]

Trade

Brazil's beef exports declined in volume during 2006–11, although the value has increased because of rising prices.[11] In 2011, Brazil's top export markets for beef were Russia, the EU-27, Iran, Hong Kong, and Egypt. In 2006–07, Brazil's largest export market was the EU-27, but the volume of exports to the EU-27 fell, due to sanitary restrictions, by more than 50 percent between 2007 and 2008, leaving Russia as Brazil's largest beef export market in terms of both volume and value.[12] In 2010, exports to Iran also exceeded exports to the EU-27. In fact, exports to Iran nearly doubled in volume during 2009–10 and more than doubled in value.[13]

[5] In 2010, 1.99 million cattle were finished in feedlots in Brazil; *Brazilian Meat Monitor*, "Feedlots Are an Option," June 3, 2011, 9. This was equivalent to approximately 6 percent of the total number of cattle slaughtered.

[6] Veloso and Teixeira, "Economic Aspects of the Agricultural Production in Brazil," Embrapa, 2010, 11.

[7] In contrast, most cattle in the United States and in Europe are *Bos taurus* cattle. One breed of *Bos indicus* cattle that is common in the United States is the Brahman. *Bos indicus* cattle are characterized by a hump on the shoulder and neck.

[8] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 26, 2011.

[9] USDA, FAS, PSD Online.

[10] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 31, 2011.

[11] See chapter 5 for a discussion on the role of Brazilian agribusiness in global agricultural exports.

[12] The decline in exports to the EU-27 was due to sanitary restrictions. Developments in individual markets are discussed below.

[13] There is no competition between U.S. and Brazilian beef producers for the Iranian beef market because U.S. firms and citizens are prohibited from exporting any goods or services to Iran. U.S. Department of the Treasury, Office of Foreign Assets Control, "What You Need to Know About U.S. Economic Sanctions," 18. Even if U.S. producers were granted access in the future, it is unlikely that U.S. exporters would gain significant market share in the short run because Iran requires imports to be certified as halal under Islamic law, and the United States is not a significant producer of halal certified beef.

BOX 9.1 Hides and Leather Production and Exports

Hide value can represent a significant percentage of the value of cattle slaughtered in both Brazil and the United States. In 2011, Brazil's leather exports were valued at $2.0 billion—more than one-third the value of its beef exports. U.S. exports of bovine hides and skins in 2011 were valued at over $3.0 billion, more than half the value of its beef exports. In the United States, the average price for a branded steer hide from major beef packers in 2010 was $70.91—almost 6 percent of the value of the average steer.[a] Raw hides and skins can be either exported or tanned to produce leather, which may be further processed before being used to produce products such as shoe uppers, apparel, and luggage.

There are important differences between Brazil and the United States in this domain. Many of Brazil's cattle hides are unfit for leather production. In 2010, approximately 40 percent of cattle hides in Brazil were not used to make leather because of damage from external parasites or barbed wire fencing.[b] In contrast, almost all cattle hides in the United States are either used to produce leather in this country or are exported for the production of leather products.[c]

In addition, Brazil tends to export different types of hides than the United States does. Brazil exports relatively few raw hides and skins (HS 4101), instead exporting mostly tanned or crust hides (HS 4104), and further prepared hides (HS 4107).[d] In comparison, U.S. exports are primarily of raw hides and skins, as shown in the tabulation below. This difference in export patterns may be due to the long-term trend in leather manufacturing industries of moving to developing countries because of lower labor costs as well as weaker environmental regulations.[e]

Hides and leather exports from Brazil and the United States, 2011 (million $)

Country	Raw	Tanned	Further prepared	Total
Brazil	1.0	867.1	1,151.1	2,019.1
United States	2,153.0	787.1	118.4	3,058.5

Source: Global Trade Atlas database, exports under Harmonized System (HS) 4101, HS 4104, and HS 4107.

China is the largest export market for raw hides and skins from both Brazil and the United States, and China and Italy are major export markets for tanned leather from both countries. Brazil's major export markets for further prepared leather are the United States and Italy, while major U.S. export markets for further prepared leather include Japan, Mexico, and Hong Kong.

[a] USDA, Livestock and Grain Market News Service, *2010 Annual Meat Trade Review*, 16, 74. Prices were substantially lower in 2009, when the average branded steer hide price was $44.10. Full-year 2011 data are not yet available.

[b] Brazilian Meat Monitor, "Leather Export Revenue," October 14, 2011, 1–2.

[c] In 2010, approximately 45.4 percent of U.S. cattle hides were exported as raw hides and 54.6 percent were tanned. Leather Industries of America, *U.S. Leather Industry Statistics 2011 Edition*, 3. USDA reports a larger share exported as hides. See USDA, FAS, "Export Sales, Weekly Historical Data."

[d] HS headings 4101, 4104, and 4107 include equine as well as bovine hides and skins, but the share of equine hides and skins is believed to be small.

[e] Food and Agriculture Organization, "Medium-term Prospects for Agricultural Commodities" (accessed November 23, 2011), 3.

TABLE 9.2 Brazil: Beef production, supply, and distribution, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
							Percent
January cattle inventory (1,000 head)	172,111	173,830	175,437	179,540	185,159	190,925	2
Cattle production (1,000 head)	48,188	48,845	49,050	49,150	49,200	49,445	1
Cattle slaughter (1,000 head)	31,515	33,110	32,700	33,510	34,290	39,390	5
Beef production (1,000 mt)	9,025	9,303	9,024	8,935	9,115	9,030	0
Beef imports (1,000 mt)	28	30	29	35	35	45	10
Beef exports (1,000 mt)	2,084	2,189	1,801	1,596	1,558	1,325	–9
Domestic consumption (1,000 mt)	6,969	7,144	7,252	7,374	7,592	7,750	2
Per capita consumption (kg)	36.4	36.8	36.9	37.1	37.8	38.1	1

Source: USDA, FAS, PSD Online (accessed February 6, 2012).

Note: Beef data are in carcass weight and are not directly comparable to data in product weight.

The majority of Brazil's beef production is consumed domestically. Domestic consumption increased by 11 percent over 2006–11, while the volume of exports has declined.[14] In 2011, Brazil's per capita beef consumption (38.1 kg), was slightly higher than that of the United States (37.5 kg).[15] Over the past six years, Brazil's per capita beef consumption has risen nearly 1 percent per year. Rising incomes in Brazil, as well as population increases, have contributed to increasing domestic consumption.[16] Brazil's total domestic beef consumption during 2006–11 increased by 11 percent. As the *real* has appreciated against many foreign currencies, domestic consumption has become increasingly price-competitive with exports.[17]

Primary Factors Affecting Competitiveness

Cost of Production

Brazil's beef producers have the benefit of extensive pastureland, relatively low-cost labor, and a large domestic market that have helped hold down production costs.[18] For much of the 2006–10 period, Brazil's cost of production was reportedly significantly below that of the United States.[19] However, as the *real* has appreciated relative to the dollar, Brazil's cost advantage has largely disappeared. In any case, as noted earlier, Brazil's grass-fed beef largely competes in a different market segment than most U.S. grain-fed beef.

In 2011, the U.S. cattle herd was particularly hard hit by a widespread drought, declining by about one million animals (slightly over 1 percent). Because of the drought, more beef

[14] In contrast, U.S. domestic beef consumption declined 6 percent 2006–10, and per capita consumption fell almost 10 percent. USDA, FAS, *Livestock and Poultry: World Markets and Trade*, October 2010, 18, 30; USDA, FAS, *Livestock and Poultry: World Markets and Trade*, April 2011, 7–8, 19.

[15] USDA, FAS, PSD Online database.

[16] Association of Brazilian Beef Exporters (ABIEC), written submission to the USITC, December 2011, 4.

[17] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 28, 2011.

[18] Dyke and Nelson, Structure of the Global Markets for Meat, September 2003, 4.

[19] Beef Magazine, *Ten Years Later*, April 1, 2008, 1; Ferraz and Felício, "Production Systems: An Example from Brazil," June 2009, 2.

In 2011, the U.S. cattle herd was particularly hard hit by a widespread drought, declining by about one million animals (slightly over 1 percent). Because of the drought, more beef cows were sent to slaughter, and cattle were sent to slaughter at an earlier age.[20] This lowered the price of U.S. beef in the short run, particularly that of the lean beef that competes more closely with the majority of U.S. imports. This greater availability of domestic lean beef in the U.S. market lowered U.S. imports and placed downward pressure on global prices. However, in the long run, the decline in the U.S. cattle herd is expected to make U.S. beef more expensive, particularly as cattle ranchers withhold heifers from slaughter in order to expand the herd. Once herd rebuilding begins in the United States, the lower availability of domestic lean beef, primarily used in processed products such as hamburger meat, is expected to bolster U.S. imports and raise prices for lean beef on the global market.

The cost of beef production in Brazil in 2010 was very close to the average price paid for steers and heifers by U.S. slaughterhouses. The cost of producing beef in Brazil, for a typical producer in Mato Grosso in 2010, was R$5.737 per kg, which is equivalent to $147.86 per hundredweight.[21] The average price for steers and heifers slaughtered in the United States in 2010 was respectively $150.67 and $150.61 per hundredweight, dressed, or only 2 percent higher than the cost of beef production in Mato Grosso.[22]

Beef prices in both Brazil and the United States fell in 2009 and increased in 2010. In 2010, the difference between average dressed steer prices in the United States and Brazil narrowed. Average annual carcass prices per hundredweight (cwt) for Mato Grosso, Brazil, are compared to annual average U.S. dressed steer prices in the following tabulation.

Year	Brazil/cwt ($)	U.S./cwt ($)	Difference
2008	129.14	147.37	14%
2009	110.68	131.99	19%
2010	141.23	150.61	7%

Source: IMEA, *Boletim Semanal*, various dates, USDA Livestock and Grain, Annual Meat Trade Review, 2009 and 2010.

Because most cattle in Brazil are grass fed, increases in the prices of corn and soybeans have less direct impact on the costs of production for beef than for pork and poultry, and feed prices have less impact on the cost of beef production in Brazil than in the United

[20] Most beef produced in the United States is from steers and heifers. The slaughter of breeding stock (cows) can increase the supply of beef in the short run at the expense of future productivity.

[21] IMEA, *Boletim Semanal*, "Cost of Beef Cattle in Production Systems: Full Cycle," August 26, 2011, 6. Beef in Brazil is typically priced per arroba (@), a unit that is 15 kg carcass weight; with a 50 percent conversion rate, the arroba is equal to 30 kg live weight. Cost data from IMEA do not include opportunity costs for the owner's labor but do include the cost of land. The annual average exchange rate during this period was R$1.76 per dollar. In the United States, cattle and beef are often priced per hundredweight.

[22] The cost comparison is based on the price of beef rather than the live weight price of cattle because, as noted earlier, the average dressing percentage (ratio of dressed carcass weight to live weight) is lower in Brazil than in the United States. Cattle prices in both countries may differ from the data presented because cattle also produce valuable hides, edible offal, and inedible products in addition to cuts of beef.

States.[23] In 2010, purchased feed accounted for 40.4 percent of the total cost of beef production in Kansas, and pasture costs accounted for 13.9 percent.[24] In Mato Grosso, in comparison, the costs of pasture renewal and recovery accounted for 18.0 percent of the reported cost of beef production, and other feed (mineral supplements and concentrates) accounted for 10.9 percent.[25] However, beef production in Brazil competes for acreage with crops like corn and soybeans. Increasing prices for these crops may increase rental rates or opportunity costs for grazing land, or alternatively, may push cattle grazing onto less productive land.

During 2006–10, Brazilian beef cost less than U.S. beef on a per-pound basis. However, with the appreciation of the *real*, particularly in 2010, the difference in cost has narrowed. In beef markets where Brazil more directly competes with the United States, such as Russia, Egypt, and Hong Kong, the increase in Brazil's cost of production has made U.S. beef increasingly price-competitive.

Efficiency

The typical time it takes to raise an animal to slaughter weight is longer in Brazil than in the United States. Cattle raised in Brazil typically reach slaughter weight at 25–36 months, compared to 18–22 months for the grain-fed cattle typically produced in the United States.[26] The time to slaughter in Brazil has been declining in recent years, and it is possible that Brazil's ranchers could reduce this time somewhat further and become more productive by improving their pasture through greater investments in seeds, fertilizer, and lime.[27]

The number of calves produced annually per cow in Brazil is lower than in the United States and other major beef producing regions, such as Australia and the EU-27. In 2011, the calf crop in Brazil was equivalent to 55 percent of the number of cows (beef and dairy) in the cattle herd, compared to 89 percent in the United States. The reproductive rate is a function of both management practice and nutrition. Many cattle producers in Brazil do not use artificial insemination, and those that do usually limit the practice to a single heat cycle because of the expense.[28] Improvements in pasture conditions would also be expected to improve the reproductive rate through better nutrition.

Beef heifers in Brazil also typically reach breeding maturity at a later age than do the breeds common in the United States. Gestation length is also slightly longer, further

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[23] According to Brazil's National Animal Feed Association (Sindirações), Brazil's consumption of cattle feed in 2010 was approximately 7 million metric tons, far less than the 30 million mt consumed as feed in poultry production or the 15 million mt consumed in swine production, even though Brazil produced nearly three times as much beef as pork in 2010. *Brazilian Meat Monitor*, Feed Industry Forecasts Growth of 4.2%, March 25, 2011, 13.

[24] USITC staff calculations from Kansas Farm Management Association, "Profit Center Analysis: Beef Cows, Sell Calves," 2010; Kansas Farm Management Association, "Profit Center Analysis: Beef Backgrounding/Finishing."

[25] IMEA, *Boletim Semanal*, "Cost of Beef Cattle in Production Systems: Full Cycle," August 26, 2011, 6.

[26] Industry representatives, interviews by USITC staff, Mato Grosso, Brazil, August 25–September 1, 2011; Bragantini, "Agribusiness Innovation in Brazil," 2008, 24.

[27] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 31, 2011.

[28] Industry representative, interview by USITC staff, Mato Grosso, Brazil, September 1, 2011.

reducing the reproductive efficiency.[29] These are genetic traits that would be difficult to improve in the near term.

Beef production per carcass is lower in Brazil than in the United States both because of lower live weights and a lower yield rate, or "dressing percentage."[30] The average dressing percentage in Brazil is approximately 50–53 percent,[31] while the average carcass weight in 2011 was 229 kilograms (kg) (505 lb).[32] At a dressing percentage of 50 percent, the average live weight was 459 kg (1,011 lb).[33] The average dressing percentage for fed steers and heifers slaughtered in the United States in 2010 was 65–66 percent.[34] The dressing percentage for all federally inspected cattle slaughtered in the United States in 2010 was 60 percent.[35] The main reason for Brazil's lower dressing percentage is genetic.

The number of cattle in Brazil that are fed in feedlots has generally increased over time, although fewer cattle were fed in Brazil in 2010 than in 2009 or 2008.[36] In 2010, 1.99 million cattle were finished in Brazilian feedlots, a decline from almost 2.75 million in 2008.[37] High costs for feed ingredients and high prices for feeder cattle have been blamed for the slow growth in feedlot production.[38] Corn is the primary source of grain used in Brazilian feedlots, followed by sorghum.[39] However, much of the ration is made up of crop residues such as sugar cane bagasse or citrus pulp.[40]

Much of the pasture land in Brazil is relatively poor in nutrients, and some cattle producers in Brazil do not add fertilizers to forage. As a result, there are many underutilized pasture areas.[41] However, there are incentives to encourage the recovery of degraded pasture land. A new credit line for such efforts has recently been approved under the Brazilian government's Low Carbon Agriculture (ABC) Program. Credit will be available for up to 12 years, with a three-year grace period and special low interest rates. The Instituto Mato-grossense de Economia Agropecurária [Mato Grosso Institute

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[29] Randel, "Reproduction of *Bos indicus* Breeds and Crosses," 2005, 28–29.

[30] Filho, "Cross-breeding Strategies for Beef Cattle Production in Brazil," January 2000, 357. Dressing percentage is the ratio of the live weight of the animal to the "dressed" carcass weight.

[31] Filho, "Cross-breeding Strategies for Beef Cattle Production in Brazil," January 2000, 357; *BeefMagazine.com*, "So What about Brazil?" March 1, 2005. The dressing percentage is the ratio of the live weight of the animal to the dressed or carcass weight.

[32] Given the number of cattle slaughtered in Brazil in 2011 and the amount of beef produced. USDA, FAS, PSD Online database (accessed February 6, 2012).

[33] This is a substantial increase from 2006, when the average carcass weight was 219 kg and the average estimated live weight was 438 kg.

[34] USDA, AMS, "5 Area Yearly Weighted Average Direct Slaughter Cattle – Negotiated," January 4, 2012.

[35] USDA, NASS, *Livestock Slaughter: 2010 Summary*, April 2011, 9, 15. Calculated as the ratio of average dressed weight to average live weight of cattle.

[36] *Brazilian Meat Monitor*, "Feedlots to Resume growth in Brazil this year," August 26, 2011, 8. Cattle may also be fed for a short period of time in the winter months when forage is scarce. The number of cattle that receive supplemental feed in the winter exceeds the number that are finished in feedlots.

[37] *Brazilian Meat Monitor*, "Feedlots are an Option for Live Cattle Production in Brazil," June 3, 2011, 9.

[38] *Brazilian Meat Monitor*, "High Production Costs Could Undermine Feedlots," June 3, 2011, 1–2.

[39] Millen, et al., "A Snapshot of Management Practices and Nutritional Recommendations Used by Feedlot Nutritionists in Brazil," *Journal of Animal Science*, 2009 (87), 3427–3439.

[40] Industry representative, e-mail to USITC staff, August 17, 2011; *Brazilian Meat Monitor*, June 3, 2011, 1.

[41] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 26, 2011. Mato Grosso has the largest cattle herd in Brazil.

for Agricultural Economics (IMEA)] estimates that about 9 million ha (22 million acres) could be recovered under the new policy, equivalent to 34 percent of the total pastureland area in the state.[42] Restoration of degraded pasture would allow ranchers to produce more beef in the region without putting additional acreage into beef production.

Product Characteristics

Competition between beef produced in Brazil and the United States is limited because of the differences between Brazilian grass-fed beef and U.S. grain-fed beef. Grass-fed beef typically has a lower percentage of intra-muscular fat (marbling) than grain-fed beef. Marbling is also a function of the breed of cattle, and the breeds of cattle predominately raised in Brazil have less marbling than most breeds raised in the United States.[43] Marbling in beef contributes to its tenderness and flavor. For instance, a higher degree of marbling is required for USDA prime beef than for choice grade, and a higher percentage for choice than for select grade. Beef with more marbling is preferred for many dishes prepared using dry heat, such as steaks, and for dishes in which thinly sliced beef is cooked quickly, such as Korean-style barbeque and the popular Japanese beef dish gyudon. Less well-marbled beef is used in dishes in which beef is cooked slowly using moist heat. In addition, much lean beef is used in processed beef products, such as ground beef. The United States is the largest import market for lean beef for processing. Japan and Korea are among the largest import markets for well-marbled beef.

Disease

Competition between U.S. and Brazilian beef exports is further limited by sanitary restrictions on Brazil's exports, most notably due to the presence of FMD in some parts of Brazil. Markets such as the United States, Japan, and Korea are closed to fresh/chilled and frozen beef from Brazil because of Brazil's FMD status. Other markets, such as the EU-27, allow imports of fresh/chilled and frozen beef from approved producers in Brazil that meet strict guidelines including traceability.[44] FMD was last reported in Brazil in April 2006.[45]

The OIE does consider some zones within Brazil to be FMD-free: it recognizes the state of Santa Catarina as being FMD-free without vaccination, and it recognizes five zones within Brazil, encompassing 10 states and the Federal District, plus parts of 5 additional states, as being FMD-free with vaccination.[46] Some countries allow imports of beef from zones that are FMD-free with vaccination. The United States recognizes the state of Santa

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[42] *Brazilian Meat Monitor*, "New Credit Line for Pastureland," September 30, 2011, 11; industry representative, interview by USITC staff, Mato Grosso, Brazil, August 31, 2011.

[43] Industry representative, interview by USITC staff, Washington, DC, August 1, 2011. Beef from *Bos indicus* cattle has generally been reported to be less tender than beef from *Bos taurus* cattle. Crouse et al, "Comparisons of *Bos Indicus* and *Bos Taurus* Inheritance," *Journal of Animal Science*, 1989, 2666–67.

[44] USDA, FAS, *EU-27: Livestock and Products Semi-Annual*, February 26, 2010, 8.

[45] More precisely, FMD was last reported in a domesticated animal in Brazil in April 2006, but the prevalence of FMD in the wild population is unknown. World Animal Health Organization (OIE), World Animal Health Information Database, accessed December 8, 2011.

[46] The states of Acre, Espírito Santo, Goiás, Mato Grosso, Minas Gerais, Paraná, Rio de Janeiro, Rondônia, São Paulo, and Sergipe, plus the Distrito Federal and parts of the states of Amazonas, Bahia, Mato Grosso do Sul, Pará, and Tocatins, are recognized by the OIE as FMD-free with vaccination. World Animal Health Organization, List of FMD-Free members, May 2011. http://www.oie.int/en/animal-health-in-the-world/official-disease-status/fmd/list-of-fmd-free-members/ (accessed September 12, 2011).

Catarina as free of FMD, but considers the preventive measures on animal or meat imports into the region from infected regions to be "less restrictive than would be acceptable for importation into the United States." Therefore the United States does not allow imports of fresh/chilled and frozen beef from Brazil. U.S. sanitary regulations, like those of many other countries, do allow imports of cooked or processed beef from Brazil.[47]

Sanitary measures are a major factor restricting direct competition between the United States and Brazil in third-country markets. Brazil's lack of market access to many major import markets, including North America, Japan, and Korea, forces it to depend on a limited number of markets, including Russia, the second-largest import market for beef after the United States. As long as the barriers in major importing countries such as Japan, Korea, and the United States remain in place, direct competition between U.S. and Brazilian beef is expected to remain limited to only a few markets, such as Russia and Hong Kong.

Transportation Infrastructure

Long overland transportation routes and infrastructure deficiencies significantly increase Brazil's total cost to supply beef to export markets. Most major river export routes are in the Northeast or the far southern part of the country, while most cattle production is in the center of the country. As a result, transportation costs to ports are high.[48] According to industry sources, beef prices in Mato Grosso are 8–10 percent below export prices because of transportation costs.[49] The cost of refrigerated transportation from packer to port in São Paulo is reportedly R$70 (roughly $40) per mt. According to industry sources, this is one-third more than refrigerated transport costs would be in the United States for the same distance.[50]

Competitive Position with the United States

Competition between U.S. and Brazilian fresh, chilled, and frozen beef in export markets is limited by Brazil's disease status and product characteristics. The recognition of disease-free status within a subnational zone, discussed above, has the potential to increase the ability of Brazil to compete with U.S. producers in export markets.[51] However, competition with U.S. beef is also limited by the characteristics of Brazil's grass-fed beef and the small size of Brazil's feedlot sector. Brazil is a low-cost supplier of grass-fed beef and a major exporter of prepared and preserved beef. The United States supplies primarily well-marbled grain-fed beef. Even if Brazil were to become eligible to export beef to North America, Japan and Korea, beef from Brazil is more likely to compete with other sources of grass-fed beef than with the majority of U.S. beef.[52]

[47] U.S. Code of Federal Regulations, Title 9, § 94.11.

[48] See chapter 3 for more information on Brazil's transportation infrastructure.

[49] Industry representative, interview by USITC staff, Mato Grosso Brazil, August 28, 2011.

[50] Industry representative, interview by USITC staff, São Paulo Brazil, August 22, 2011.

[51] Stewart and Stewart, on behalf of the National Farmers Union and the United States Cattlemen's Association, written submission to the USITC, October 13, 2011, 3.

[52] Brazil does not allow imports of U.S. beef because of concerns related to bovine spongiform encephalopathy (BSE).

Key Export Markets

Brazil's beef exports are limited by its disease status, particularly for FMD. Producers in Brazil are not eligible to export fresh/chilled and frozen beef to Canada, Japan, Korea, Mexico, or the United States—5 of the top 10 beef-importing countries.[53] Brazil's beef exports to the EU-27, formerly its largest export market, have also been restricted by traceability problems related to its disease status.[54] Brazil's top beef export markets in 2011 were Russia, the EU-27, Iran, Hong Kong, and Egypt (table 9.3). The removal of nontariff measures (NTMs) that restrict beef trade, including sanitary measures related to FMD and restrictions related to hormones and bovine spongiform encephalopathy (BSE, also known as mad cow disease), would change export patterns for both Brazilian and U.S. beef. See chapter 11 for an analysis of these impacts.

TABLE 9.3 Brazil: Beef exports to selected markets, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
Russia	756	975	1,431	912	1,024	1,015	6
EU-27	1,387	1,330	675	595	641	783	–11
Iran	107	145	323	335	808	689	45
Hong Kong	111	183	368	479	383	535	37
Egypt	376	347	231	214	431	439	3
All other	1,152	1,373	2,053	1,355	1,278	1,616	7
Total	3,890	4,354	5,081	3,890	4,564	5,077	5

Source: GTIS, Global Trade Atlas database (accessed February 6, 2012).

Note: Totals may not add due to rounding.

Russia

Export Volume

Russia has consistently been a major export market for Brazilian beef and was the single largest export market for Brazil's beef in 2011. In 2011, exports to Russia accounted for 22 percent of these exports by volume and 20 percent by value. Russia has been Brazil's leading export market by value since 2008 (2007 on a volume basis).

Russia is the world's largest importer of beef.[55] However, production, imports, and consumption of beef in Russia have fallen from the levels reached in 2008 (table 9.4), and for 2006–11 Russia's production and consumption of beef were significantly below the levels reached a decade earlier. Low productivity and reproductive inefficiency have caused Russia's cattle sector to be unprofitable over the long term.[56]

[53] USDA, FAS, *Livestock and Poultry: World Markets and Trade*, April 2011, 8.
[54] These restrictions are described below.
[55] USDA, FAS, PSD Online database (accessed February 6, 2012).
[56] USDA, FAS, *Russian Federation: Livestock Semi-annual Report*, March 9, 2009, 4.

TABLE 9.4 Russia: Beef production, supply, and distribution, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
							Percent
Production (1,000 mt carcass weight equivalent, CWE)	1,450	1,430	1,490	1,460	1,435	1,405	–1
Imports (1,000 mt CWE)	1,018	1,087	1,200	1,005	1,020	1,050	1
Exports (1,000 mt CWE)	8	8	11	8	5	4	–13
Total supply (1,000 mt CWE)	2,468	2,517	2,690	2,465	2,455	2,455	0
Domestic consumption (1,000 mt CWE)	2,460	2,509	2,679	2,457	2,450	2,451	0
Per capita consumption (kg)	17.3	17.7	19.0	17.5	17.6	17.7	0

Source: USDA, FAS, PSD Online (accessed February 6, 2012).

Brazil is by far the largest supplier of imported beef to Russia. In 2011, imports from Brazil accounted for 35 percent of the value of Russia's beef imports.[57] Other major suppliers to Russia include the EU-27, Uruguay, Paraguay, Australia, and Argentina. The United States is the seventh-largest supplier of imported beef to Russia (if the EU-27 is considered as a single market), accounting for 6 percent in 2010 (table 9.5). During 2006–07, the Russian market was closed to U.S. beef imports due to concerns related to BSE.

TABLE 9.5 Russia: Beef imports, by supplier, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
Brazil	601	1,100	1,345	1,174	973	923	9
EU-27	229	136	211	98	303	386	11
Uruguay	184	59	272	239	274	301	10
Australia	55	34	264	87	183	277	38
United States	([a])	([a])	104	47	143	217	1,509
All other	249	244	307	189	403	532	–3
Total	1,688	1,900	2,827	2,444	2,370	2,636	9

Source: GTIS, global Trade Atlas database (accessed March 30, 2012).

Note: Totals may not add due to rounding.

[a]Less than $500,00.

Export Composition

Russia's beef imports from Brazil consist predominately of frozen boneless beef. Before 2008, edible offal was the second-largest category of beef exports to Russia, and frozen beef liver accounted for the majority of this volume. After 2007, Brazil's exports of frozen beef liver to Russia fell to zero and exports of all edible offal declined substantially (table 9.6).[58]

[57] Global Trade Atlas, GTIS database (accessed March 30, 2012).

[58] Brazil's overall exports of edible offal increased substantially from 2006 to 2007 and increased slightly after 2007, as edible offal exports to Hong Kong, Iran, Egypt, and other countries more than offset the decline in exports to Russia.

TABLE 9.6 Brazil: Beef exports to Russia, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
Fresh/chilled	([a])	([a])	([a])	([a])	([a])	3	45
Frozen	743	968	1,430	911	1,023	1,011	6
Edible offal	13	7	([a])	([a])	([a])	([a])	–53
Prepared or preserved	([a])	([a])	1	1	([a])	1	116
Total	756	975	1,431	912	1,024	1,015	6
	Metric tons						
Fresh/chilled	125	58	60	13	69	489	31
Frozen	318,198	447,938	382,610	327,207	284,840	228,333	–6
Edible offal	7,568	5,263	46	76	43	102	–58
Prepared or preserved	3	118	189	177	97	75	90
Total	325,895	453,379	382,904	327,473	285,050	228,998	–7

Source: GTIS, Global Trade Atlas database (accessed February 6, 2012).

Note: Fresh/chilled includes exports under HS 020110, 020120, and 020130; frozen includes exports under HS 020220 and 020230 (there were no exports under HS 020210); edible offal includes exports under HS 020610, 020621, 020622, and 020629; prepared or preserved includes exports under HS 021020 and 160250.

[a]Less than $500,000.

Import Restrictions

Russia has established a tariff-rate quota (TRQ) system for beef, pork, and poultry imports. Within-quota beef imports are subject to a duty of 15 percent, while over-quota imports are subject to a duty of 50 percent. The quota for imports of fresh and chilled beef is largely allocated to the EU-27; U.S. producers have access only to a small "other country" within-quota volume. The quota for imports of frozen beef, however, has recently changed from one that was largely allocated to the EU-27 to one that is open to other suppliers, including the United States. Before 2010, nearly 80 percent of the frozen beef TRQ was allocated to the EU-27. However, for 2010, the EU-specific allocation was reduced and 85 percent of the frozen beef TRQ was allocated to "other countries." In January 2011, the U.S. allocation was increased by 20,000 mt and the other country allocation was decreased by the same amount (table 9.7). The total TRQ volume was also increased. These changes in Russia's beef TRQ are expected to benefit both Brazil and the United States over the EU-27.[59]

Russia banned imports of beef, pork, and poultry from 89 Brazilian processing plants in the states of Mato Grosso, Paraná, and Rio Grande do Sul, effective June 15, 2011, due to sanitary problems. Brazil's total beef exports in July fell 19 percent by volume, largely as a result of the ban. In August, Russia expanded the ban to an additional 37 plants, but in September agreed to allow imports from 7 of these plants "under special monitoring."

[59] Russia has announced that the total within-quota volume of beef imports for 2012 will remain unchanged from 2011, but has not yet announced country-specific allocations. USDA, FAS, *Russian Federation: Customs Union Announces*, December 28, 2011, 2–4.

TABLE 9.7 Allocations of frozen beef (HS 0202) imports under Russia's TRQ system, 2007–11

	2007	2008	2009	2010	2011
TRQ volume (1,000 mt)	440.0	445.0	450.0	530.0	530.0
EU allocation (1,000 mt)	347.6	351.6	355.5	60.0	60.0
U.S. allocation (1,000 mt)	18.1	18.3	18.5	21.7	41.7
U.S. allocation (percent)	4.1	4.1	4.1	4.1	7.9
Paraguay (1,000 mt)	3.0	3.0	3.0	0.0	0.0
Other countries (1,000 mt)	71.3	72.1	73.0	448.3	428.3
Within-quota duty (percent)	15	15	15	15	15
Over-quota duty (percent)	55	50	50	50	50

Source: Agreement Between the Government of the United States of America and the Government of the Russian Federation on Trade in Certain Types of Poultry, Beef, and Pork, June 15, 2005, Annex 2; USDA, FAS, *Russian Federation: Livestock and Products Semi-Annual*, 10; USDA, FAS, *Russian Federation: Livestock and Products Semi-Annual,* September 21, 2010, 18; *Meat and Livestock Australia*, "Russia Changes Frozen Beef Tariff Rate Quota Allocations," January 10, 2011.

Russia is expected to become a member of the WTO in the near future, possibly by mid-2012.[60] In the past, Russia's sanitary measures have sometimes been viewed as nontransparent or not based on science. According to some industry sources, Russia's WTO accession is expected to give exporting countries a means to ensure that Russia's sanitary measures are consistent with international standards.[61]

Competition with the United States

Like its imports from Brazil, most of Russia's beef imports from the United States are of frozen boneless beef. As mentioned earlier, U.S. exporters have access to a country-specific TRQ allocation for imports of frozen beef muscle cuts. Russia banned imports of beef from the United States following the discovery of BSE in the U.S. cattle herd in December 2003, but allowed these imports to resume in 2008.[62] In addition to frozen boneless beef muscle cuts, Russia also imports some edible beef offal (mostly frozen beef liver) and fresh beef from the United States. In 2010, these products accounted for 29.7 percent and 6.8 percent, respectively, of U.S. beef exports to Russia.

EU-27

Export Volume

The EU-27 was the third largest beef producer in the world, by volume, but was also a major importer throughout 2006–11 (table 9.8). In 2006 and 2007, the EU-27 was Brazil's largest export market for beef, accounting for roughly 25 percent of total exports. In 2008, however, the EU-27 briefly suspended beef imports from all Brazilian producers, because of disagreements over traceability of cattle and the ability of Brazilian

[60] Russia is not yet a member of the World Trade Organization (WTO), but the WTO Ministers have adopted Russia's terms of entry. Russia has 220 days from December 16, 2011 to ratify the terms of entry and would become a full-fledged WTO member 30 days after it notifies the ratification to the WTO. World Trade Organization, "Ministerial Conference Approves Russia's WTO Membership," December 16, 2011.

[61] Meatingplace.com, "Russia's WTO Membership," November 23, 2011.

[62] Russia allows imports of U.S. beef from cattle under 30 months of age produced under an approved AMS Export Verification (EV) program for beef to Russia. http://www.fsis.usda.gov/Regulations_&_Policies/Russia_Requirements/index.asp, (accessed March 13, 2012).

TABLE 9.8 EU-27: Beef production, supply, and distribution, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
							Percent
Production (1,000 mt CWE)	8,150	8,188	8,090	7,913	8,022	8,050	0
Imports (1,000 mt CWE)	717	642	466	497	437	370	–12
Exports (1,000 mt CWE)	218	140	204	148	337	475	17
Total supply (1,000 mt CWE)	8,867	8,830	8,556	8,410	8,459	8,420	–1
Domestic consumption (1,000 mt CWE)	8,649	8,690	8,352	8,262	8,122	7,945	–2
Per capita consumption (kg)	17.1	17.1	16.4	16.2	15.9	15.5	–2

Source: USDA, FAS, PSD Online (accessed February 6, 2012).

authorities to certify that cattle meet EU-27 traceability requirements.[63] Since then, Brazil has gradually expanded the list of eligible producers. As a consequence, Brazilian exports to the EU-27 declined and beef exported from Brazil to the EU-27 is subject to stringent sanitary and traceability requirements that have restricted the volume of trade. Brazil's exports to the EU-27 declined 49 percent in quantity and 44 percent in value between 2006 and 2011. In 2011, exports to the EU-27 accounted for 10 percent of Brazil's beef exports on a volume basis and 15 percent of beef exports by value.

Export Composition

By volume, more than half of Brazil's beef exports to the EU-27 in 2011 were of prepared or preserved beef (HS 1602.50). Almost all the remainder was frozen boneless beef (29 percent) and boneless fresh and chilled beef (19 percent). The average unit value for prepared or preserved beef, at $5.75 per kg, was much lower than for frozen beef, at $8.32 per kg, and for fresh and chilled beef, at $12.31 per kg (table 9.9).

TABLE 9.9 Brazil: Beef exports to the EU-27, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
Fresh/chilled	517	593	99	131	172	232	–15
Frozen	599	436	160	166	173	245	–16
Edible offal	5	4	2	1	1	1	–35
Prepared, or preserved	267	297	414	298	296	306	3
Total	1,387	1,330	675	595	641	783	–11
	Metric tons						
Fresh/chilled	77,855	78,389	9,137	16,804	19,196	18,839	–25
Frozen	227,110	106,820	25,808	27,710	25,002	29,438	–34
Edible offal	2,179	1,830	628	252	242	157	–41
Prepared, or preserved	89,958	99,595	93,847	77,222	70,453	53,131	–10
Total	397,101	286,635	129,422	121,988	114,892	101,565	0

Source: GTIS, Global Trade Atlas database (accessed February 6, 2012).

Import Restrictions

Before 2008, the EU-27 was Brazil's largest export market for beef, and in 2011 was Brazil's second-largest export market for beef. Additionally, the EU-27 is a market for

[63] USDA, FAS, *EU-27: Livestock and Products: EU Suspends Brazil Beef Imports*, February 1, 2008, 1–2.

higher-quality beef, with average unit values higher than those of Brazil's other major beef export markets. The loss of many Brazilian producers' eligibility to ship to the EU-27 market, therefore has been a substantial blow to the industry.

The European Council Decision 79/542/EEC, December 21, 1976, established a list of third countries and regions from which member states were authorized to import cattle, swine, and fresh, chilled, and frozen meat. The Decision has been amended numerous times in response to animal disease outbreaks and other sanitary conditions. As of January 2008, over 6,000 producers in Brazil were authorized to export beef to the EU-27.[64] Then, on January 17, 2008, the European Commission (EC) amended the Decision in order to address what the EC described as Brazil's noncompliance with registration, identification, and movement requirements, and the failure to respect commitments to take corrective measures.[65]

The EC delisted all Brazilian cattle producers as of January 31, 2008. In February 2008, however, 95 farms were relisted, and the list of eligible producers has since expanded. The number of eligible farms was approximately 2,000 in July 2010, and is expected to be increased to about 2,200 by the end of 2011.[66]

Although Brazil remained the largest supplier of imported beef to the EU-27 in 2011, accounting for 31 percent of EU-27 beef imports, the annual value of EU imports from Brazil during 2008–11 was substantially below the value in 2006 and 2007 (table 9.10). In 2011, exports to the EU-27 accounted for 15 percent of Brazil's beef exports, on a value basis, down from 36 percent in 2006.

TABLE 9.10 EU-27: Beef imports, by supplier, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
Brazil	1,361	1,431	739	603	645	764	–11
Argentina	505	653	811	703	618	650	5
Uruguay	192	209	458	380	351	384	15
United States	11	25	53	68	113	186	77
Australia	60	57	89	88	88	133	17
New Zealand	28	34	102	94	81	122	34
All other	114	163	167	194	244	204	12
Total	2,270	2,572	2,418	2,129	2,141	2,443	1

Source: GTIS, Global Trade Atlas database (accessed March 30, 2012).

Note: Totals may not add due to rounding.

[64] USDA, FAS, *EU-27: Livestock and Products: EU Suspends Brazil Beef Imports*, February 1, 2008, 2; USDA, FAS, *EU-27: Livestock and Products Annual 2008*, August 21, 2008, 13.
[65] European Commission (EC) Decision 2008/61/EC, January 17, 2008, 1.
[66] Government official, e-mail to USITC staff, June 16, 2011.

Tariff-Rate Quotas

Brazil and the United States both have access to the EU-27 market through TRQ allocations for high-quality beef.[67] Brazil has access to a 10,000 mt quota for boneless beef and skirt meat at an ad valorem duty rate of 20 percent.[68] In comparison, the over-quota duty on fresh and chilled boneless beef imports is 12.8 percent plus €3.034/kg. The over-quota duty on frozen boneless beef imports is 12.8 percent plus €2.211/kg.[69] However, stringent traceability requirements plus the requirement that cattle be exclusively grass-fed have effectively limited Brazil's exports under this quota.[70] During the July 1, 2009 through June 30, 2010 quota year, Brazil's exports under the quota were 450 mt, a fill rate of only 4.5 percent.[71] As a result, most of Brazil's exports paid the above-quota tariff. In comparison, most U.S. beef exports to the EU-27 were within quota.

U.S. beef exports to the EU-27 have increased 10-fold since 2006. All U.S. beef exports to the EU-27 must meet the requirements of the Non-Hormone Treated Cattle (NHTC) program. In August 2010, the United States and the EU-27 reached a memorandum of understanding in their long-running dispute over beef hormones. As part of the negotiated settlement, the EU-27 increased U.S. beef access to the EU-27 market by establishing a quota for 20,000 mt of high-quality grain-fed beef at zero duty. In the most recent quota year this 20,000 mt quota was essentially filled (96 percent), with U.S. exports under this quota estimated at 15,000 mt. The European Parliament has approved an expansion of this quota to 48,200 mt, effective August 2012.[72] The quota is currently shared with Australia, Canada, New Zealand, and Uruguay.

The United States has additional access to the EU-27 market for high-quality beef and bison meat at an ad valorem duty rate of 20 percent through a 11,500 mt quota that is shared with Canada. In the most recent quota year, only 519 mt were shipped within this quota, a fill rate of 4.5 percent. As this quota is shared with Canada and some imports under this quota are of bison, it is estimated that U.S. beef shipments under this quota in the most recent quota year were only approximately 100 mt.[73]

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[67] Regulations specify the requirements for beef imported under each of the quotas, and note that the indication 'High Quality Beef' may be added to the information on the label. Requirements for Brazil require that cattle be exclusively grass-fed. Quota years run from July 1 to June 30.

[68] Skirt steak is a long, flat muscle cut from the beef flank and plate area that is prized for its flavor.

[69] Fresh/chilled boneless beef imports under HS 0201.31.00.90, skirt meat under HS 0206.10.95.90, and frozen boneless beef under HS 0202.30.50.99. EC, Taxation and Customs Union, Taric Measure Information, May 12, 2011, http://ec.europa.eu/taxation_customs/dds2/taric/taric_consultation.jsp?Lang=en.

[70] *Meat and Livestock Australia,* "EU rejects Brazil's 'Hilton' modification request," June 20, 2011.

[71] EC Directorate-General for Agriculture and Rural Development, "Beef Import Quotas – Certificates of Authority Issued, Cumulated Quantity up to 30/06/2011;" government official, e-mail to USITC staff, September 1, 2011.

[72] European Parliament Press Service Press Release, "Win-win ending to the 'Hormone Beef Trade War,'" March 14, 2012.

[73] Government official, e-mail to USITC staff, September 1, 2011.

Competition with the United States

Over time, EU-27 imports of beef are predicted to increase.[74] Brazil and the United States are both significant suppliers of beef to the EU-27, and competition between Brazilian and U.S. producers in the EU-27 beef market is largely dependent on TRQs. The memorandum of understanding between the U.S. and the EU-27 in connection with the beef hormone dispute provides for the possibility of expanding U.S. exporters' access to the EU-27 for high-quality beef, potentially entering up to 45,000 mt at zero duty.[75] This improved access to the EU-27 market would be expected to improve U.S. exporters' competitive position. If, on the other hand, Brazil regains access to the EU-27 market for many of its producers that lost access in 2008, this would favor imports from Brazil.[76]

Hong Kong and China

Volume of Exports

Brazil's beef exports to Hong Kong increased substantially in 2008 after Brazil lost much of its access to the EU-27 beef import market. In 2011, Hong Kong was Brazil's fourth-largest beef export market by value and its second-largest by volume. In 2011, exports to Hong Kong accounted for 14 percent of Brazil's beef exports on a volume basis and 11 percent of beef exports by value. Like most of Brazil's export markets for beef, Brazil's beef exports to Hong Kong are predominantly of frozen boneless beef. Unlike Brazil's other major export markets, Hong Kong is also a major export market for Brazil's edible beef offal.

China has the world's third-largest cattle herd and calf production, behind India and Brazil, and is the fourth-largest beef producer behind the United States, Brazil, and the EU-27. Officially, China imports little beef, yet the Commission is aware that beef shipments sent to neighboring countries may reach China through "gray market" channels.[77] Nonetheless, even including possible gray market imports, China is largely self-sufficient in beef (table 9.11).

Export Composition

Brazil's beef exports to Hong Kong are predominantly of frozen boneless beef and frozen edible offal (table 9.12). Most U.S. beef exports to Hong Kong are also of frozen boneless beef, but frozen bone-in beef accounts for a significant share as well. Edible offal accounts for a smaller share of U.S. beef exports to Hong Kong, compared to Brazil's exports.

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[74] European Commission, *Prospects for Agricultural Markets and Income in the EU*, December 2010, 32, table A12; FAPRI 2011 Agricultural Outlook.

[75] United States of America and European Commission, *Memorandum of Understanding*, May 13, 2009.

[76] See chapter 11 for a discussion of the impact of the removal of EU-27 NTMs that restrict imports of beef from the United States and Brazil.

[77] USDA, FAS, *China: Livestock and Products Semi-Annual*, March 9, 2009, 3; USDA, FAS, *China: Livestock and Products Annual*, September 2009, 2, 4.

TABLE 9.11 China and Hong Kong: Beef production, supply, and distribution, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
							Percent
China							
Production (1,000 mt carcass weight equivalent, CWE)	5,767	6,134	6,132	5,764	5,600	5,550	-1
Imports (1,000 mt CWE)	10	12	6	23	40	42	3
Exports (1,000 mt CWE)	85	81	58	38	51	60	–7
Total supply (1,000 mt CWE)	5,777	6,146	6,138	5,787	5,640	5,592	–1
Domestic consumption (1,000 mt CWE)	5,692	6,065	6,080	5,749	5,589	5,532	–1
Per capita consumption (kg)	4.3	4.6	4.6	4.3	4.2	4.1	–1
Hong Kong							
Production (1,000 mt CWE)	14	15	15	15	15	15	1
Imports (1,000 mt CWE)	89	90	118	154	154	120	6
Exports (1,000 mt CWE)	([a])	([a])	([a])	([a])	([a])	([a])	([b])
Total supply (1,000 mt CWE)	103	105	133	169	169	135	6
Domestic consumption (1,000 mt CWE)	103	105	133	169	169	135	6
Per capita consumption (kg)	14.8	15.0	19.0	24.0	23.8	19.0	5

Source: USDA, FAS, PSD Online (accessed February 6, 2012).

[a]Not reported.
[b]Not applicable.

TABLE 9.12 Brazil: Beef exports to China and Hong Kong, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
Fresh/chilled	2	2	2	1	([a])	1	–19
Frozen	59	96	223	319	240	337	42
Edible offal	50	82	131	162	148	208	33
Prepared or preserved	([a])	4	13	1	1	([a])	4
Total	111.3	183.7	369.0	481.8	388.7	545.6	37
	Metric tons						
Fresh/chilled	605	485	471	158	66	139	–25
Frozen	27,062	40,313	64,269	101,906	68,075	76,392	23
Edible offal	40,372	48,959	53,236	60,456	55,986	68,777	11
Prepared or preserved	196	1,608	4,041	263	172	127	–8
Total	68,235	91,365	122,018	162,783	124,300	145,435	16

Source: GTIS, Global Trade Atlas database (accessed February 6, 2012).

Note: Fresh/chilled includes exports under HS 020110, 020120, and 020130; frozen includes exports under HS 020210, 020220 and 020230; edible offal includes exports under HS 020610, 020621, 020622, and 020629; prepared or preserved includes exports under HS 021020 and 160250.

[a]Less than $500,000.

Competition with the United States

China imposes the same rates of duty on imports of beef from Brazil and the United States. The rate is 12 percent ad valorem on boneless and bone-in beef, edible beef offal, and prepared or preserved beef. Beef imports enter Hong Kong duty free. The Chinese market has been closed to U.S. beef since the detection of BSE in the U.S. cattle herd in December 2003. In June 2006, the government of China offered to allow imports of boneless U.S. beef from cattle less than 30 months of age. However, approval was subject to a number of stipulations, many unrelated to BSE risk, and an agreement has not been reached. Hong Kong also banned imports of U.S. beef in December 2003, but resumed imports of U.S. boneless beef from cattle less than 30 months of age in December 2005.[78]

China does now allow some imports of beef from Brazil, after having halted all such imports in 2005 because of the presence of FMD in Brazil. In January 2010, China agreed to begin accepting beef imports from some regions of Brazil.[79] However, beef packers have been required to be individually certified by China's National Certification and Accreditation Administration. As of April 2011, five plants had been certified to ship to China.[80]

Exports of beef to Hong Kong from both Brazil and the United States increased during 2006–11, with U.S. exports increasing at a faster rate than Brazil's exports (table 9.13).[81] While the Commission is aware of allegations of re-exports of beef to China from neighboring countries, the Commission is not in a position to evaluate this issue given the lack of conclusive data.

TABLE 9.13 China and Hong Kong reported beef imports, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–10
	Million $						Percent
China							
Australia	13	16	22	27	39	59	363
Uruguay	1	7	4	15	25	34	2,371
New Zealand	5	4.54	1	8	7	11	141
Brazil	([a])	1	([a])	3	32	9	1,961
United States	0	([a])	([a])	0	0	0	([b])
All other	([a])	([a])	([a])	1	([a])	([a])	–90
Total	19	29	28	53	104	112	477
Hong Kong							
Brazil	189	284	465	605	533	588	211
United States	16	37	55	95	139	243	1,421
Argentina	40	50	57	87	86	121	200
Australia	34	50	82	121	90	94	182
Canada	33	30	34	36	77	91	172
All other	72	78	121	173	165	226	214
Total	384	528	814	1,117	1,091	1,363	255

Source: GTIS, Global Trade Atlas database (accessed April 17, 2012).

[a]Less than $500,000.
[b]Not applicable.

Egypt

Export Volume

In 2011, exports to Egypt accounted for 10 percent of Brazil's beef exports on a volume basis and 9 percent of beef exports by value. Egypt's beef production is largely dependent on the state of its dairy herd. Egypt experienced disease outbreaks in 2009 and

[78] USDA, FAS, *Hong Kong Livestock and Products Semi-annual*, February 1, 2006, 3.
[79] Meat Trade News Daily, "Brazil: Beef Exports to China Resume," January 27, 2010.
[80] Meat and Livestock Australia, "China and Brazil to Facilitate Beef Trade," April 20, 2011.
[81] U.S. beef exports to Vietnam increased even more rapidly during 2006–11.

2010 that led many dairy producers to slaughter their cattle and that also lowered the calving rate. The resulting higher beef prices encouraged still more producers to slaughter dairy cattle for beef, leading to declines in both the cattle herd and beef production (table 9.14).[82] This led to increased imports in 2010 (table 9.15).[83] Egypt also imports live cattle, mostly for immediate slaughter. Imports of live cattle, predominately from Australia, increased from 19,000 head in 2006 to 140,000 in 2010.[84]

TABLE 9.14 Egypt: Beef production, supply, and distribution, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
							Percent
Production (1,000 mt CWE)	465	365	350	355	330	315	–7
Imports (1,000 mt CWE)	292	293	166	180	260	230	–5
Exports (1,000 mt CWE)	0	0	0	0	0	0	0
Total supply (1,000 mt CWE)	757	658	516	535	590	545	–6
Domestic consumption (1,000 mt CWE)	757	658	516	535	590	545	–6
Per capita consumption (kg)	10.2	8.7	6.7	6.8	7.3	6.6	–8

Source: USDA, FAS, PSD Online (accessed February 6, 2012).

Note: Data in carcass weight equivalent (CWE) are not directly comparable with data in product weight.

TABLE 9.15 Egypt: Beef imports, by supplier, 2006–10

	2006	2007	2008	2009	2010	Average annual change 2006–10
			Million $			Percent
Brazil	376	386	174	182	371	([a])
India	11	86	273	193	278	123
United States	56	65	77	77	106	17
Australia	1	2	4	4	41	203
New Zealand	([b])	([b])	([b])	1	5	121
Argentina	25	14	2	12	4	–35
All other	4	8	52	27	26	60
Total	473	561	582	496	831	15

Source: GTIS, Global Trade Atlas database (accessed November 22, 2011).

Note: Totals may not add due to rounding.

[a]Rounds to zero.
[b]Less than $500,000.

Competition with the United States

Although Brazil and the United States are both major suppliers of beef to Egypt, beef from Brazil and the United States do not often compete head-to-head. Exports of edible beef offal accounted for 60 percent of U.S. beef exports to Egypt by value and for over three-quarters of such exports by volume, while exports from Brazil are largely frozen beef meat (table 9.16). Brazilian frozen beef muscle cuts are largely sold to more price-conscious segments such as the package tourism industry, while U.S. beef muscle cuts

[82] USDA, FAS, *Egypt: Livestock and Products Annual*, September 2, 2010, 2.
[83] Full-year 2011 data on Egypt's beef imports are not yet available.
[84] USDA, FAS, PSD Online (accessed October 12, 2011); Global Trade Atlas GTIS database.

TABLE 9.16 Brazil: Beef exports to Egypt, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
Fresh/chilled	([a])	0	0.4	0.1	0	0.5	91
Frozen	364.2	333.1	209.9	200.1	410.0	413.1	3
Edible offal	4.6	4.9	9.4	7.0	5.0	6.7	8
Prepared, or preserved	7.7	9.2	11.6	6.7	15.9	18.7	20
Total	376.5	347.3	231.2	213.8	430.8	439.0	3
	Metric tons						
Fresh/chilled	5	0	75	25	0	126	91
Frozen	198,142	174,188	64,919	71,955	113,228	98,811	–13
Edible offal	5,740	5,542	7,707	6,560	3,975	4,044	–7
Prepared, or preserved	3,115	3,616	3,713	2,154	4,601	4,149	6
Total	207,002	183,345	76,414	80,694	121,804	105,130	–13

Source: GTIS, Global Trade Atlas database (accessed February 6, 2012).

[a]Less than $50,000.

are largely sold in the hotel and restaurant segment to international restaurant and hotel chains. Within the package tourism industry, Brazilian beef competes with imports of beef from India and with imports of U.S. edible beef offal. Recent sanitary problems experienced with imports from India are expected to benefit both Brazil's exports of beef and U.S. exports of edible beef offal to Egypt.[85] Prepared and preserved beef—including canned beef and other cooked products—accounts for about 4 percent of Brazil's exports to Egypt, while they make up less than 1 percent of U.S. beef exports to Egypt.

[85] USDA, FAS, *Egypt: Livestock and Products Annual*, September 2, 2010, 3–4.

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CHAPTER 10
Pork

Overview

Brazil is the world's fourth-largest producer and fourth-largest exporter of pork. Brazil's commercial swine and pork producers are globally competitive, using modern, efficient methods and genetics. However, sanitary measures, predominantly those related to diseases such as foot-and-mouth disease (FMD), prohibit Brazil from exporting to many of the largest importing markets, including Japan, Mexico, and Canada, the largest export markets for U.S. pork. As a result of these sanitary restrictions, Brazil has confined its pork exports to a limited number of markets and has become heavily dependent on its largest export market, Russia.[1] As Russia has increased its own pork production in recent years, it has proven to be an unreliable export market, and Brazil's total pork exports declined in volume during 2006–11.

Brazil is addressing the sanitary restrictions both by attempting to eradicate diseases such as FMD from the entire country and by having regions of the country recognized as being disease-free. If Brazil is successful in achieving access for its pork in markets that have traditionally been closed, exports are likely to increase rapidly, as many of Brazil's major pork producers are also major producers of poultry that have already established export markets and trading relationships.[2]

Exports have not kept pace with increases in production during 2006–11. In 2011, Brazil's pork exports were equivalent to approximately 18 percent of production, compared to 23 percent in 2006.[3] Brazil's main export markets for pork in 2011 were Russia, Hong Kong, Ukraine, Argentina, and Angola.

Brazil is a major pork consumer and ranked fifth in global consumption in 2010.[4] Yet domestic pork consumption lags far behind consumption of beef and broiler meat. The relatively small size of the domestic market means that a disruption in exports may have a greater impact on pork producers than on beef or poultry producers. Statistics for the production, consumption, and trade of major pork producers and importers in 2011 (in metric tons carcass weight) are presented in table 10.1.

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[1] Associação Brasileira da Indústria Produtora e Exportadora de Carne Suina (ABIPECS), *Annual Report 2008*, 2009, 2.
[2] See chapter 5 for a description of Brazil's globally integrated livestock producers.
[3] USDA, FAS, PSD Online (accessed February 15, 2012).
[4] USDA, FAS, *Livestock and Poultry: World Markets and Trade,* April 2011, 9.

TABLE 10.1 Pork: Production, consumption, and trade, selected producers and markets, 2011 (1,000 mt carcass wt)

	Production	Consumption	Imports	Exports	Trade balance
Producers					
China	49,500	49,810	550	260	–290
EU-27	22,530	20,545	15	2,000	1,985
United States	10,278	8,384	379	2,246	1,867
Brazil	3,227	2,646	1	582	581
Russia	1,965	2,894	930	1	–929
All other	13,627	16,570	4,391	1,485	–2,906
Total	101,127	100,849	6,266	6,574	–
Selected major importers					
Hong Kong	114	474	360	0	–360
Japan	1,255	2,481	1,210	0	–1,210
Korea	835	1,470	625	0	–625
Canada	1,753	793	195	1,160	965
Subtotal	2,204	4,425	2,195	0	–2,195

Source: USDA, FAS, PSD Online database (accessed February 6, 2012).

Brazilian Production, Consumption, and Trade

Brazil’s pork production primarily serves its domestic market, and over the past five years, domestic consumption has grown more rapidly than production. However, as noted above, Brazil’s per capita consumption of pork is relatively low compared to countries such as the United States and the EU-27, and compared to its consumption of beef and broiler meat (table 10.2).

TABLE 10.2 Brazil: Swine and pork production, supply, and distribution, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
							Percent
January 1 sow inventory (1,000 head)	3,030	3,040	2,970	2,960	2,890	2,925	–1
Swine production (1,000 head)	33,304	34,530	34,845	35,890	36,970	37,750	3
Swine slaughter (1,000 head)	31,515	33,110	32,700	33,510	34,290	34,870	2
Pork production (1,000 mt)	2,830	2,990	3,015	3,130	3,195	3,227	3
Pork imports (1,000 mt)	0	0	0	0	1	1	([a])
Pork exports (1,000 mt)	639	730	625	707	619	582	–2
Domestic consumption (1,000 mt)	2,191	2,260	2,390	2,423	2,577	2,646	4
Per capita consumption (kg)	11.4	11.7	12.2	12.2	12.8	13.0	3

Source: USDA, FAS, PSD Online database (accessed February 6, 2012).

[a]Not applicable.

Brazil’s pork production became more efficient during 2006–11. Brazil’s production of swine and pork increased in this period even as the number of sows declined. In addition, most swine slaughter in Brazil is under federal inspection. Traceability under federal inspection is assumed to reduce food safety risks, increasing competitiveness in exports. The share under federal inspection increased from 77.7 percent in 2004 to 83.1 percent in 2009.[5]

[5] ABIPECS *Annual Report 2010*, 2011, 6.

Industry Structure

Swine production in Brazil consists of both subsistence producers, raising swine largely for home consumption, and commercial operations. In 2008, it was estimated that subsistence producers accounted for 26 percent of breeding sows in Brazil and 10 percent of swine produced, down from 38 percent of sows and 14 percent of swine produced in 2006.[6] Pork production by subsistence producers accounted for only about 10 percent of Brazil's production in 2010 as well.[7]

The continued shift to commercial production has made Brazil's pork producers more competitive in global export markets, as Brazil's commercial swine producers are much more productive than subsistence producers. The movement towards greater commercial swine production, along with improvements in swine genetics, better meet pork producers' requirements for a standardized input. At the same time, stringent requirements in export markets have encouraged higher-quality pork production in Brazil.[8] As pork produced in commercial operations under federal inspection is more likely to be eligible for export, such production has increased more rapidly than Brazil's overall pork production over the last five years.

The average size of commercial swine operations in Brazil is smaller than the average size in the United States. Reportedly, smaller Brazilian swine producers find it easier to gain access to government-subsidized low-cost financing for capital improvements.[9] Typical slaughter facilities in Brazil are also smaller than most facilities in the United States. Their smaller size may lessen these enterprises' ability to supply large volumes of specific cuts.

Another difference between U.S. production and that of Brazil is that many swine producers in Brazil grow much of their own feed. Integrated producers often grow much of the grain used to formulate the swine ration that is provided to the facilities where hogs are raised to market weight.[10] This may partially insulate these producers from fluctuations in the cost of feed grains.

Regional Production

Brazil's swine and pork production is predominately in the southern states of Paraná, Santa Catarina, and Rio Grande do Sul. Nationally, the number of swine in Brazil increased 7 percent in 2006–10, and pork production increased 13 percent.[11] Santa Catarina is the leading swine-producing state in Brazil, with 20 percent of the total swine inventory in 2010, up from 16 percent in 2000 and 2005.

Traditionally, pork was produced in Brazil primarily in the coastal states. More recently, production has declined in northern states and increased in the Southeast, the

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[6] ABIPECS *Annual Report 2008*, 2009, 4; ABIPECS Annual Report 2006, 2007, 12–13.
[7] ABIPECS *Annual Report 2010*, 2011, 3.
[8] Neves, Saab, and Prado, "Analyzing Some Relationships," 2008, 5, 2.
[9] Industry representative, interview by USITC staff, Washington, DC, July 7, 2011.
[10] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011.
[11] USDA, FAS, *Livestock and Poultry: World Markets and Trade*, October 2010, 20, 28; USDA, FAS, *Livestock and Poultry: World Markets and Trade*, April 2011, 9, 17.

Center-West, and the South. Between 2005 and 2010, the swine herd expanded most rapidly in the Center-West, although the top three pork-producing states are still located in the South region.

Since 2000, swine production has increased most rapidly in Mato Grosso. The state of Mato Grosso accounted for just 3 percent of Brazil's swine herd in 2000, rising to more than 5 percent in 2010. Swine production has been migrating to the Center-West region because of lower feed costs.[12] Corn and soybean production have increased rapidly in Mato Grosso, and the costs of these major inputs into swine feed are lower in Mato Grosso than in traditional swine-producing states such as Santa Catarina. Improvements in transportation infrastructure in the Center-West would be expected to lead to further production increases in the Center-West region and increase the competitiveness of Brazilian pork in global markets.[13]

The sources of Brazil's pork exports are more concentrated geographically than the swine herd. More than three-fourths of pork exports in 2011 were from the South region. But in 2006–10, the share of exports from the Center-West generally increased at the expense of exports from the South and Southeast (table 10.3).

TABLE 10.3 Export share by region (volume)

Region	2006	2007	2008	2009	2010	2011
	Percent					
South	82	77	82	71	75	79
Southeast	12	6	7	16	8	6
Center-West	6	9	11	13	17	15
All other	0	9	0	0	1	0

Source: ABIPECS, "Brazilian Pork Exports by State."

Consumption

Pork consumption has been increasing in Brazil, but is much lower than consumption of beef and poultry. In 2010, Brazil's per capita consumption of pork was 12.8 kg, compared to 37.8 kg for beef and 45.4 kg for broiler meat.[14] Brazil's per capita pork consumption in 2010 was less than half that of the EU-27, China, or the United States.[15] Brazil's domestic consumption of pork has increased over the last five years more rapidly than beef consumption, but more slowly than broiler consumption.[16]

[12] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 31, 2011.
[13] See chapter 3 for a description of Brazil's transportation infrastructure.
[14] USDA, FAS, PSD Online (accessed October 12, 2011).
[15] In 2010, per capita pork consumption in the EU-27, China, and the United States was 43.2, 37.9, and 27.9 kg, respectively. USDA, FAS, *Livestock and Poultry: World Markets and Trade*, April 2011, 20.
[16] USDA, FAS, *Livestock and Poultry: World Markets and Trade*, October 2010, 18, 20, 22; USDA, FAS, *Livestock and Poultry: World Markets and Trade*, April 2011, 7, 9, 11. Neves, Saab, and Prado report that the share of pork in Brazil's domestic meat consumption has declined over the long run, i.e., since the 1970s; see "Analyzing Some Relationships," 2008, 3–4.

Trade

Reportedly, Brazil tends to export different cuts of pork than those it consumes. Ham and processed pork products derived from shoulder cuts account for the majority of Brazil's domestic pork consumption. Russia and Ukraine were reportedly developed as export markets for pork loins, which are not widely consumed in Brazil. Export markets in Asia were reportedly developed as outlets for other cuts and trim.[17] These differences in composition would make it more difficult for producers to shift pork to the domestic market in response to a disruption in an export market.

Brazil is ineligible to export to some of the largest importers of pork, including Japan and Korea, because of sanitary measures.[18] Until recently, Brazil was also ineligible to export to China, the world's largest producer and consumer of pork. However, in May 2011, three slaughterhouses in Brazil were authorized to export pork to China.[19] Seara Alimentos, part of the Marfrig group, began shipments in November 2011. Aurora Alimentos began shipments in February 2012, and Brazil Foods began shipping pork to China in March 2012.[20] China is a major destination market for U.S. pork, and opening China's pork market to exports from Brazil would increase competition between Brazilian and U.S. pork. Brazil's exports to its largest markets for pork are depicted in figure 10.1.

Primary Factors Affecting Competitiveness

Efficiency

By some measures, U.S. swine producers are more efficient than those in Brazil. One measure of productive efficiency in the swine industry is the quantity of pork produced per sow per year. In 2011, producers in Brazil averaged 1,103 kilograms (kg) of pork per sow in the breeding herd, compared to 1,779 kg for U.S. producers. A related measure is the ratio of the number of hogs produced to the number of sows each year. In Brazil, this ratio ranged from 11.0 in 2006 to 12.9 in 2011, compared to 17.5 in 2006 and 19.9 in 2011 in the United States.[21] However, Brazil's national productivity measures are negatively influenced by the country's remaining subsistence producers. Brazil's national pork producers association, Associação Brasileira da Indústria Produtora e Exportadora de Carne Suina (ABIPECS), reports that in 2008, Brazil's national average number of finished hogs produced per sow was 15.6, but that the number was 21.4 for commercial producers and 5.6 for subsistence producers. Further, the carcass weight of finished pigs from commercial operations averaged 82.1 kg, compared to 67.9 kg for subsistence producers.[22]

[17] Industry representative, interview by USITC staff, Washington, DC, July 7, 2011. Trim consists of small pieces of meat or fat removed when primal cuts are removed from the carcass or when smaller cuts of meat are fabricated.

[18] Recently, a limited number of pork producers in Santa Catarina became eligible to export pork to the United States. This development is described below.

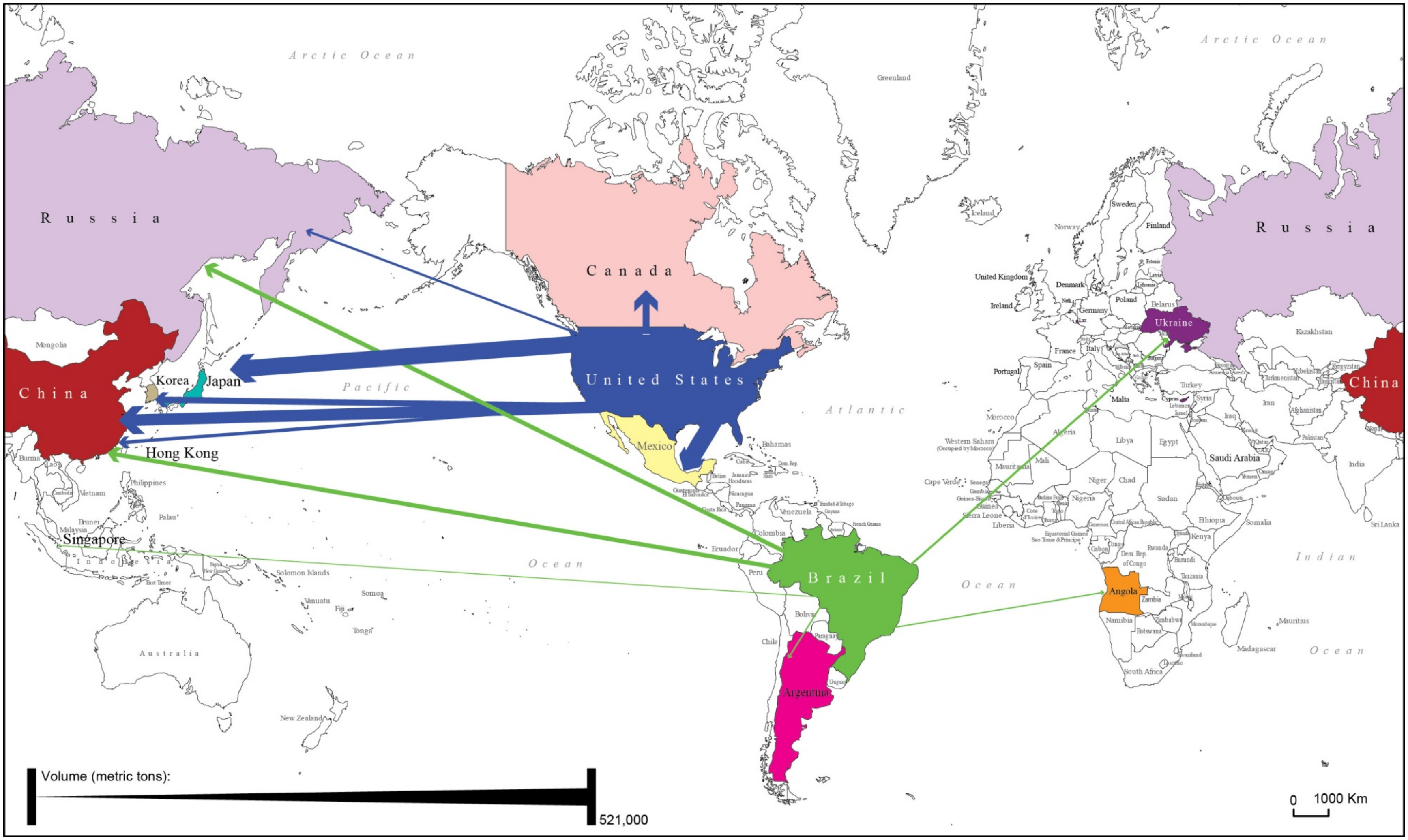
[19] *Brazilian Meat Monitor*, "Three Companies Get Permission to Sell Pork to China," May 30, 2011.

[20] TheMeatSite.com, Brazil Foods Ships Pork to China, March 1, 2012.

[21] USDA, FAS, PSD Online (accessed February 8, 2012).

[22] ABIPECS, *Annual Report 2008*, 2009**,** 12–13.

FIGURE 10.1 Competition between U.S. and Brazilian pork exports in 2011 was limited by sanitary restrictions on Brazilian exports



Source: Compiled by USITC staff using data from GTIS, Global Trade Atlas database (accessed February 13, 2012).

In fact, commercial swine producers in Brazil are reported to be among the most efficient in the world. A 2004 comparison of efficiency in swine production found that the lowest-cost producing countries were Brazil, Canada, and the United States. In this survey, commercial producers in Brazil surpassed U.S. producers in several measures of efficiency, including the number of pigs produced per sow, overall mortality, and feed conversion.[23] A survey of pig producers in 2010 (which did not include the United States) found that production costs were roughly one-third lower in Brazil than the average for the European Union (EU-27) and Canada.[24]

Cost of Production[25]

As in the United States, the cost of feed is the largest element in the cost of raising swine commercially in Brazil.[26] This cost is largely driven by prices for corn and soybean meal, the principal components of swine feed. Prices for corn and soybean meal in both Brazil and the United States largely reflect global prices.[27]

Swine producers in Mato Grosso, which has the most rapidly expanding swine herd in Brazil, have a minor cost advantage over those in Santa Catarina, which has the largest swine herd. Slightly higher fixed costs in Mato Grosso have countered some of the feed cost advantage enjoyed by swine producers in that state, but the total cost advantage in Mato Grosso still increased between 2006 and 2010. In 2006, the average total cost to produce one kg of pork in Mato Grosso was 98 percent of the cost for producers in Santa Catarina. In 2010, even with a slightly greater increase in relative feed costs, the cost to produce pork in Mato Grosso decreased to 96 percent of the cost in Santa Catarina (table 10.4).[28] Expanded production and exports from lower-cost producers in the Center-West would be expected to make Brazil more cost competitive in global markets.

Most of Brazil's corn production and a significant fraction of its soybean production is consumed as animal feed. Because corn and soybean meal are globally traded commodities, the prices for corn and soybean meal in Brazil have generally tracked movements in international prices. However, there can be significant regional differences in price because of local market conditions and transportation issues. The regional differences in the cost of feed ingredients influence where swine producers locate or

[23] Rasmussen, "Costs in International Pig Production," 2006, table 5.

[24] ThePigSite.com, "InterPIG 2010 Results," October 3, 2011.

[25] Companhia Nacional de Abastecimento (CONAB) publishes cost of production data for swine producers in Brazil, by state. The USDA's ERS likewise publishes annual cost of production data for U.S. swine producers. A large share of swine producers in Brazil participate in all stages of swine production, from breeding through final sale of market hogs. Therefore, cost of production data for producers in Santa Catarina and Mato Grosso can be compared to costs of production for farrow-to-finish producers in the United States, in order to provide comparable data on the entire cost of production. Reported cost data for swine production in Brazil do not include the opportunity cost of unpaid labor. In 2010, this accounted for 10.2 percent of reported total cost for U.S. farrow-to-finish producers.

[26] Neves, Saab, and Prado, "Analyzing Some Relationships," 2009, 5. Other ingredients can be substituted for corn and soybean meal, but their costs and nutritional value are typically weighed against those of corn and soybean meal.

[27] See chapter 8, box 8.1.

[28] Note that these reported costs include only costs to raise swine and do not include the costs of slaughter and transportation.

TABLE 10.4 Swine: Average costs of production in Santa Catarina and Mato Grosso Brazil, 2006–10

	2006	2007	2008	2009	2010	Average annual change 2006–10
	R$/kg					Percent
Santa Catarina						
Feed	1.15	1.44	1.77	1.70	1.44	6
Other variable costs[a]	0.31	0.40	0.43	0.44	0.53	15
Fixed costs[b]	0.12	0.11	0.12	0.11	0.12	0
Total	1.57	1.95	2.30	2.25	2.09	7
Mato Grosso						
Feed	1.00	1.12	([c])	([c])	1.38	8
Other variable costs	0.36	0.45	([c])	([c])	0.42	4
Fixed costs	0.18	0.18	([c])	([c])	0.20	3
Total	1.54	1.74	([c])	([c])	2.00	7

Source: Companhia Nacional de Abastecimento, "Custo de Produção de Suinos para Abate," 2006 through 2010.

[a]Variable costs include labor and benefits, veterinary expenses, utilities, and transportation costs.
[b]Fixed costs include depreciation of fixed assets and interest.
[c]Not available.

expand operations.[29] Center-West states have significantly increased their production of corn and soybeans during 2006–10 (box 10.1).

BOX 10.1 Availability of Feed Impacts Swine and Poultry Production

Both poultry feed and swine feed are typically largely composed of corn and soybean meal. Corn provides energy, and soybean meal provides protein. Poultry and swine feed typically are composed of two-thirds or more corn by weight, and most of the balance is soybean meal.[a]

Feed typically accounts for more than half of the total cost of raising poultry and swine in both the United States and Brazil. Feed is also relatively expensive to transport. It takes roughly 3 pounds of feed to produce a pound of pork, and 2 pounds of feed to produce a pound of broiler meat. Poultry and pork production have expanded so rapidly in Brazil for the same reason that pork production in the United States has expanded in the "corn belt"—access to feed ingredients.

In 2010, three-fourths of Brazil's corn production and one-fourth of its soybeans were consumed as animal feed.[b] The poultry and swine industries are the largest consumers of animal feed in Brazil. Brazil's National Animal Feed Industry Association (Sindirações) has estimated that total animal feed production in 2011 will reach 64 million metric tons (mt); 31.8 million mt for poultry (up 5 percent from 2010), and 15.7 million mt for swine (up 2 percent from 2010).[c]

Access to feed influences the location of poultry and swine production within Brazil. Nearly half of the poultry and swine in Brazil are raised in the three southernmost states of Paraná, Santa Catarina, and Rio Grande do Sul. These three states also accounted for 41 percent of Brazil's 2010 corn production.

Brazil's corn and soybean production are expanding most rapidly in the Center-West region, comprised of the states of Mato Grosso, Mato Grosso do Sul, and Goiás, plus the Federal District. Corn production increased almost 70 percent in the Center-West between 2006 and 2010, and increased 23 percent in the South. Over the period, swine production expanded 34 percent in the Center-West and 17 percent in the South. Poultry production grew 27 percent in the Center-West and 29 percent in the South.

[a] Rations differ with stage of development and other grains and protein sources may be substituted. The nutritional values of ingredients are commonly compared to those for corn and soybean meal.
[b] See chapters 6 and 7 for more information on Brazil's production and consumption of soybeans and corn.
[c] *Brazilian Meat Monitor*, "Feed Industry Forecasts Growth of 4.2%," March 25, 2011, 13.

[29] Industry representative, interview by USITC staff, São Paulo Brazil, August 22, 2011.

Exchange Rate

In countries where Brazil and the United States compete directly, appreciation of the *real* has made U.S. pork more price-competitive.[30] In dollar terms, feed costs for swine producers in Santa Catarina and Mato Grosso increased 55 percent and 70 percent during 2006–10, and overall costs increased 64 percent and 60 percent, respectively. In comparison, feed costs for U.S. farrow-to-finish swine producers increased 55 percent during 2006–10, but total costs increased only 25 percent over the same time period.[31] In 2010, the reported average cost of U.S. farrow-to-finish swine producers, including the opportunity cost of the operator's labor and excluding transportation to slaughter, was 21 percent above reported cost in Santa Catarina and 27 percent above reported cost in Mato Grosso (table 10.5)

TABLE 10.5 Swine: Average 2010 costs of production per kilogram of weight gain ($ at R$1.76/$)

	U.S. national average	Santa Catarina	Mato Grosso
Total feed costs	0.74	0.82	0.79
Labor	0.23	0.12	0.07
Veterinary and medicine	0.04	0.05	0.03
Other operating costs	0.10	0.14	0.14
Capital recovery, machinery and equipment	0.27	0.05	0.12
Other allocated overhead	0.07	([a])	([a])
Total costs listed	1.44	1.19	1.14

Source: USDA, ERS, "U.S. Farrow-to-Finish Production Costs" (accessed September 21, 2011); CONAB, "Custo de Produção de Suinos para Abate," 2006 through 2010.

Note: Labor cost for U.S. producers includes $0.148 for opportunity cost of unpaid labor**.** This figure was not available for Brazilian producers.

[a]Not reported.

To assess the impact of exchange rates on costs of production, USITC analysts used two theoretical exchange rates, R$2.00 per dollar and R$1.50 per dollar. These rates are within the range of the highest and lowest exchange rate for 2006–10, but do not represent outliers.[32] For this exercise, no changes were assumed to the current cost structure, nor were any adjustments made to account for dynamic effects related to exchange rate changes.

Given current cost structures and assuming that transportation adds another 15 percent to the costs of production in Brazil, if the *real* were to depreciate to R$2.00 per dollar, swine costs of production would be significantly lower in Santa Catarina and in Mato Grosso than in the United States. If the *real* instead continues to appreciate against the dollar and reaches R$1.50 per dollar, production costs would be higher in Santa Catarina and Mato Grosso than in the United States. In this exercise, the break-even point between total costs for producers in the United States and Santa Catarina is R$1.85 per dollar; for Mato Grosso, it is R$1.78 per dollar (table 10.6).

[30] Industry representatives, interview by USITC staff, Washington, DC, July 7, 2011; ABIPECS, *Annual Report 2011*, 2012, 4.
[31] USDA, ERS, "U.S. Farrow-to-Finish Production Costs," (accessed September 21, 2011).
[32] IMF, Exchange Rates database (accessed November 4, 2011).

TABLE 10.6 Swine: Average 2010 costs of production using hypothetical R$/$ exchange rates ($/kg)

	United States[a]	Brazil[b]			
	National	Santa Catarina		Mato Grosso	
	Actual costs	R$2.00/$1	R$1.50/$1	R$2.00/$1	R$1.50/$1
Feed	0.74	0.72	0.96	0.69	0.92
Other variable costs[c]	0.22	0.27	0.35	0.21	0.28
Fixed costs[d]	0.34	0.06	0.08	0.10	0.14
Total	1.30	1.04	1.39	1.00	1.33

Source: USDA, ERS, "U.S. Farrow-to-Finish Production Costs" (accessed September 21, 2011); CONAB, "Custo de Produção de Suinos Para Abate," 2010.

[a]Reported costs in Brazil do not include the opportunity cost of the operator's labor. Therefore this item was subtracted from reported U.S. costs for this comparison.
[b]Costs are for raising swine and do not include transportation costs, which may add as much as 15 percent to costs of production in Mato Grosso.
[c]Other variable costs include items such as fuel and electricity, veterinary services, and labor.
[d]Fixed costs include capital recovery of machinery and equipment and allocated overhead.

Disease

Competition between U.S. and Brazilian pork exports is limited by sanitary restrictions on Brazil's exports, most notably due to the presence of FMD in some parts of Brazil. Markets such as North America, Japan, and Korea were closed to fresh/chilled and frozen pork from Brazil in 2006–11 because of Brazil's FMD status. Canada, Japan, Korea, Mexico, and the United States together accounted for just over half the volume and 61 percent of the value of global imports of fresh/chilled and frozen pork muscle cuts (HS 0203) in 2010.[33]

FMD was last reported in Brazil in April 2006.[34] The state of Santa Catarina in Brazil is recognized by the World Animal Health Organization (OIE) as FMD-free without vaccination. Five zones within Brazil, encompassing 10 states and the Distrito Federal, plus parts of 5 additional states are recognized by the OIE as being FMD-free with vaccination, but many countries will not accept pork from regions that are FMD-free with vaccination.[35] The United States recognizes the State of Santa Catarina as FMD-free but considers restrictions on animal or meat imports into the region from infected regions to be "less restrictive than would be acceptable for importation into the United States." Therefore the United States allows imports of fresh/chilled and frozen pork from Santa Catarina only from facilities that have been certified as eligible "to have its products imported into the United States under the Federal Meat Inspection Act."[36] U.S. sanitary

[33] GTIS, Global Trade Atlas database (accessed November 30, 2011). Cuts of pork are termed muscle cuts to distinguish them from edible offal.
[34] FMD was last reported in a domesticated animal in April 2006; however, the prevalence in the wild population is unknown. Rinderpest has not been reported in Brazil, in either domesticated or wild animal populations, since 1921. World Animal Health Organization (OIE) World Animal Health Information Database.
[35] The states of Acre, Espírito Santo, Goiás, Mato Grosso, Minas Gerais, Paraná, Rio de Janeiro, Rondônia, São Paulo, and Sergipe, plus the Distrito Federal and parts of the states of Amazonas, Bahia, Mato Grosso do Sul, Pará, and Tocatins, are recognized by the OIE as FMD-free with vaccination. OIE, "List of FMD-Free Members," May 2011.
[36] U.S. Code of Federal Regulations, Title 9, § 94.11. As of January 17, 2012, six facilities in Brazil had been certified to export such pork to the United States. USDA, FSIS, "Brazil: Eligible Plants Certified to Export Meat to the United States," January 17, 2012.

regulations and those of many other countries do allow imports of cooked and processed pork.

Japan reportedly sent a team to Brazil to audit swine production facilities on August 28–September 3, 2011. Producers in Brazil hope that the results of the audit will allay Japanese regulators' worries about FMD in Brazil's commercial pork production and lead to the opening of the Japanese market to pork from Brazil.[37] Korea is also reportedly considering allowing imports of pork from Santa Catarina, and will reportedly issue a statement on its risk analysis of pork imports from Santa Catarina in the near future.[38]

Japan and Korea are the number one and the number five global destination markets for pork. Further, the unit value of pork exports to Japan is among the highest in the world. Together, the two countries account for 31 percent of the volume and 46 percent of the value of reported global imports under HS 0203 in 2011. Opening either of these markets, particularly Japan, to exports of pork from Santa Catarina would significantly increase Brazil's potential export opportunities for fresh/chilled and frozen pork significantly and increase competition between U.S. and Brazilian pork producers.

Transportation Infrastructure

Brazil's global competitiveness in the pork sector is limited by its transportation infrastructure.[39] Transportation to a slaughter plant can reportedly add 15 percent to the cost of swine raised in the state of Mato Grosso.[40] Transportation from Mato Grosso to the port of Paranaguá in the state of Paraná reportedly adds another 12 percent.[41] Transportation costs in Brazil are significantly higher than in the United States. The cost of refrigerated transportation in São Paulo, for instance, is reportedly 30 percent higher than in the United States.[42] Improvements in Brazil's transportation infrastructure would be expected to increase the competitiveness of Brazil's pork exports in third-country markets.

Government Support

As of May 21, 2011, Brazil's pork producers are exempt from the Program for Social Integration (PIS) and the federal contribution (Contribuição para o Financiamento da Seguridade Social or "COFINS") taxes, as are providers of swine feed and other inputs. This is expected to primarily benefit producers selling in Brazil's domestic market, because exporters can already deduct from their overall tax liabilities any PIS and COFINS taxes paid on exported pork.[43] But tax breaks such as these lower the production costs of Brazil's pork industry and indirectly lower the cost structure of pork exporters.

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[37] *Brazilian Meat Monitor*, "Santa Catarina to Be Visited by Japanese Mission," August 19, 2011, 16.

[38] *Brazilian Meat Monitor*, "South Korean Government to Give Answer on Pork Imports," October 28, 2011, 17.

[39] Consoli et al., "Mapping and Quantification of the Meat Chain in Brazil," November 2009, 10; industry representative, interview by USITC staff, Mato Grosso, Brazil, August 31, 2011.

[40] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 31, 2011.

[41] Embrapa, *Economic Aspects of the Agricultural Production in Brazil*, December 13, 2010, 10.

[42] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011.

[43] *Brazilian Meat Monitor*, "Tax Exemption Reaches Producers of Pork," June 23, 2011, 1–2.

Competitive Position with the United States

Both Brazil and the United States are among the lowest-cost producers of swine and pork, and both countries are major pork exporters. Competition between U.S. and Brazilian pork in export markets is limited by Brazil's disease status; Brazilian pork producers were not eligible to export to North America, Japan, or Korea over 2006–11.[44] If restrictions on Brazil's pork exports were eliminated, either for the entire country, or for exports from Santa Catarina, competition between U.S. and Brazilian pork would rise substantially. The United States and Brazil do compete in the Russia and Hong Kong markets, both of which are major U.S. export markets, and as discussed above, some producers in Brazil have reportedly become eligible to export pork to China.

Brazil is not eligible to export pork to the EU-27 because of the widespread use in Brazil of the feed additive ractopamine, an additive that promotes gain in lean meat over fat. Brazil reportedly does not have a system in place that can certify that swine were raised without ractopamine.[45] Ractopamine is also widely used in the United States (and many other countries). However, pork produced in the United States is eligible for export to the EU-27 as long as swine are produced under a documented system to ensure that no ractopamine was fed to the animal.[46] Approximately half of the swine produced in the United States are fed ractopamine.[47]

Most pork exports by both Brazil and the United States are frozen pork cuts in the HS subheading 0203.29, "Meat of swine, not elsewhere specified or included, frozen." In 2011, such exports accounted for 74 percent of Brazil's total pork exports, on a volume basis. This is a residual category, and the type of pork and the quality can vary significantly. Brazil's exports to Russia and Ukraine under this subheading are likely to be loin cuts, while its exports to Asian markets are more likely to be trim and lower-valued cuts.[48] This difference is likely responsible for the difference in unit values observed for Brazil's exports to Russia compared to its exports to markets in Asia and Africa.

U.S. exports to markets in Asia are also typically of cuts for which demand is lower in Western countries.[49] U.S. pork exports are unlikely to be loin cuts, as demand for these cuts is high in the U.S. domestic market.[50] Therefore, U.S. products exported to markets in Asia are likely to be similar in composition to products exported from Brazil, but Brazil's exports to markets like Russia and Ukraine are likely to be of different cuts than U.S. exports to these markets.

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[44] Brazil requires the inspection of individual U.S. plants in order to export pork to Brazil. This process is costly, and to date no plants have been approved. Brazil also does not allow imports of fresh/chilled pork from the United States citing the risk of trichinosis. USTR, *2011 Report on Sanitary and Phytosanitary Measures*, 32; USDA, FSIS, "Export Requirements for Brazil," http://www.fsis.usda.gov/Regulations_&_Policies/Brazil_Requirements/index.asp, accessed March 14, 2012.

[45] PigProgress.net, "EU Food Watchdog: Pork Imports from Brazil," August 23, 2011.

[46] USDA, FSIS, "Program for Certifying Pork Intended for Export," accessed November 9, 2011.

[47] Ortega and Wang, "Opportunities for U.S. Pork in China," April 2009, 3.

[48] The loin is the area on both sides of the backbone and is the source of the most tender pork.

[49] Ortega and Wang, "Opportunities for U.S. Pork in China," April 2009, 1.

[50] Industry representative, interview by USITC staff, Washington, DC, July 7, 2011.

Key Export Markets

Exports account for a significant share of Brazil's pork production, approximately 20 percent in each year 2006–11. Brazil exported pork to 62 countries in 2011, but the top 5 markets—Russia, Hong Kong, Ukraine, Argentina, and Angola—accounted for 78 percent of exports on a value basis (table 10.7).[51]

TABLE 10.7 Brazil's pork exports to selected markets, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
Russia	618	666	739	566	649	394	–9
Hong Kong	95	167	232	221	197	320	28
Ukraine	75	94	136	107	105	183	19
Argentina	34	51	63	58	97	126	30
Angola	11	22	42	53	45	77	47
All other	189	210	235	200	228	317	11
Total	1,022	1,209	1,448	1,205	1,322	1,416	7

Source: GTIS, Global Trade Atlas database (accessed February 6, 2012).

Russia

Export Volume

Russia is the world's second-largest global export market for pork, after Japan. In each year 2006–08, exports to Russia accounted for more than half the value of Brazil's total pork exports.[52] Brazil's pork producers are aware of the risks in depending so heavily on one export market.[53] Some pork producers are reportedly being forced into bankruptcy due to reductions in sales to the Russian market.[54] Brazilian exporters have continued to open and develop new markets and, as a result, exports to Russia have generally declined as a share of Brazil's total pork exports, from 60 percent by value in 2006 to 28 percent in 2011.[55] Despite recent advances in pork production, Russia depended on imports for nearly one-third of its pork consumption in 2011 (table 10.8). Brazil was Russia's second-largest source of imported pork (after the EU-27) in every year 2006–10 (table 10.9).

[51] GTIS, Global Trade Atlas database (accessed February 6, 2012).

[52] GTIS, Global Trade Atlas database (accessed November 30, 2011). On a volume basis, exports to Russia accounted for between 46 percent and 48 percent of Brazil's total pork exports.

[53] Industry representative, interview by USITC staff, São Paulo, Brazil, August 23, 2011; ABIPECS, *Annual Report 2008*, 2009, 2.

[54] USDA, FAS, *Brazil: Annual Livestock Report 2011*, August 16, 2011, 10.

[55] Pig333.com, "Pig Production in Brazil," August 20, 2009; GTIS, Global Trade Atlas database (accessed November 30, 2011).

TABLE 10.8 Russia: Pork production, supply, and distribution, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
							Percent
Production (1,000 mt CWE)[a]	1,444	1,640	1,736	1,844	1,920	1,965	6
Imports (1,000 mt CWE)	835	894	1,053	845	854	930	2
Exports (1,000 mt CWE)	0	0	0	1	1	1	([b])
Total supply (1,000 mt CWE)	2,279	2,534	2,789	2,689	2,800	2,895	5
Domestic consumption (1,000 mt CWE)	2,279	2,534	2,789	2,688	2,799	2,894	5
Per capita consumption (kg)	16.0	17.9	19.8	19.2	20.1	20.9	5

Source: USDA, FAS, PSD Online (accessed February 6, 2012).

[a]Carcass weight equivalent.
[b]Not applicable.

TABLE 10.9 Russia: Pork imports, by supplier, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
			Million $				Percent
EU-27	747	799	1,060	913	1,086	1,377	13
Brazil	535	706	701	780	729	441	–4
Canada	158	172	273	114	186	349	17
United States	166	210	481	336	191	196	3
All other	35	6	21	9	10	93	21
Total	1,641	1,893	2,536	2,152	2,202	2,455	8
			Metric tons				
EU-27	432,386	417,944	465,748	386,483	444,200	503,362	3
Brazil	238,187	289,725	243,591	260,158	241,242	144,595	–10
Canada	82,002	84,102	112,941	50,841	74,286	120,194	8
United States	85,485	100,890	194,237	136,390	68,574	65,012	–5
All other	18,169	3,019	7,320	3,373	4,000	22,273	4
Total	856,229	895,680	1,023,837	837,245	832,302	855,3536	0

Source: GTIS, Global Trade Atlas database (accessed March 30, 2012).

Notes: Full-year 2011 data are not yet available. Totals may not add due to rounding.

Brazil's Export Composition

In 2011, frozen boneless muscle cuts of pork accounted for 82 percent of Brazil's pork exports to Russia by value. The average unit value can provide some information on the relative quality of the product; for Brazil's exports to Russia in this subheading, it was $3.44 per kg. This was slightly lower than the unit value of such exports to Argentina, but substantially higher than the unit value of such exports to Hong Kong and Angola. Exports of frozen carcasses and half-carcasses also account for a substantial share of exports; they made up 14 percent of Brazil's total pork exports to Russia in 2011.

Exports of fresh/chilled pork (generally seen as more likely to be destined for the hotel and restaurant segment) accounted for less than one-half of 1 percent of Brazil's exports to Russia in 2010 and 2011. In contrast, exports of fresh/chilled pork accounted for 6 percent of pork exports to Russia in 2010 from the EU-27, Russia's largest imported pork supplier, and 7 percent of such exports in the first 10 months of 2011. Exports of frozen boneless muscle cuts of pork accounted for 74 percent of Brazil's exports, 59 percent of U.S. exports, and 62 percent of EU-27 pork exports to Russia. Edible pork offal accounted for less than 1 percent of Brazil's pork exports to Russia in 2010 and

2011. Edible pork offal accounted for 32 percent of both EU-27 and U.S. pork exports to Russia in 2010, on a volume basis. Unit values for edible offal are typically much lower than the unit values for exports of pork muscle cuts.[56]

Russia's Import Restrictions

Russia maintains a tariff-rate quota (TRQ) on pork imports (table 10.10). In 2011, within-quota imports of pork from developed countries were assessed a duty of 15 percent of the customs value, but not less than €0.25 per kg, while over-quota imports were assessed a duty of 75 percent, but not less than €1.50 per kg.[57] The duty charged on imports from a developing country such as Brazil are 75 percent of the normal rate, for both within-quota and over-quota shipments. Russia has set a goal of achieving self-sufficiency in pork production, and has increased support for its domestic pork producers. As Russia's domestic pork production has increased, the within-quota TRQ volumes have decreased.[58] In 2009, the U.S. allocation was doubled, and in 2010, the U.S. allocation was reduced from 100,000 mt to 57,500 mt. Unlike the EU-27 and the United States, Brazil does not have a country-specific quota volume. Instead, Russia's imports of pork from Brazil either enter under the "other countries" quota or face over-quota tariffs. Brazil's pork exports to Russia significantly exceeded the "other country" quota volume in each year of the period.

TABLE 10.10 Russia: Within-quota TRQ volumes for pork, 2006–11 (1,000 mt)

	2006	2007	2008	2009	2010	2011
Pork: fresh/chilled, frozen	476.1	484.8	493.5	531.9	472.1	472.1
European Union	240.5	244.9	249.3	253.4	225.0	225.0
United States	54.8	49.0	49.8	100.0	57.5	57.5
Paraguay	1.0	1.0	1.0	1.0	0	0
All other	179.8	189.9	193.4	177.5	189.6	189.6
Pork: trimmings	0	0	0	0	27.9	27.9

Sources: USDA, FAS, *Russian Federation Livestock and Products Semi-annual*, September 21, 2010, table 14; USDA, FAS, *Russia Announces 2011 TRQ Quantities*, December 27, 2010, 3.

Russia has also recently restricted imports of pork from Brazil for sanitary reasons. In June 2010, Russia's Federal Office for Veterinary and Sanitary Control removed 87 packing plants in Brazil from the list of exporters eligible to ship to Russia. In August, a further 37 meat packing plants were determined to be ineligible.[59] In September 2011, Russia's veterinary service, Rosselkhozadzor, announced plans to reinspect Brazil's processors in the fourth quarter 2011 before deciding whether to extend the ban.[60] Because exports to Russia account for such a large share of Brazil's total pork exports,

[56] GTIS, Global Trade Atlas database (accessed March 30, 2012).

[57] With the exception of over-quota imports of frozen boneless shoulders and cuts that were charged a duty of 75 percent but not less than €1.00 per kg, or 56.25 percent but not less than €0.75 per kg if from a developing country. There is no TRQ on edible offal. Russia's tariffs on most edible pork offal are 15 percent but not less than €0.15 per kg. Tariff data from the International Trade Centre, Market Access Map.

[58] Meatingplace.com, "Russia Cuts 2010 U.S. Pork, Poultry Import Quotas," December 21, 2009; MeatRussia.com, "Gordeev: Meat Provision is the Main Food Question in Russia," October 27, 2008.

[59] Meatingplace.com, "Russian Trade Embargo on Brazil Extended," August 2, 2011.

[60] MeatingPlace.com, "Talks Resurface between Brazil, Russia," September 7, 2011.

when Russia banned imports from many of Brazil's pork producers in 2010, prices for pork in Brazil's domestic market declined significantly.[61]

Competition with the United States

Russia is also a major export market for U.S. pork. As noted, the United States has a country-specific quota allocation while Brazil's pork exports to Russia are under the "other countries" quota allocation. Throughout most of 2006–11, U.S. pork exports to Russia exceeded the U.S. quota allocation. Brazil's exports exceeded the "other country" quota allocation in every year. Brazil's over-quota shipments benefit from Brazil's status as a developing country compared to U.S. over-quota pork exports. As Russia decreases the volumes of its within-quota pork imports, Brazil's developing-country status makes its pork exports increasingly price-competitive with those from the United States.

Hong Kong and China

Export Volume

Hong Kong is a major pork importer and a major export market for Brazil (table 10.11). The four largest exporters of pork to Hong Kong by value in 2011 were the EU-27, Brazil, China, and United States (table 10.12). A significant fraction of Hong Kong's imports are reportedly re-exported to China. Re-exports reportedly account for 28 percent of all Hong Kong pork muscle cut imports and 75 percent of edible offal imports and China is reportedly the largest re-export market for these products.[62]

TABLE 10.11 Hong Kong: Pork production, supply, and distribution, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
							Percent
Production (1,000 mt CWE)	142	127	110	117	119	114	–4
Imports (1,000 mt CWE)	277	302	346	369	347	360	5
Total supply (1,000 mt CWE)	419	429	456	486	466	474	2
Domestic consumption (1,000 mt CWE)	419	429	456	486	466	474	2
Per capita consumption (kg)	60.4	61.5	65.0	68.9	65.9	66.5	2

Source: USDA, FAS, PSD Online (accessed February 6, 2012).

[61] Industry representative, interview by USITC staff, Mato Grosso, Brazil, August 31, 2011. See chapter 11 for an estimate of the impact of nontariff measures (NTMs), including sanitary measures, on pork exports.

[62] USDA, FAS, *Hong Kong: Livestock and Products Annual*, August 24, 2011, 2, 9–10.

TABLE 10.12 Hong Kong: Pork imports, by supplier, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
	Million $						Percent
EU-27	174	324	741	681	715	1,047	43
Brazil	110	174	264	254	237	361	27
China	212	227	249	289	326	338	10
United States	60	99	368	315	279	234	31
Canada	14	30	119	100	96	54	31
All other	40	61	85	73	70	97	19
Total	610	916	1,827	1,712	1,722	2,131	28

Source: GTIS, Global Trade Atlas database (accessed February 6, 2012).

Note: Totals may not add due to rounding.

China is the world's largest producer and consumer of pork. A severe disease outbreak devastated its swine herd in 2007, but in response to high prices, both China's pork imports and its domestic swine production have increased.[63] China reported no imports of pork from Brazil in 2010, and Brazil reported pork exports to China of just 54 mt that year. U.S. pork exports to China in 2010 totaled 108,761 mt.

Brazil's Export Composition

More than half of Brazil's pork exports to Hong Kong are of frozen boneless muscle cuts of pork. Exports of bone-in frozen hams, shoulders, etc. also account for a substantial share of exports—6 percent of Brazil's total pork exports to Hong Kong in 2011. The average unit value of Brazil's exports of frozen boneless pork to Hong Kong in 2011 was $2.83 per kg, lower than the unit value of its exports to Russia ($3.44 per kg) and Ukraine (3.04 per kg). This difference may reflect a difference in the composition of exports. China's consumers reportedly have relatively higher demand for pork cuts that are not in much demand in Western markets, including cuts with a greater share of fat, such as pork belly.[64] Also, Brazil's pork exports to Asian markets reportedly include a large share of trim.[65] Approximately 27 percent of Brazil's pork exports to Hong Kong in 2011 were of edible offal.[66]

Hong Kong's Import Restrictions

Hong Kong has zero duties on imports of all pork. China maintains MFN duties of 20 percent ad valorem (as a percentage of value) on fresh pork muscle cuts and edible offal, 12 percent ad valorem on frozen pork muscle cuts and edible offal, 25 percent ad valorem on salted or dried pork products, and 15 percent ad valorem on prepared or preserved pork products, such as cooked hams or other cooked products. In addition, like the EU-27, China bans imports of pork from swine that were fed ractopamine, a measure that affects both Brazil and the United States.

[63] USDA, FAS, *China: Livestock and Products Annual*, September 2, 2011, 6, 8.
[64] Ortega and Wang, "Opportunities for U.S. Pork in China," April 2009, 1.
[65] Industry representative, interview by USITC staff, Washington, DC, July 7, 2011.
[66] Edible offal includes internal organs such as liver and kidney (variety meats) plus other products such as tails, meat processed from the head, casings (intestines), and feet.

Competition with the United States

Currency appreciation in Brazil and other major pork producers, relative to the U.S. dollar, has favored U.S. pork exports to Hong Kong. Traditional cuts of pork differ by country, and as U.S. pork exports to Hong Kong have increased, more U.S. producers have offered pork cuts tailored to the Chinese market. This also has benefited U.S. exports.[67] However, some cuts typically produced in Brazil more closely match those traditionally consumed in China.[68]

Sixty-two percent of the volume of U.S. exports of pork to Hong Kong in 2011 was of edible offal, compared to 27 percent of Brazil's exports to Hong Kong. Edible offal reportedly accounts for the majority of pork re-exports from Hong Kong to mainland China.[69] U.S. pork exporters reportedly have an advantage over other exporters in being able to offer greater volumes of offal in a single order due to the scale of U.S. production.[70]

Since Russia banned imports from many producers in Brazil, these producers have reportedly begun offering more pork to Hong Kong at lower prices than previously.[71] Additionally, as noted earlier, three Brazilian pork producers have reportedly recently been approved to export to China, although to date USITC staff cannot confirm that any shipments have taken place.[72] If these producers and others in Brazil do begin direct exports to mainland China, this would be expected to increase competition between U.S. and Brazilian pork in the region.

Ukraine

More than half of Ukraine's domestic pork production is by small household farms, although the share of such production is falling.[73] Before Ukraine's accession to the World Trade Organization (WTO) in 2008, inefficient domestic producers were largely protected from competition from imports. Ukraine's domestic pork demand is currently strong, and a decline in feed prices is leading to greater investments in domestic production. High pork prices are also spurring imports from multiple sources, although imports have declined in volume in each of the last three years (table 10.13).[74]

Export Volume

Brazil's pork exports to Ukraine increased in both volume and value during 2006–11. In 2011, Ukraine was Brazil's third-largest export market for pork. Brazil was the first- or second-largest supplier of pork to Ukraine throughout 2006–10 (table 10.14). In May

[67] USDA, FAS, *Hong Kong: Livestock and Products Annual*, August 24, 2011, 2.
[68] U.S. Meat Export Federation, "Greater China Pork," October 2008, 2.
[69] USDA, FAS, *Hong Kong: Livestock and Products Annual*, August 24, 2011, 9–10.
[70] USDA, FAS, *Hong Kong: Livestock and Products Annual*, August 24, 2011, 9.
[71] Ibid.
[72] *Brazilian Meat Monitor*, "Three Companies Get Permission to Sell Pork to China," June 3, 2011, 17.
[73] USDA, FAS, *Ukraine: Livestock and Products*, September 14, 2009, 4; USDA, FAS, *Ukraine: Livestock and Products*, October 14, 2010, 2.
[74] USDA, FAS, *Ukraine: Livestock and Products Voluntary Annual Report*, September 8, 2011, 1–2.

TABLE 10.13 Ukraine: Pork production, supply, and distribution, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
							Percent
Production (1,000 mt CWE)	526	635	590	527	631	650	4
Imports (1,000 mt CWE)	62	82	238	186	146	90	8
Exports (1,000 mt CWE)	3	2	0	0	1	16	40
Total supply (1,000 mt CWE)	610	739	850	735	799	762	5
Domestic consumption (1,000 mt CWE)	585	715	828	713	776	724	4
Per capita consumption (kg)	12.5	15.4	18.0	15.6	17.1	16.0	5

Source: USDA, FAS, PSD Online (accessed February 6, 2012).

TABLE 10.14 Ukraine: Pork imports, by supplier, 2006–10

	2006	2007	2008	2009	2010	Average annual change 2006–10
	Million $					Percent
EU-27	7	2	343	155	137	113
Brazil	66	94	87	112	72	2
United States	0	0	11	19	13	([a])
Canada	([b])	0	6	12	8	211
All other	2	2	3	3	7	49
Total	75	98	449	300	236	34

Source: GTIS, Global Trade Atlas database (accessed November 30, 2011).

Notes: Full-year 2011 data on Ukraine's pork imports are not yet available. Totals may not add due to rounding.

[a]Not applicable.
[b]Less than $500,000.

2008, Ukraine lowered import tariffs on pork and liberalized its sanitary requirements when it acceded to the WTO.[75] Since accession, Ukraine's pork imports have grown substantially. Imports have increasingly been from the EU-27 and to some extent the United States, and the share of imports from Brazil has declined.

Brazil's Export Composition

The composition of Brazil's pork exports to Ukraine is similar to its exports to Russia. The largest share is frozen boneless muscle cuts of pork, while exports of frozen carcasses and half-carcasses also account for a substantial share of exports—7 percent in 2011. Edible offal accounted for less than 1 percent of exports. The average unit value of Brazil's boneless pork exports to Ukraine in 2010 was slightly lower than for exports to Russia, at $3.06 per kg.

Ukraine's Import Restrictions

As part of its WTO accession package, Ukraine lowered import tariffs on pork and reduced sanitary restrictions.[76] Nonetheless, some problems are said to remain. The Ukraine State Customs Service (SCS) reportedly sometimes assigns customs values to U.S. imports that are higher than the values declared in import documentation, and the

[75] USDA, FAS, *Ukraine: Livestock and Products*, September 14, 2009, 7.
[76] Ibid.

State Committee for Veterinary Medicine has reportedly limited imports by delaying import permits.[77] Ukraine's MFN tariffs on pork are reported in the following tabulation.

Ukraine's MFN Pork Tariffs, 2011

	Percent
Fresh/chilled muscle cuts	12
Frozen muscle cuts	10
Fresh/chilled edible offal	15
Frozen edible offal	10
Prepared hams, shoulders	20
Other prepared pork products	10

Competition with the United States

Before 2008, almost all of Ukraine's pork imports were from Brazil. The United States began exporting pork to Ukraine in 2008 when Ukraine joined the WTO. Consumers in Ukraine have a preference for fresh/chilled pork. Most imports are of frozen pork and are largely used in the production of processed products. Most of Ukraine's imported frozen pork is trimmings.[78] Both Brazil and the United States export mostly frozen pork to Ukraine. In contrast, pork exports from the EU-27 include large shares of edible offal and fresh/chilled pork.[79] In 2010, imports from the EU-27 gained market share in Ukraine slightly, at the expense of both Brazil and the United States.

Argentina

Export Volume

Per capita pork consumption in Argentina increased more than 10 percent during 2006–11, with most of the increase attributable to imports (table 10.15). As a member of Mercosul, Brazil faces zero tariffs on its pork exports to Argentina and has captured the majority of Argentina's market for imported pork (table 10.16). Argentinian imports of pork more than tripled by value during the 2006–11 and Brazil accounted for approximately 82 percent of the total growth during that period.

TABLE 10.15 Argentina: Pork production, supply, and distribution, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
							Percent
Production (1,000 mt CWE)	210	215	220	225	218	215	0
Imports (1,000 mt CWE)	24	33	31	35	48	60	20
Exports (1,000 mt CWE)	1	1	2	2	1	1	0
Total supply (1,000 mt CWE)	234	248	251	260	266	275	3
Domestic consumption (1,000 mt CWE)	233	247	249	258	265	274	3
Per capita consumption (kg)	5.9	6.2	6.2	6.3	6.7	6.6	2

Source: USDA, FAS, PSD Online (accessed February 6, 2012).

[77] USTR, *2011 National Trade Estimate Report on Foreign Trade Barriers*, 363; USDA, FAS, *Ukraine: Livestock and Products Voluntary Annual Report*, September 8, 2011, 7.

[78] USDA, FAS, *Ukraine: Livestock and Products Voluntary Annual Report*, September 8, 2011, 7.

[79] GTIS, Global Trade Atlas database (accessed November 30, 2011).

TABLE 10.16 Argentina: Pork imports, by supplier, 2006–11

	2006	2007	2008	2009	2010	2011	Average annual change 2006–10
	Million $						Percent
Brazil	37	58	72	65	106	135	30
Chile	6	6	8	7	19	21	29
EU-27	2	3	6	6	11	10	38
All other	([a])	([a])	([a])	([a])	([a])	([a])	([b])
Total	45	67	86	78	136	165	30

Source: GTIS, Global Trade Atlas database (accessed April 18, 2012).

Note: Totals may not add due to rounding.

[a]Less than $500,000.
[b]Not applicable.

Brazil's total pork exports to Argentina in 2011 consisted mostly of frozen boneless muscle cuts of pork. The average unit value of such pork exports to Argentina in 2010 was $3.24 per kg. Brazil's pork exports to Argentina also include processed and prepared products. These products accounted for 9 percent of Brazil's pork exports to Argentina in 2011.

Import Restrictions

Under Mercosul, imports of pork from Brazil enter Argentina duty free. Imports from outside the region, including those from the United States, face Mercosul tariffs of 10 percent on most pork products and 16 percent on prepared or preserved pork products such as cooked hams. Argentina reportedly applies reference pricing to most imports, rather than basing tariffs on the declared value of imports, but it is not known if this practice is applied to imports of pork.[80]

Competition with the United States

The United States exports very little pork to Argentina, and the volume of exports has declined from over 17 mt in 2006 to just over 1 mt in 2010 and zero in 2011. In 2010, all of U.S. pork exports to Argentina were of frozen boneless muscle cuts of pork. The average unit value of U.S. pork exports to Argentina in 2010 was 12 percent above the unit value of Brazil's exports to Argentina, approximately equal to the preferential tariff treatment. U.S. exporters are unlikely to gain market share from those in Brazil unless Argentina reduces or eliminates the duty-rate advantage available to Brazilian exporters.

Angola

Export Volume

Angola's consumption of pork rose by more than one-third in 2006–11, with almost all the increase attributable to imports (table 10.17). Angola is Brazil's fourth-largest pork

[80] USTR, *2011 National Trade Estimate Report on Foreign Trade Barriers*, 2011, 21. Reference pricing is the practice of basing tariffs on a (usually higher) "reference price" rather than on the actual invoice price of a shipment.

TABLE 10.17 Angola: Pork production, supply, and distribution, 2006–11

Item	2006	2007	2008	2009	2010	2011	Average annual change 2006–11
							Percent
Production (1,000 mt, CWE)	30	31	32	32	33	32	1
Imports (1,000 mt CWE)	36	45	55	61	58	70	14
Domestic consumption (1,000 mt CWE)	66	76	87	93	91	102	9
Per capita consumption (kg)	5.5	6.2	6.9	7.3	7.0	7.6	7

Source: USDA, FAS, PSD Online (accessed February 6, 2012).

export market by volume. It is also Brazil's fastest-growing pork market, having expanded 600 percent in value during 2006–11. Brazil and Angola share cultural ties. Both are former colonies of Portugal, and Portuguese is the official language of both countries. They also share culinary traditions such as feijoada, a stew of pork and beans.

Angola's economy is heavily dependent on oil, which accounts for 85 percent of its GDP. Increases in oil prices in recent years have fueled economic expansion. With the growth of the economy, consumption of pork has grown by more than one-third since 2006, largely through increased imports. Imports rose 66 percent in quantity and nearly doubled in value during 2006–10 (table 10.18).

TABLE 10.18 Angola: Pork imports, by supplier, 2006–10[a]

	2006	2007	2008	2009	2010	Average annual change 2006–10
	Million $					Percent
EU-27	35	46	57	56	52	11
Brazil	11	22	42	53	45	41
United States	1	1	3	2	2	21
Canada	1	1	5	2	2	25
Chile	0	([b])	1	2	1	([c])
All other	4	2	1	1	1	–28
Total	52	73	110	115	103	19

Source: GTIS, Global Trade Atlas database (accessed November 30, 2011).

Notes: Full-year 2011 data on global pork exports to Angola are not yet available. Totals may not add due to rounding.

[a]Data represent global exports to Angola from its top suppliers.
[b]Less than $500,000.
[c]Not applicable.

Export Composition

Brazil's exports to Angola are predominantly frozen boneless muscle cuts of pork (HS 0203.29). Almost all the rest are frozen edible offal (HS 0206.49). Average unit values of goods exported under this subheading to Angola are much lower than unit values of Brazil's exports of such goods to any of its other major markets for pork. In 2011, the unit value of Brazil's exports of frozen boneless pork to Angola was $2.36 per kg.[81]

[81] GTIS, Global Trade Atlas database (accessed November 30, 2011).

Import Restrictions

Angola maintains tariffs of 10 percent ad valorem on imports of pork meat and edible offal, and 15 percent on imports of processed pork products.[82] Exports of all goods to Angola are potentially impacted by widespread reported corruption in Angola and deficiencies in infrastructure.[83] USITC staff have not identified any major sanitary barriers or technical barriers to trade facing U.S. exports of pork to Angola.

Competition with the United States

Brazil's pork exports to Angola in 2011 were made up of 70 percent frozen boneless muscle cuts of pork, 3 percent bone-in frozen pork, and 23 percent frozen edible offal other than livers by volume. The composition of U.S. pork exports to Angola in 2011 was somewhat different: 14 percent frozen boneless pork, 65 percent bone-in frozen pork, and 21 percent frozen edible offal other than livers. The average unit values for Brazil's 2011 exports of bone-in and boneless pork of $1.50 and $2.36 per kg, respectively, were lower than the average unit values of U.S. exports at $1.92 and $2.60. The average unit values of exports to Angola from both Brazil and the United States in 2010 were lower than the average unit values of similar products to other major trading partners, perhaps indicating a lower quality of product exported to Angola from both countries. Brazil's cultural and linguistic ties to Angola give Brazilian pork a competitive advantage in this market.

[82] WTO Tariff Information database.
[83] USTR, *2011 National Trade Estimate Report on Foreign Trade Barriers*, 2011, 10–11.

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CHAPTER 11
Estimated Effects of Nontariff Measures and Brazil's Preferential Tariffs

Overview

This study used an applied general equilibrium (AGE) global trade model to estimate the economic effects of selected non-tariff measures (NTMs) on U.S. and Brazilian exports of meat, grain, and oilseed products in major third-country export markets. This model was also used to estimate the economic effects of preferential tariffs negotiated under Brazil's free trade agreements (FTAs) on U.S. and Brazilian exports.

Model simulations suggest that in 2010, food and agricultural NTMs in five major markets—the European Union (EU-27), Japan, Korea, China, and Russia—reduced U.S. exports of meats and grains by $5.0–$11.0 billion (the equivalent of 17–37 percent).[1] NTMs in these markets also reduced Brazilian exports of meats and grains by $3.7–$5.9 billion (23–38 percent). The largest effects for the United States, in terms of value, relate to beef exports, while the largest effects for Brazil relate to poultry exports. NTMs in the EU-27 account for most of the reduced exports for both the United States and Brazil.

Mercosul, a customs union in South America, is Brazil's most significant free trade agreement (FTA) and the only FTA modeled in this report.[2] As a member of Mercosul, Brazil has signed limited agreements with other countries, but because of the small number of agricultural products covered and the minimal preferences provided, the impacts of other agreements on Brazilian agricultural exports were not modeled by USITC staff. Model simulations were used to estimate how U.S. food and agricultural exports would change under a scenario where Brazil's imports from or exports to the rest of Mercosul stopped receiving preferential duties and trade became subject to MFN tariffs. Two separate model simulations were undertaken, reflecting alternative assumptions about which tariff preferences are removed. The first simulation estimates the effects on U.S. food and agricultural exports in 2010 if none of Brazil's imports from or exports to the rest of Mercosul received preferential duties, i.e., all of Brazil's trade with Mercosul faced normal trade relations duties. The second simulation estimates the effect on U.S. food and agricultural exports in 2010 if Brazil's food and agricultural trade with the rest of Mercosul stopped receiving preferential duties, leaving tariff preferences on manufactured goods in place.

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[1] USITC staff research found no trade-distorting NTMs on soybeans and soybean products in any of the five focus markets. USITC staff are aware of U.S. industry issues related to the acceptance of GM products in the EU-27, but staff found no price gaps in 2010 related to NTMs for these products, expressed as the differences between global prices and EU-27 import prices. For more information on soybeans and soybean products, see chapter 6.

[2] Mercosul is discussed in more detail in chapter 2. For the purpose of the modeling simulations, the Commission has defined Mercosul as all current Mercosul members, associate members, and observers. In addition to Brazil, these include Argentina, Paraguay, Uruguay, Bolivia, Chile, Colombia, Ecuador, Mexico, Peru, and Venezuela.

Results from the first simulation show that removing tariff preferences on all products (food, agriculture, and manufactures) would lead to an increase in U.S. food and agricultural exports to Brazil and to the rest-of-Mercosul: U.S. food and agricultural exports to Brazil would increase by $62–$116 million (11–21 percent) and exports to the rest-of-Mercosul would increase by $14–$20 million (0.08–0.11 percent). While U.S. food and agricultural exports to Mercosul would expand, the simulation results indicate a small drop in U.S. food and agricultural exports to the world, falling by $109–$115 million (0.1 percent) in 2010. This counterintuitive result was obtained because food and agricultural trade between Brazil and other Mercosul countries is relatively small compared with trade in manufactured products, and also because Mercosul's tariff preferences for manufactures are larger than those for food and agricultural products. Thus, removing tariff preferences on all products induces a shift in global export demand for U.S. products: demand for global U.S. manufacturing exports would be stimulated, while demand for global U.S. food and agricultural exports would slightly decline. As a result of the shift in U.S. export demand, the prices of manufactures would rise relative to agricultural prices, causing a shift in resources away from food and agricultural production. This in turn would slightly reduce the quantity of U.S. agricultural output. Nevertheless, even though total U.S. food and agricultural exports would decline, U.S. exports of selected food and agricultural products, including wheat, and beef and pork meat, would expand. These are products for which Brazil's tariff preferences are relatively large and U.S. producers can easily expand their exports. The simulation results also show that for 2010, the absence of Brazil's preferential tariffs with its Mercosul partners would have caused a decline in Brazilian food and agricultural exports to the world of $356–$378 million, or 1 percent.

Results from the second simulation show that removing tariff preferences on just food and agricultural products would cause U.S. food and agricultural exports to the world to increase by $121–$148 million (0.1 percent) in 2010. If food and agricultural tariff preferences were removed while manufacturing preferences remained in place, only demand for U.S. food and agricultural exports would be stimulated, without any significant change in demand for U.S. manufacturing exports.

Although the direction of the change in U.S. food and agricultural exports differs, depending on the assumption about tariff preference removal, in either case the impact is negligible. Further, any effect on U.S. food and agricultural exports associated with Mercosul preferences would likely be overwhelmed by normal annual variations in food and agricultural trade that are driven by weather-related supply adjustments and income-related changes in demand. Thus, if Brazil's Mercosul preferences were removed, any potential effect on U.S. food and agricultural exports could be imperceptible. In addition to model assumptions about the demand for food and agricultural and manufactured products, these simulated effects are sensitive to model assumptions about the reallocation of resources between food and agriculture and manufactures for the global economy. Given the small size of these effects, it is possible that changes in model assumptions could produce different results.

The AGE model used in this study covers 50 sectors and 21 economies. Thirty-eight sectors represent food and agricultural products, including the products that are the focus of this report, that is, meats, grains, and soybean products. Besides the United States and Brazil, the AGE model includes Brazil's trade partners in Mercosul, China, the EU-27, Japan, Korea, Russia, and other major economies producing agricultural goods. The data in the simulation model are for 2010, and simulated effects reflect long-term adjustments in factor markets.[3] Appendix E discusses the details of the simulation model and the simulation inputs.

Simulated Effects of Nontariff Measures Affecting U.S. and Brazilian Exports

The USITC conducted economic model simulations to examine the effects of NTMs affecting certain U.S. and Brazilian agricultural exports to five partner countries: China, the EU-27, Japan, Korea, and Russia, known as the focus markets.[4] The set of products considered includes 11 agricultural products for which USITC staff research indicated that NTMs were impeding imports into individual focus markets.[5] The 11 agricultural products include wheat, corn, and several beef products (meat, offal, and processed), pork products (meat, offal, and processed), and poultry products (whole, pieces, and preserved).[6]

Focus markets may not have NTMs impeding trade in all products. In table 11.1, a checkmark indicates the products and corresponding focus markets for which there were known NTMs and for which import prices were higher than the world price or imported quantities were negligible. In some cases, staff research indicated the presence of a trade-restricting policy; however, a positive tariff equivalent could not be calculated, and the product was excluded from the simulation analysis. This was principally the case for pork exports to China.[7]

For the cases noted in table 11.1, the USITC's model simulations removed estimated tariff equivalents that measure the trade restrictiveness of NTMs in the identified products. These tariff equivalents were calculated separately for each exporter and destination market, using bilateral data on values and quantities traded.[8] The estimated tariff equivalents, calculated in ad valorem terms (i.e., as a percentage of the value of the traded good), are shown in the lower panel of tables 11.3–11.7. They reflect the aggregate estimated effect of all known and unknown NTMs specific to these products, as well as the effect of factors affecting importation of products in general, such as customs procedures, notice and comment procedures, and tax policies.

[3] Based on labor supply functions for the whole economy, labor employment would increase if the real wage increased; similar adjustments would take place for land use. Economy-wide capital would adjust so that returns to capital do not change.

[4] The simulation framework is described in appendix E.

[5] Staff used a variety of resources. Many of these were government publications, such as the U.S. Department of Agriculture (USDA) Foreign Agricultural Service (FAS) attaché reports (GAIN reports); USDA Food Safety and Inspection Service (FSIS) "Export Requirements" guides; USITC and United States Trade Representative (USTR) reports; and publications of the European Commission Directorate General for Agriculture and Rural Development. Staff also drew on industry publications, such as the *Brazilian Meat Monitor* and *Meat Trade News Daily*, and interviews with government officials and industry representatives.

[6] Information about NTMs that affect these products is found in chapters 7–10.

[7] For an analysis of Chinese NTMs affecting U.S. exports of pork products, see USITC, *China's Agricultural Trade*, March 2011.

[8] See appendix E for details.

TABLE 11.1 Products and markets used in the NTM simulation analysis

	Third-country market				
Product	China	EU-27	Japan	Korea	Russia
Wheat	✓		✓	✓	
Corn	✓	✓	✓		
Beef	✓	✓	✓	✓	✓
Beef offal	✓	✓	✓	✓	✓
Processed beef		✓			
Pork	([a])	([a])	✓	✓	✓
Pork offal	([a])	([a])	✓	✓	✓
Processed pork	([a])				✓
Poultry, whole birds	✓	✓	✓		✓
Poultry, pieces and offal	✓	✓	✓		✓
Preserved poultry	✓	✓			

Source: Compiled by USITC staff.

[a]Product was not included in the simulation analysis because a representative positive tariff equivalent of a known NTM could not be calculated.

The analysis below consists of six simulation scenarios. The first scenario considers the simultaneous elimination of all NTMs across the five focus markets for all of the products—that is, wheat, corn, beef products, pork products, and poultry products.[9] The other five scenarios consider the elimination of all NTMs across the focus markets for each of the product groups.

Changes in trade due to the elimination of NTMs reflect a combination of factors, such as the size of the estimated ad valorem equivalents (AVEs) of NTMs, which measure the NTMs' restrictiveness; baseline conditions, such as the initial market shares of the exporting countries; and general equilibrium adjustments, such as income and price effects. While NTMs affecting a specific market or facing an exporter across markets typically restrict exports, market liberalization can also cause imports from a supplier to fall in one or more markets. For example, if restrictive NTMs on a U.S. product in one market are removed, U.S. exports of the product to that market may still decline if another supplier to the same market had been facing NTMs that were even more restrictive—and that were also removed. In other cases, increased demand in large markets, such as the EU-27 or Japan, can cause the world price of the product to rise to the point where the quantity demanded in smaller markets declines.

All Focus Products Considered Together

The first simulation analyzes the combined effects on trade of all NTMs affecting all the focus products shown in table 11.1 in all five focus markets.[10] The results of this simultaneous removal of NTMs for 2010 are shown in table 11.2. These results show that U.S. exports of the focus products would have been higher by $5.0–$11.0 billion (an

[9] The analysis illustrates potential changes in trade flows from the removal of NTMs, and it makes no judgment about the feasibility or desirability of such a policy scenario. Countries may sometimes impose NTMs for legitimate purposes, such as for health and safety reasons.

[10] Information about NTMs that affect the focus products is found in chapters 7–10.

TABLE 11.2 Simulated effects of the removal of corn, wheat, beef, pork, and poultry NTMs

Product	Exporter	Exports to the world, 2010	Change in exports to the world	Change in imports				
				China	EU-27	Japan	Korea	Russia
		Million $						
All products	U.S.	29,748	4,956–10,965	703–2,008	3,385–8,317	939–1,433	167–330	123–377
	Brazil	15,763	3,669–5,936	(91)–(68)	4,692–7,391	(654)–(449)	40–90	461–536
	Other	38,678	5,073–7,449	(396)–(186)	2,623–2,874	2,240–3,195	(391)–(179)	(158)–78

Sources: UNSD, Comtrade; USITC staff estimates.

Notes: Figures in parentheses indicate a negative number. EU-27 exports counted under “other exporters” exclude intra-EU trade. The simulated effects are given in ranges calculated by performing sensitivity analysis with respect to the values of the international trade elasticities in the simulation model. Changes in total exports may differ from the sum of changes in imports in the five focus markets because of import changes in other countries. Exports are free on board (f.o.b.). Imports are cost, insurance, and freight (c.i.f.).

increase of 17–37 percent) in this scenario, while Brazilian exports of these products would have been higher by $3.7–$5.9 billion (23–38 percent). These are considerable trade expansions, and they are driven primarily by the resulting higher demand for these products in the EU-27 from all sources and by increased exports of U.S. products to China and Japan.

Changes in total exports are determined by changes in imports in the five focus markets, as well as resulting changes in imports in all other countries. Removal of all NTMs in the five focus markets would have increased U.S. and Brazilian exports to the focus markets by $12.5 billion and $7.3 billion, respectively, if the upper-bound effects were aggregated (table 11.2). Despite higher production, demand in the focus markets would have expanded strongly enough to raise the world price of these products, which would in turn decrease the quantity demanded in other markets. U.S. and Brazilian exports to those other markets would have declined by as much as $1.5 billion and $1.3 billion.[11] The difference between the increases in global exports to and imports from liberalized focus markets reflects this trade diversion and the changes in the quantity demanded in other markets caused by rising world prices.

Corn

The United States is the world’s largest exporter of corn, accounting for 61 percent of global exports in 2010. That year, Brazil was the second-largest exporter of corn, accounting for about 15 percent of world corn exports. In 2010, about 45 percent of U.S. corn exports went to the focus markets (primarily Japan and Korea), while about 20 percent of Brazilian corn exports were sent to focus markets (primarily the EU-27). Table 11.3 presents the simulated effects on corn exports from the United States, Brazil, and other corn exporters in 2010 if all corn NTMs were removed in the focus markets.[12] U.S. corn exports would have been higher by between $281 million and $1.3 billion under this scenario, representing a 3–12 percent increase in total U.S. exports of corn. The largest trade-restricting NTMs faced by U.S. corn exports are in China and the EU-27, and the potential expansion in U.S. exports of corn is driven mostly by the restrictiveness of the NTMs in these two markets. The effects on Brazilian corn exports,

[11] U.S. exports to other countries would decline by $361 million to $1.5 billion. Brazilian exports to other countries would decline by $1.0–$1.3 billion.

[12] Information about NTMs that affect corn in the focus markets is found in chapter 7.

TABLE 11.3 Simulated effects of the removal of corn NTMs and estimated AVEs of known corn NTMs

Product	Exporter	Exporters to the world, 2010	Change in exports to the world	China	EU-27	Japan	Korea	Russia
				Change in imports				
		Million $						
Corn	U.S.	10,352	281–1,290	102–363	171–1,002	28–49	(1)–0	0–0
	Brazil	2,504	48–91	(7)–(4)	78–145	(41)–(19)	0–0	0–0
	Other	4,034	56–80	(15)–(11)	62–67	7–18	0–4	0–1
				Estimated NTM AVEs removed in simulation				
				Percent				
Corn	U.S.			157	116	21	([a])	([a])
	Brazil			29	19	9	([a])	([a])
	Other			11	12	22	([a])	([a])

Sources: UNSD, Comtrade; USITC staff estimates.

Notes: Figures in parentheses indicate a negative number. EU-27 exports counted under "other exporters" exclude intra-EU trade. The simulated effects are given in ranges calculated by performing sensitivity analysis with respect to the values of the international trade elasticities in the simulation model. Changes in total exports may differ from the sum of changes in imports in the five focus markets because of import changes in other countries. Exports are free on board (f.o.b.). Imports are cost, insurance, and freight (c.i.f.).

[a]USITC staff research found no known trade-restricting NTMs.

which would have increased by $48–$91 million (a 2–4 percent increase), are smaller than for the United States but are also driven by NTMs in China and the EU-27.

Wheat

The United States is the world's largest wheat-exporting country and supplied wheat valued at about $6.9 billion globally in 2010 (about 39 percent of world wheat exports). That year, the United States exported approximately 21 percent of its wheat exports to China, the EU-27, Japan, Korea, and Russia. In contrast, Brazil is a relatively small exporter of wheat, accounting for just 1 percent of global exports. Table 11.4 presents the simulated effects on wheat exports from the United States, Brazil, and other exporters in the absence of NTMs on wheat in the focus markets.[13] U.S. wheat exports for 2010 would have been higher by $241–$751 million under this scenario, representing a 4–11 percent increase in total U.S. exports of wheat. This gain is largely driven by increased imports of U.S. wheat in China, the focus market where U.S. wheat faces its most restrictive NTMs. Simulated effects for Brazilian exports of wheat are fairly small in general; total exports of Brazilian wheat would have fallen by $6–$7 million with the removal of NTMs, as Korean imports of Brazilian wheat would have declined in favor of U.S. wheat.

Beef Products

Brazil and the United States are the world's two largest exporters of beef products, with each country's exports of beef products totaling $4.7 billion and $4.0 billion, respectively, in 2010. U.S. and Brazilian exports of beef to all focus markets combined were comparable at $1.4 billion and $1.6 billion, respectively, but market shares varied

[13] Information about NTMs that affect wheat is found in chapter 7.

TABLE 11.4 Simulated effects of the removal of wheat NTMs and estimated AVEs of known wheat NTMs

Product	Exporter	Exports to the world, 2010	Change in exports to the world	Change in imports: China	EU-27	Japan	Korea	Russia
		Million $						
Wheat	U.S.	6,861	241–751	139–865	(21)–(2)	(84)–30	116–304	0–0
	Brazil	244	(7)–(6)	0–0	0–0	0–0	(12)–(8)	0–0
	Other	10,532	24–55	(245)–(81)	(8)–(1)	193–475	(284)–(97)	0–0
				Estimated NTM AVEs removed in simulation				
				Percent				
Wheat	U.S.			46	([a])	40	30	([a])
	Brazil			1	([a])	2	1	([a])
	Other			([a])	([a])	46	18	([a])

Sources: UNSD, Comtrade; USITC staff estimates.

Notes: Figures in parentheses indicate a negative number. EU-27 exports counted under "other exporters" exclude intra-EU trade. The simulated effects are given in ranges calculated by performing sensitivity analysis with respect to the values of the international trade elasticities in the simulation model. Changes in total exports may differ from the sum of changes in imports in the five focus markets, because of import changes in other countries. Exports are free on board (f.o.b.). Imports are cost, insurance, and freight (c.i.f.).

[a]Staff research found no known trade-restricting NTMs.

considerably among focus markets; U.S. beef exports went primarily to Japan and Korea, while Brazilian beef exports were sent largely to Russia and the EU-27. Table 11.5 shows the simulated effects on exports of beef meat, beef offal, and processed beef from the United States, Brazil, and other suppliers if there had been no NTMs on beef in the focus markets in 2010.[14] U.S. exports of beef meat would have been higher by $3.4–$6.7 billion in this scenario. The focus market with the most restrictive NTMs on both U.S. and Brazilian beef meat is the EU-27. As a result, the increase in U.S. exports would have been driven mostly by higher imports of U.S. beef meat in the EU-27. Brazilian exports of beef meat to the EU-27 would have been higher by $602–$808 million, but NTMs in the other focus markets are less restrictive on imports of Brazilian beef meat. Although demand for Brazilian beef meat would have increased in the EU-27, demand would have declined in Russia and other importing markets in favor of imports from other sources, resulting in an ambiguous change in Brazilian total exports of beef meat.

Without NTMs in 2010, exports of beef offal would have been higher for both Brazil and the United States—and in similar magnitudes. Imports of U.S. beef offal would have increased mainly in Russia. Brazilian beef offal exports, which face the most restrictive NTMs in the EU-27, would have seen the largest expansion of imports in that market. Restrictive NTMs on processed beef were identified for U.S. exports to the EU-27. In the absence of these measures, U.S. exports to the EU-27 would have been higher by $66–$708 million. With demand for U.S. processed beef increasing in the EU-27, consumption of processed beef in the EU-27 market from Brazil and other suppliers would have declined, resulting in declines in total exports of processed beef from these regions.

[14] Information about NTMs that affect beef is found in chapter 9.

TABLE 11.5 Simulated effects of the removal of beef NTMs and estimated AVEs of known beef NTMs

Product	Exporter	Exporters to the world, 2010	Change in exports to the world	Change in imports				
				China	EU-27	Japan	Korea	Russia
		Million $						
Beef meat	U.S.	3,379	3,449–6,749	1–1	3,135–6,590	686–1,338	(4)–24	(25)–32
	Brazil	3,964	(131)–48	(4)–(4)	602–808	0–0	0–1	(357)–(256)
	Other	9,933	998–2,043	(15)–(6)	(252)–137	(140)–(137)	(58)–(55)	385–823
Beef offal	U.S.	466	146–739	0–1	12–82	(96)–(94)	19–44	138–461
	Brazil	214	117–952	0–1	166–1,196	0–0	0–0	0–0
	Other	647	924–1,127	(12)–(7)	2–13	1,025–1,370	(50)–(21)	(59)–5
Processed beef	U.S.	146	61–679	0–0	66–708	0–0	0–0	0–0
	Brazil	539	(160)–(41)	0–0	(166)–(48)	0–1	0–0	0–0
	Other	470	(26)–(16)	0–0	(75)–(26)	3–23	0–0	(1)–0
				Estimated NTM AVEs removed in simulation				
				Percent				
Beef meat	U.S.			44	118	23	8	23
	Brazil			3	101	9	12	6
	Other			12	38	([a])	([a])	9
Beef offal	U.S.			93	61	([a])	14	34
	Brazil			35	148	12	27	23
	Other			25	([a])	200	([a])	19
Processed beef	U.S.			([a])	[b]118	([a])	([a])	([a])
	Brazil			([a])	([a])	([a])	([a])	([a])
	Other			([a])	([a])	([a])	([a])	([a])

Sources: UNSD, Comtrade; USITC staff estimates.

Notes: Figures in parentheses indicate a negative number. EU-27 exports counted under "other exporters" exclude intra-EU trade. The simulated effects are given in ranges calculated by performing sensitivity analysis with respect to the values of the international trade elasticities in the simulation model. Changes in total exports may differ from the sum of changes in imports in the five focus markets because of import changes in other countries. Exports are free on board (f.o.b.). Imports are cost, insurance, and freight (c.i.f.).

[a]USITC staff research found no known trade-restricting NTMs.
[b]USITC staff research indicated that in the EU-27, beef meat, beef offal, and processed beef from the United States are subject to the same NTMs. Because the United States is not a large exporter of processed beef, a representative price gap could not be calculated and the calculated price gap for U.S. beef meat exports to the EU-27 was used.

Pork Products

The United States is the largest global exporter of pork products, with exports of $4.5 billion in 2010. Brazil is the fourth-largest exporter of pork products (after the EU-27 and Canada), exporting $1.3 billion worth in 2010. Most U.S. pork exports to the focus markets go to Japan, while Brazilian pork exports, because of sanitary restrictions in other focus markets, are shipped mostly to Russia. U.S. pork exports exceed Brazilian pork exports in all five focus markets, except in Russia. Table 11.6 shows the simulated effects on pork exports from the United States, Brazil, and other pork exporters if these NTMs had not been in place in 2010.[15] NTMs on pork exported to China are not considered in the analysis because of the difficulty in estimating accurate NTM AVEs, due to the low unit value of pork imported into China.[16]

[15] Information about NTMs that affect pork is found in chapter 10.
[16] USITC staff research indicated the presence of trade-restricting NTMs affecting imports of pork into China. However, a representative positive tariff equivalent of the NTM could not be calculated due to the low unit value of pork imported and consumed in China relative to the price of world imports of pork from the same supplier, which makes the calculation of a positive tariff equivalent infeasible.

TABLE 11.6 Simulated effects of the removal of pork NTMs and estimated AVEs of known pork NTMs

Product	Exporter	Exports to the world, 2010	Change in exports to the world	Change in imports: China	EU-27	Japan	Korea	Russia
		Million $						
Pork meat	U.S.	3,502	(96)–(53)	(2)–(1)	(1)–(1)	(58)–(31)	(9)–(5)	(49)–(35)
	Brazil	1,213	449–774	0–0	18–44	80–272	20–50	442–539
	Other	6,610	(526)–(372)	0–0	(21)–(17)	(57)–(13)	(21)–(8)	(503)–(402)
Pork offal	U.S.	477	(16)–(7)	2–3	0–0	(24)–(14)	(7)–(4)	16–17
	Brazil	72	222–433	0–0	34–82	103–225	29–55	41–63
	Other	885	(90)–(62)	(11)–(8)	0–1	(7)–(4)	(9)–(6)	(56)–(40)
Processed pork	U.S.	565	35–54	0–0	0–0	0–0	0–0	36–56
	Brazil	39	0–0	0–0	0–0	0–0	0–0	0–0
	Other	946	(31)–(23)	0–0	0–0	0–0	0–0	(38)–(27)
				Estimated NTM AVEs removed in simulation				
				Percent				
Pork meat	U.S.			([a])	([b])	([b])	([b])	15
	Brazil			([a])	[c]66	[c]101	[c]70	32
	Other			([a])	([b])	([b])	([b])	11
Pork offal	U.S.			([a])	([b])	([b])	([b])	9
	Brazil			([a])	[c]66	[c]101	[c]70	33
	Other			([a])	([b])	([b])	([b])	([b])
Processed pork	U.S.			([a])	([b])	([b])	([b])	63
	Brazil			([a])	([b])	([b])	([b])	24
	Other			([a])	([b])	([b])	([b])	7

Sources: UNSD, Comtrade; USITC staff estimates.

Notes: Figures in parentheses indicate a negative number. EU-27 exports counted under "other exporters" exclude intra-EU trade. The simulated effects are given in ranges calculated by performing sensitivity analysis with respect to the values of the international trade elasticities in the simulation model. Changes in total exports may differ from the sum of changes in imports in the five focus markets, because of import changes in other countries. Exports are free on board (f.o.b.). Imports are cost, insurance, and freight (c.i.f.).

[a]Product was not included in the simulation analysis because a representative positive tariff equivalent of a known NTM could not be calculated.
[b]Staff research found no known trade-restricting NTM.
[c]The estimated NTM AVEs for Brazilian pork meat and pork offal are approximately equal within each market. Since the NTMs facing these imports are the same, same estimates were used for pork meat and pork offal within each of these markets.

Without NTMs in 2010, Brazilian exports of pork meat and pork offal would have been higher by an estimated $449–$774 million and $222–$433 million, respectively. These are pork products where Brazil faced higher NTMs in 2010 than any other supplier. U.S. total exports of pork meat and pork offal would have declined by as much as $96 million and $16 million, respectively, as Brazilian exports of these products would have expanded in the focus markets. On the other hand, NTMs on processed pork were more restrictive for the United States than for any other supplier, and U.S. exports of processed pork would have been $35–$54 million higher in the absence of pork NTMs in 2010.

Poultry Products

Brazil and the United States are the world's two largest exporters of poultry meat products, accounting for 45 percent and 26 percent of world exports of poultry, respectively, in 2010.[17] Brazilian poultry exports exceed U.S. poultry exports both globally and to the five focus markets combined. Table 11.7 shows the simulated effects on poultry exports from the United States, Brazil, and other exporters if there were no NTMs on poultry exports to the focus markets for 2010.[18] U.S. poultry exports are concentrated in poultry pieces (cuts) (rather than whole birds or preserved poultry), and these exports would have expanded considerably—by $571–$681 million (16–20 percent)—under this scenario, driven by increases in exports to China and Japan. On the other hand, exports of whole birds and preserved poultry from Brazil, which exports much higher volumes of these products than the United States and has a comparative advantage, would have increased dramatically. This trade expansion would have been driven mostly by sharp increases in imports of Brazilian whole and preserved poultry by the EU-27.

TABLE 11.7 Simulated effects of the removal of poultry NTMs and estimated AVEs of known poultry NTMs

				Change in imports				
Product	Exporter	Exports to the world, 2010	Change in exports to the world	China	EU-27	Japan	Korea	Russia
		Million $						
Whole poultry	U.S.	207	117–197	14–28	0–0	34–61	0–0	1–1
	Brazil	2,389	1,273–1,921	1–2	1,481–2,302	(9)–(9)	0–0	94–124
	Other	239	70–117	0–0	(19)–0	45–78	0–0	(32)–(28)
Poultry pieces	U.S.	3,492	571–681	293–388	15–31	298–300	0–1	(82)–(65)
	Brazil	3,811	(24)–51	(81)–(62)	706–854	(883)–(806)	(2)–(1)	144–176
	Other	1,506	2,909–3,916	(100)–(77)	1,975–2,733	1,113–1,408	0–0	(68)–(56)
Preserved poultry	U.S.	300	152–390	153–395	0–0	0–0	0–0	0–0
	Brazil	774	1,614–2,097	0–0	1,667–2,167	0–0	0–0	(1)–(1)
	Other	2,875	487–498	3–4	488–497	(1)–(1)	0–0	(1)–0
				Estimated NTM AVEs removed in simulation				
				Percent				
Whole poultry	U.S.			112	16	107	([b])	34
	Brazil			85	118	([b])	([b])	73
	Other			([a])	19	107	([b])	15
Poultry pieces	U.S.			18	69	63	([b])	1
	Brazil			([a])	24	([b])	([b])	12
	Other			([a])	35	84	([b])	([b])
Preserved poultry	U.S.			207	16	([b])	([b])	([c])
	Brazil			62	29	([b])	([b])	([b])
	Other			120	16	([b])	([b])	([b])

Sources: UNSD, Comtrade; USITC staff estimates.

Notes: Figures in parentheses indicate a negative number. EU-27 exports counted under "other exporters" exclude intra-EU trade. The simulated effects are given in ranges calculated by performing sensitivity analysis with respect to the values of the international trade elasticities in the simulation model. Changes in total exports may differ from the sum of changes in imports in the five focus markets, because of import changes in other countries. Exports are free on board (f.o.b.). Imports are cost, insurance, and freight (c.i.f.).

[a]Product was not included in the simulation analysis because a representative positive tariff equivalent of a known NTM could not be calculated.
[b]USITC staff research found no known trade-restricting NTM.
[c]Because known NTMs affect U.S. exports of preserved poultry to Russia indirectly and might not have a substantial trade-restricting effect, the estimated ad valorem equivalent of the known NTM was excluded from the analysis.

[17] The export shares for poultry presented in chapter 11 are different than the shares listed in table 8.1 of the report. For the model simulation discussed here, all poultry meats, including chicken and turkey, were included rather than only broiler (chicken) meat in chapter 8. In addition, chapter 11 data are values in 2010 (the last year modeling data are available), while chapter 8 compares volumes exported in 2011. Lastly, chapter 11 uses data generated and updated specifically for the GTAP model, and chapter 8 uses USDA data.
[18] Information about NTMs that affect poultry is found in chapter 8.

Simulated Effects of Preferential Tariffs Negotiated under Brazil's Free Trade Agreements

In order to estimate the economic effects of the preferential tariffs negotiated under Brazil's FTAs on U.S. and Brazilian food and agricultural exports, the USITC conducted economic model simulations[19]in which preferential tariffs for all products traded between Brazil and its Mercosul partners were raised from their 2010 levels to their most-favored-nation (MFN) levels. [20] The resulting simulated trade flows were then compared to actual trade flows for 2010. The simulation results, represented by the difference between the two sets of trade flows, reflect the effects of the removal of tariff preferences negotiated under Mercosul on U.S. and Brazilian global exports and imports of food and agricultural products. Simulated trade effects are also presented for the rest-of-Mercosul.[21]

The simulated effects discussed in this section are the marginal effects of Brazil's bilateral tariff preferences in 2010, and they do not incorporate any other effects of Brazil's participation in Mercosul, including other economic policies related to Mercosul or economic changes induced by Brazil's participation in Mercosul since 1995.

Table 11.8 presents simulated effects of the absence of Brazil's tariff preferences for the value of U.S. exports to Brazil and to the rest-of-Mercosul in meats, grains, and soybean products, as well as the aggregate effects for the rest of food and agricultural products. The simulated effects in table 11.8 indicate that in the absence of Brazil's bilateral tariff preferences, the value of total U.S. food and agricultural exports to Brazil would have been higher by $62–$116 million (11–21 percent) than actual 2010 exports. Among farm products, U.S. wheat exports to Brazil would have been higher by $19–57 million (17–52 percent). In 2010, Brazil imported about $1.6 billion of wheat; the great bulk of it was imported from Mercosul countries, mostly Argentina. If Brazil's bilateral tariff preferences were removed, Brazil would have imported less wheat from Argentina and more from the United States. In the absence of Brazil's bilateral tariff preferences, U.S. exports of other food products to Brazil would have expanded by $37–$46 million (13–16 percent), mostly representing processed foods. Table 11.8 also shows that in the absence of Brazil's bilateral tariff preferences, the value of U.S. food and agricultural exports to the rest-of-Mercosul would have been higher than actual 2010 exports by $14–$20 million (less than 1 percent). However, U.S. wheat, beef meat, beef offal, pork offal, and soymeal exports to the rest-of-Mercosul would have been slightly lower than in 2010 because exports from the rest-of-Mercosul to Brazil would have declined, raising the supply of those products in their domestic markets and lessening demand for imports from the United States.

Tables 11.9, 11.10, and 11.11 present effects for the value of U.S., Brazilian, and rest-of-Mercosul trade with the world for meats, grains, and soybean products, along with

[19] The USITC's simulations were performed with an applied general equilibrium (AGE) global trade model, the Global Trade Analysis Project (GTAP) model. The simulation framework is described in appendix E.

[20] Simulated effects from an alternative simulation, which removed preferences for only food and agricultural products, are discussed at the end of this section.

[21] In this chapter, the "rest-of-Mercosul" is defined as Argentina, Paraguay, Uruguay, Venezuela, Bolivia, Chile, Colombia, Ecuador, Peru, and Mexico.

TABLE 11.8 United States food and agricultural exports to Brazil and to the rest-of-Mercosul[a]: 2010 trade and simulated[b] trade effects of removing Brazilian bilateral tariff preferences

Sector	U.S. exports to Brazil, model data for 2010, f.o.b.	Range of simulated change in U.S. exports to Brazil absent Brazilian preferences, f.o.b.[c]		U.S. exports to the rest-of-Mercosul[a], model data for 2010, f.o.b.	Range of simulated change in U.S. exports to rest-of-Mercosul[a] absent Brazilian preferences, f.o.b.	
	Million $	Million $	Percent	Million $	Million $	Percent
Wheat	109	19–57	17–52	1,220	(3)–(1)	0–0
Corn	2	0–0	4–10	2,070	0–4	0–0
Soybeans	0	0–0	7–9	1,645	1–2	0–0
Other farm products	139	6–12	4–8	3,701	2–4	0–0
Beef meat	1	0–0	0–0	648	(1)–(1)	0–0
Beef offal	0	0–0	17–32	142	(1)–(1)	(1)–(1)
Prepared beef meat	5	0–1	8–11	6	0–0	3–5
Pork meat	0	0–0	0–0	604	2–3	0–1
Pork offal	0	0–0	0–0	173	(1)–(1)	(1)–0
Prepared pork meat	0	0–0	0–0	233	0–0	0–0
Poultry meat, whole birds	0	0–0	0–0	41	0–1	1–1
Poultry meat, pieces and offal	0	0–0	26–32	605	1–1	0–0
Preserved poultry meat	1	0–0	0–0	44	1–1	1–2
Soymeal	0	0–0	14–18	832	(7)–(6)	(1)–(1)
Soybean oil	0	0–0	26–33	341	1–1	0–0
Other food products	290	37–46	13–16	5,834	16–17	0–0
Total[d]	550	62–116	11–21	18,137	14–20	0–0

Sources: USITC staff calculations; GTAP framework; UNCTAD, TRAINS.

Notes: Figures in parentheses indicate a negative number. Dollar values are rounded to whole millions, and percentage changes are rounded to whole numbers. The calculations performed to produce these data, however, used numbers that were not rounded. f.o.b. = free on board.

[a]In this analysis, the "rest-of-Mercosul" consists of Argentina, Paraguay, Uruguay, Venezuela, Bolivia, Chile, Colombia, Ecuador, Peru, and Mexico.
[b]The simulation removed 2010 bilateral import tariff preferences between Brazil and its Mercosul partners: Argentina, Paraguay, Uruguay, Venezuela, Bolivia, Chile, Colombia, Ecuador, Peru, and Mexico.
[c]The simulated effects are given in ranges that were calculated by performing sensitivity analysis with respect to the values of the international trade elasticities in the simulation model.
[d]Ranges for total trade have been separately calculated and will not equal to the sum of sectoral changes.

TABLE 11.9 United States food and agricultural trade with the world: 2010 trade and simulated[a] trade effects of removing Brazilian bilateral tariff preferences

Sector	U.S. exports to the world, model data for 2010, f.o.b.	Range of simulated change in U.S. exports to the world absent Brazilian preferences, f.o.b. [b]		U.S. imports from the world, model data for 2010, c.i.f.	Range of simulated change in U.S. imports from the world absent Brazilian preferences, c.i.f. [b]	
	Million $	Million $	Percent	Million $	Million $	Percent
Wheat	6,861	22–53	0–1	615	(0)–0	(0)–0
Corn	10,352	(10)–(6)	(0)–(0)	349	(0)–0	(0)–0
Soybeans	18,460	(114)–(93)	(1)–(1)	248	(1)–(1)	(0)–(0)
Other farm products	30,439	22–26	0–0	33,253	2–6	0–0
Beef meat	3,379	1–1	0–0	2,802	1–2	0–0
Beef offal	466	(7)–(5)	(1)–(1)	99	1–1	1–1
Prepared beef meat	146	0–0	0–0	226	3–6	1–3
Pork meat	3,502	0–1	0–0	944	1–1	0–0
Pork offal	477	(2)–(2)	(0)–(0)	22	0–0	0–0
Prepared pork meat	565	(0)–0	(0)–0	288	0–0	0–0
Poultry meat, whole birds	207	(1)–(1)	(1)–(1)	14	0–0	0–0
Poultry meat, pieces and offal	3,492	(39)–(32)	(1)–(1)	172	0–0	0–0
Preserved poultry meat	300	0–0	0–0	96	0–0	0–0
Soymeal	3,560	(64)–(58)	(2)–(2)	55	(0)–(0)	(0)–(0)
Soybean oil	1,589	(19)–(15)	(1)–(1)	53	0–1	1–1
Other food products	39,717	57–61	0–0	69,599	42–50	0–0
Total[c]	123,512	(115)–(109)	(0)–(0)	108,835	50–65	0–0

Sources: USITC staff calculations; GTAP framework; UNCTAD, TRAINS.

Notes: Figures in parentheses indicate a negative number. Dollar values are rounded to whole millions, and percentage changes are rounded to whole numbers. The calculations performed to produce these data, however, used numbers that were not rounded. f.o.b. = free on board; c.i.f. = cost, insurance, and freight.

[a]The simulation removed 2010 bilateral import tariff preferences between Brazil and its Mercosul partners— Argentina, Paraguay, Uruguay, Venezuela, Bolivia, Chile, Colombia, Ecuador, and Peru—as well as Mexico.

[b]The simulated effects are given in ranges that were calculated by performing sensitivity analysis with respect to the values of the international trade elasticities in the simulation model.

[c]Ranges for total trade have been separately calculated, and they are not equal to sum of sectoral changes.

TABLE 11.10 Brazilian food and agricultural trade with the world: 2010 trade and simulated[a] trade effects of removing Brazilian bilateral tariff preferences

Sector	Brazilian exports to the world, model data for 2010, f.o.b.	Range of simulated change in Brazilian exports to the world absent Brazilian preferences, f.o.b.[b]		Brazilian imports from the world, model data for 2010, c.i.f.	Range of simulated change in Brazilian imports from the world absent Brazilian preferences, c.i.f.[b]	
	Million $	Million $	Percent	Million $	Million $	Percent
Wheat	244	(6)–(2)	(3)–(1)	1,645	(41)–(26)	(3)–(2)
Corn	2,504	(35)–(21)	(1)–(1)	77	(8)–(4)	(11)–(5)
Soybeans	11,099	(12)–(10)	(0)–(0)	59	(7)–(5)	(11)–(9)
Other farm products	15,205	21–37	0–0	2,332	(199)–(154)	(9)–(7)
Beef meat	3,964	(85)–(52)	(2)–(1)	171	(69)–(46)	(40)–(27)
Beef offal	214	4–5	2–2	7	(2)–(2)	(31)–(21)
Prepared beef meat	539	3–5	0–1	8	(1)–(1)	(14)–(11)
Pork meat	1,213	(5)–(5)	(0)–(0)	1	(0)–(0)	(3)–(2)
Pork offal	72	2–2	2–3	1	(0)–(0)	(3)–(3)
Prepared pork meat	39	(7)–(6)	(19)–(17)	7	(0)–(0)	(4)–(3)
Poultry meat, whole birds	2,389	5–7	0–0	1	(0)–(0)	(2)–(1)
Poultry meat, pieces and offal	3,811	55–71	1–2	4	(1)–(1)	(26)–(22)
Preserved poultry meat	774	12–16	2–2	1	(0)–(0)	(2)–(2)
Soymeal	4,872	(59)–(56)	(1)–(1)	14	(3)–(2)	(19)–(16)
Soybean oil	1,397	(13)–(10)	(1)–(1)	15	(4)–(4)	(28)–(24)
Other food products	21,172	(315)–(278)	(1)–(1)	5,491	(683)–(564)	(12)–(10)
TOTAL[c]	69,509	(378)–(356)	(1)–(1)	9,833	(1,019)–(809)	(10)–(8)

Sources: USITC staff calculations; GTAP framework; UNCTAD, TRAINS.

Notes: Figures in parentheses indicate a negative number. Dollar values are rounded to whole millions and percentage changes are rounded to whole numbers. The calculations performed to produce these data, however, used numbers that were not rounded. f.o.b. = free on board; c.i.f. = cost, insurance, and freight.

[a]The simulation removed 2010 bilateral import tariff preferences between Brazil and its Mercosul partners—Argentina, Paraguay, Uruguay, Venezuela, Bolivia, Chile, Colombia, Ecuador, and Peru—as well as Mexico.

[b]The simulated effects are given in ranges that were calculated by performing sensitivity analysis with respect to the values of the international trade elasticities in the simulation model.

[c]Ranges for total trade have been separately calculated, and they are not equal to the sum of sectoral changes.

TABLE 11.11 Rest-of-Mercosul[a] food and agricultural trade with the world: 2010 trade and simulated[b] trade effects of removing Brazilian bilateral tariff preferences

Sector	Rest-of-Mercosul exports to the world, model data for 2010, f.o.b.	Range of simulated change in rest-of-Mercosul exports to the world absent Brazilian preferences, f.o.b.[c]		Rest-of-Mercosul imports from the world, model data for 2010, c.i.f.	Range of simulated change in rest-of-Mercosul imports from the world absent Brazilian preferences, c.i.f.[c]	
	Million $	Million $	Percent	Million $	Million $	Percent
Wheat	1,537	(123)–(53)	(8)–(3)	2,446	(4)–(3)	(0)–(0)
Corn	2,732	6–39	0–1	3,677	(17)–(15)	(0)–(0)
Soybeans	7,960	30–63	0–1	2,095	(3)–(3)	(0)–(0)
Other farm products	30,753	(21)–(19)	(0)–(0)	9,638	(116)–(101)	(1)–(1)
Beef meat	2,911	16–23	1–1	1,928	2–3	0–0
Beef offal	146	8–16	6–11	189	(0)–(0)	(0)–(0)
Prepared beef meat	180	7–13	4–7	37	(2)–(1)	(5)–(4)
Pork meat	615	4–5	1–1	936	(6)–(6)	(1)–(1)
Pork offal	17	1–1	7–9	227	(1)–(1)	(1)–(1)
Prepared pork meat	33	(0)–(0)	(1)–(1)	287	(4)–(4)	(1)–(1)
Poultry meat, whole birds	80	1–1	2–2	402	(3)–(2)	(1)–(1)
Poultry meat, pieces and offal	520	20–25	4–5	761	(14)–(13)	(2)–(2)
Preserved poultry meat	58	1–2	2–3	88	(8)–(7)	(9)–(8)
Soymeal	7,847	27–44	0–1	2,333	(14)–(14)	(1)–(1)
Soybean oil	2,027	29–32	1–2	1,212	(12)–(9)	(1)–(1)
Other food products	34,360	(428)–(362)	(1)–(1)	21,047	(260)–(222)	(1)–(1)
Total[d]	91,774	(307)–(285)	(0)–(0)	47,301	(460)–(400)	(1)–(1)

Sources: USITC staff calculations; GTAP framework; UNCTAD, TRAINS.

Notes: Figures in parentheses indicate a negative number. Dollar values are rounded to whole millions and percentage changes are rounded to whole numbers. The calculations performed to produce these data, however, used numbers that were not rounded. f.o.b. = free on board; c.i.f. = cost, insurance, and freight.

[a]In this analysis, the "rest-of-Mercosul" consists of Argentina, Paraguay, Uruguay, Venezuela, Bolivia, Chile, Colombia, Ecuador, Peru, and Mexico.

[b]The simulation removed 2010 bilateral import tariff preferences between Brazil and its Mercosul partners—Argentina, Paraguay, Uruguay, Venezuela, Bolivia, Chile, Colombia, Ecuador, and Peru—as well as Mexico.

[c]The simulated effects are given in ranges that were calculated by performing sensitivity analysis with respect to the values of the international trade elasticities in the simulation model.

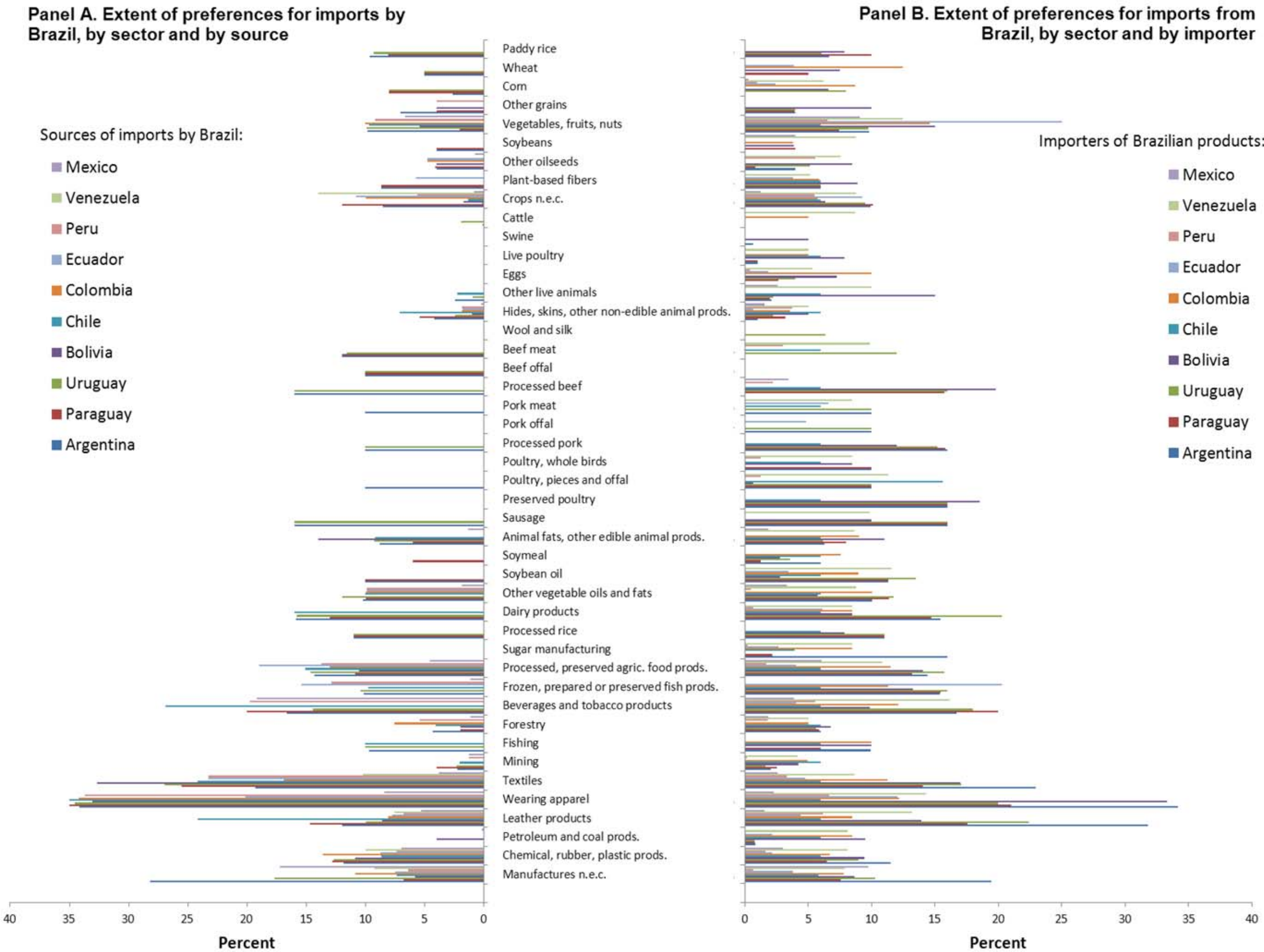
[d]Ranges for total trade have been separately calculated and will not equal to the sum of sectoral changes.

aggregate effects for the remaining food and agricultural products. The simulated effects in table 11.9 indicate that in the absence of Brazil's bilateral preferential tariffs, the value of total U.S. exports of food and agricultural products would have been lower than actual 2010 U.S. exports by $109–$115 million (less than 1 percent). Tables 11.10 and 11.11 indicate that in the absence of Brazil's bilateral preferential tariffs, Brazilian food and agricultural imports would have been $809–$1,019 million lower than 2010 imports, while food and agricultural imports by the rest-of-Mercosul would have been $400–$460 million lower. The direction and magnitude of these effects are driven by the sectoral composition of bilateral trade between Brazil and the rest-of-Mercosul and the extent of the corresponding tariff preferences. Two observations can be made in regard to the impact of the sectoral composition of trade and the extent of tariff preferences. First, in 2010 food and agricultural trade between Brazil and the rest-of-Mercosul was small relative to manufacturing trade. Bilateral food and agricultural trade amounted to about $11 billion, while bilateral manufacturing trade amounted to about $69 billion. This level of food and agricultural trade would have declined if Brazil's bilateral trade preferences were removed, and Brazil and the rest of Mercosul would have increased their imports from the rest of the world, including the United States. However, because the 2010 level of trade is small, the simulated effects are small for U.S. exports of food and agricultural products and for Brazilian and rest-of-Mercosul imports of food and agricultural products (these effects are shown in tables 11.9, 11.10, and 11.11).

Second, figure 11.1 shows that in 2010 the extent of Brazil's bilateral tariff preferences was larger for manufactures than it was for food and agriculture. Relatively large preferences coupled with relatively large bilateral trade in manufactures implies that in the absence of Brazil's bilateral tariff preferences, Brazil and the rest-of-Mercosul region would have traded less bilaterally and increased their manufacturing imports from the rest-of-the-world by larger amounts than their food and agricultural imports. Under the assumptions made by the model, for the rest-of-the-world to expand its manufacturing exports significantly to meet the increased demand in Brazil and the rest-of-Mercosul, productive resources would have been reallocated from the rest of the economy to manufactures. Thus, while manufacturing exports would have expanded, other exports, such as food and agriculture, would have declined. This explains the simulated overall decline in U.S. food and agricultural exports to the world shown in table 11.9.

Although the value of overall U.S. food and agricultural exports to the world would have declined in the absence of Brazil's bilateral tariff preferences (table 11.9), U.S. exports of certain food and agricultural products would have expanded. U.S. exports of wheat, beef and pork meat, and the two aggregate categories of other farm and other food products would have expanded in the absence of Brazil's bilateral tariff preferences. These are the products for which Brazil's tariff preferences are relatively large and U.S. producers can easily expand their exports. Because land in the United States is assumed to be fully utilized, in order to allow the United States to increase its exports to Mercosul of certain products, such as wheat, production of these products would have expanded onto land previously used to produce other food and agricultural goods, resulting in production declines in those other goods.

FIGURE 11.1 The extent of bilateral tariff preferences[a] at the sector level between Brazil and its Mercosul trading partners for 2010



Source: USITC staff calculations, GTAP framework, TRAINS database.

[a]The extent of tariff preferences has been calculated as the percent difference between the power of MFN tariffs and the power of preferential tariffs for each sector by country in 2010. According to standard GTAP notation, the power of a tariff is 1 plus the tariff rate.

In the absence of Brazil's tariff preferences, the simulated effects show that overall exports of Brazilian food and agricultural products to the world would have declined by \$356–\$378 million (about 1 percent) in value (table 11.10). Despite the simulated overall decline in the value of Brazilian food and agricultural exports, exports of some products would have expanded in value because of the increased availability of important inputs. For example, exports of poultry products would have increased (table 11.10) because of increased availability of feed.

An alternative simulation removed Brazil's bilateral food and agricultural tariff preferences while preferences for manufactures remained in place. This simulation showed that in the absence of those preferences, U.S. food and agricultural exports to the world would have increased by \$121–\$148 million, or 0.1 percent. Thus the simulated effects show that in the absence of Brazil's food and agricultural tariff preferences, the value of global U.S. food and agricultural exports would have increased, whereas in the absence of Brazilian preferences for all products (that is food, agriculture and manufactures), the value of global U.S. food and agricultural exports would have declined.

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APPENDIX A
REQUEST LETTERS

United States Senate

COMMITTEE ON FINANCE

WASHINGTON, DC 20510-6200

DOCKET NUMBER
2800
Office of the Secretary
Int'l Trade Commission

April 26, 2011

The Honorable Deanna Okun
Chairman
U.S. International Trade Commission
500 E Street, S.W.
Washington, DC 20436

Dear Chairman Okun,

The success of U.S. agriculture depends on strong export sales. The United States exported $116 billion in agricultural goods in 2010, representing more than one-third of U.S. farm cash receipts. The U.S. Department of Agriculture estimates that these exports support approximately one million U.S. jobs, both on and off the farm. As per capita incomes rise, especially in developing countries, so does demand for food and fiber.

The United States is one of the few countries in a position to boost farm exports to meet this increasing demand. Brazil is another. Brazil's global exports of agricultural products have grown substantially over the last decade, largely in beef, pork, poultry, soybeans, and corn—all products exported in significant quantities by the United States. This growth has altered the competitive landscape in global agricultural markets and resulted in declining market shares for U.S. agricultural exporters in certain countries and products.

We are writing to request that the U.S. International Trade Commission (ITC) conduct an investigation under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)) regarding competitive factors in Brazil affecting U.S and Brazilian agricultural sales in third country markets. The report should cover the period 2006-2010, and focus on the global meat, grains, and oilseeds markets.

To the extent possible, the report should include the following:

- an overview of agricultural markets in Brazil, including recent trends in production, consumption, and trade;
- an overview of U.S. and Brazilian participation in global export markets for meat, grain, and oilseed products, particularly in the European Union, Russia, China, and Japan, and markets with which Brazil has negotiated trade agreements;

- a description of the competitive factors affecting the agricultural sector in Brazil, in such areas as costs of production, transportation and marketing infrastructure, technology, exchange rates, domestic support, and government programs related to agricultural markets;

- a description of the growth of Brazilian multinational agribusiness firms and their effects on global food supply chains;

- a description of the principal trade measures affecting U.S. and Brazilian exports of meat, grain, and oilseed products in major third-country export markets, including sanitary and phytosanitary measures and technical barriers to trade; and,

- a quantitative analysis of the economic effects of preferential tariffs negotiated under Brazil's free trade agreements on U.S. and Brazilian exports of meat, grain, and oilseed products, as well as the economic effects of selected non-tariff measures on U.S. and Brazilian exports of meat, grain, and oilseed products in major third-country export markets.

Assuming there are no undue financial constraints on the Commission in FY2011 and FY2012, this report should be completed no later than eleven months from the receipt of this request. As we intend to make the report available to the public, we request that it not contain confidential business information.

Sincerely,

Max Baucus
Chairman
Committee on Finance

Orrin Hatch
Ranking Member
Committee on Finance

United States Senate

COMMITTEE ON FINANCE

WASHINGTON, DC 20510-6200

RECEIVED
APR - 4 2012
OFFICE OF THE SECRETARY
U.S. INTL. TRADE COMMISSION

March 22, 2012

The Honorable Deanna Okun
Chairman
U.S. International Trade Commission
500 E Street, SW
Washington, DC 20436

Dear Chairman Okun:

In a letter dated April 26, 2011, the Committee requested, pursuant to section 332(g) of the Tariff Act of 1930, that the Commission institute an investigation and provide a report on the competitive factors in Brazil affecting U.S. and Brazilian agricultural sales in third country markets. I asked that the Commission provide its report to the Committee no later than eleven months from receipt of the request, or by March 26, 2012.

I am amending the Committee's request, and now ask that the Commission provide its completed report no later than April 26, 2012.

Sincerely,

Max Baucus

Max Baucus

APPENDIX B
FEDERAL REGISTER NOTICE

INTERNATIONAL TRADE COMMISSION

[Investigation No. 332–524]

Brazil: Competitive Factors in Brazil Affecting U.S. and Brazilian Agricultural Sales in Selected Third Country Markets; Institution of Investigation and Scheduling of Hearing

AGENCY: United States International Trade Commission.

ACTION: Notice.

SUMMARY: Following receipt on April 26, 2011, of a request from the United States Senate Committee on Finance (Committee) under section 332(g) of the Tariff Act of 1930 (19 U.S.C. 1332(g)), the U.S. International Trade Commission (Commission) instituted investigation No. 332–524, *Brazil: Competitive Factors in Brazil Affecting U.S. and Brazilian Agricultural Sales in Selected Third Country Markets.*

DATES:

June 24, 2011: Deadline for filing requests to appear at the public hearing.
July 5, 2011: Deadline for filing prehearing briefs and statements.
July 20, 2011: Public hearing.
July 27, 2011: Deadline for filing posthearing briefs and statements.
October 6, 2011: Deadline for filing all other written submissions.
March 26, 2012: Transmittal of Commission report to the Committee.

ADDRESSES: All Commission offices, including the Commission's hearing rooms, are located in the United States International Trade Commission Building, 500 E Street, SW., Washington, DC. All written submissions should be addressed to the Secretary, United States International Trade Commission, 500 E Street, SW., Washington, DC 20436. The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at *http://www.usitc.gov/secretary/edis.htm.*

FOR FURTHER INFORMATION CONTACT: Project leader John Fry (202–708–4157 or *john.fry@usitc.gov*) or deputy project leader Brendan Lynch (202–205–3313 or *brendan.lynch@usitc.gov*) for information specific to this investigation. For information on the legal aspects of this investigation, contact William Gearhart of the Commission's Office of the General Counsel (202–205–3091 or *william.gearhart@usitc.gov*). The media should contact Margaret O'Laughlin, Office of External Relations (202–205–1819 or *margaret.olaughlin@usitc.gov*). Hearing-impaired individuals may obtain information on this matter by contacting the Commission's TDD terminal at 202–205–1810. General information concerning the Commission may also be obtained by accessing its Internet server (*http://www.usitc.gov*). Persons with mobility impairments who will need special assistance in gaining access to the Commission should contact the Office of the Secretary at 202–205–2000.

Background: As requested by the Committee, the Commission will conduct an investigation and prepare a report on the competitive factors in Brazil affecting U.S. and Brazilian agricultural sales in third country markets. As requested, to the extent possible, the report will include—

1. An overview of agricultural markets in Brazil, including recent trends in production, consumption, and trade;

2. An overview of U.S. and Brazilian participation in global export markets for meat, grain, and oilseed products, particularly in the European Union, Russia, China, Japan, and markets with which Brazil has negotiated trade agreements;

3. A description of the competitive factors affecting the agricultural sector in Brazil, in such areas as costs of production, transportation and marketing infrastructure, technology, exchange rates, domestic support, and government programs related to agricultural markets;

4. A description of the growth of Brazilian multinational agribusiness firms and their effect on global food supply chains;

5. A description of the principal trade measures affecting U.S. and Brazilian exports of meat, grain, and oilseed products in major third country export markets, including sanitary and phytosanitary measures and technical barriers to trade; and

6. A quantitative analysis of the economic effects of preferential tariffs negotiated under Brazil's free trade agreements on U.S. and Brazilian exports of meat, grain, and oilseed products, as well as the economic effects of selected non-tariff measures on U.S. and Brazilian exports of meat, grain, and oilseed products in major third country export markets.

The Committee asked that the Commission's report cover the period 2006–2010, and focus on the global meat, grains, and oilseeds markets. The Committee requested that the Commission deliver its report by March 26, 2012.

Public Hearing: The Commission will hold a public hearing in connection with this investigation at the U.S. International Trade Commission Building, 500 E Street, SW., Washington, DC, beginning at 9:30 a.m. on Wednesday, July 20, 2011. Requests to appear at the public hearing should be filed with the Secretary no later than 5:15 p.m., June 24, 2011, in accordance with the requirements in the ''Submissions'' section below. All prehearing briefs and statements should be filed with the Secretary not later than 5:15 p.m., July 5, 2011; and all posthearing briefs and statements responding to matters raised at the hearing should be filed with the Secretary not later than 5:15 p.m., July 27, 2011. All hearing-related briefs and statements should be filed in accordance with the requirements for filing written submissions set out below. In the event that, as of the close of business on June 24, 2011, no witnesses are scheduled to appear at the hearing, the hearing will be canceled. Any person interested in attending the hearing as an observer or onparticipant may call the Office of the Secretary (202–205–2000) after June 24, 2011, for information concerning whether the hearing will be held.

Written Submissions: In lieu of or in addition to participating in the hearing, interested parties are invited to file written submissions concerning this investigation. All written submissions should be addressed to the Secretary, and all such submissions (other than pre- and post-hearing briefs and statements) should be received not later than 5:15 p.m., October 6, 2011. All written submissions must conform with the provisions of section 201.8 of the Commission's Rules of Practice and Procedure (19 CFR 201.8). Section 201.8 requires that a signed original (or a copy so designated) and fourteen (14) copies of each document be filed. In the event that confidential treatment of a document is requested, at least four (4) additional copies must be filed, in which the confidential information must be deleted (see the following paragraph for further information regarding confidential business information). The Commission's rules authorize filing submissions with the Secretary by facsimile or electronic means only to the extent permitted by section 201.8 of the rules (see Handbook for Electronic Filing Procedures, *http://www.usitc.gov/secretary/fed_reg_notices/rules/documents/handbook_on_electronic_filing.pdf*). Persons with questions regarding electronic filing should contact the Office of the Secretary (202–205–2000).

Any submissions that contain confidential business information must also conform with the requirements of section 201.6 of the Commission's Rules of Practice and Procedure (19 CFR 201.6). Section 201.6 of the rules requires that the cover of the document and the individual pages be clearly marked as to whether they are the ''confidential'' or ''nonconfidential'' version, and that the confidential business information be clearly identified by means of brackets. All written submissions, except for confidential business information, will be made available for inspection by interested parties.

In its request letter, the Committee stated that it intends to make the Commission's report available to the public in its entirety, and asked that the Commission not include any confidential business information in the report it sends to the Committee. Any confidential business information received by the Commission in this investigation and used in preparing this report will not be published in a manner that would reveal the operations of the firm supplying the information.

By order of the Commission.

Issued: May 18, 2011.

James R. Holbein,
Secretary to the Commission.

[FR Doc. 2011–12672 Filed 5–23–11; 8:45 am]

BILLING CODE 7020–02–P

assistance in gaining access to the Commission should contact the Office of the Secretary at 202–205–2000. General information concerning the Commission may also be obtained by accessing its Internet server (*http://www.usitc.gov*). The public record for these reviews may be viewed on the Commission's electronic docket (EDIS) at *http://edis.usitc.gov.*

SUPPLEMENTARY INFORMATION:

Background.—On March 5, 2012, the Commission determined that the domestic interested party group response to its notice of institution (76 FR 74807, December 1, 2011) of the subject five-year reviews was adequate and that the respondent interested party group response was inadequate. The Commission did not find any other circumstances that would warrant conducting full reviews.[1] Accordingly, the Commission determined that it would conduct expedited reviews pursuant to section 751(c)(3) of the Act.

Staff report.—A staff report containing information concerning the subject matter of the reviews will be placed in the nonpublic record on May 8, 2012, and made available to persons on the Administrative Protective Order service list for these reviews. A public version will be issued thereafter, pursuant to section 207.62(d)(4) of the Commission's rules.

Written submissions.—As provided in section 207.62(d) of the Commission's rules, interested parties that are parties to the reviews and that have provided individually adequate responses to the notice of institution,[2] and any party other than an interested party to the reviews may file written comments with the Secretary on what determinations the Commission should reach in the reviews. Comments are due on or before May 11, 2012 and may not contain new factual information. Any person that is neither a party to the five-year reviews nor an interested party may submit a brief written statement (which shall not contain any new factual information) pertinent to the reviews by May 11, 2012. However, should the Department of Commerce extend the time limit for its completion of the final results of its reviews, the deadline for comments (which may not contain new factual information) on Commerce's final results is three business days after the issuance of Commerce's results. If comments contain business proprietary information (BPI), they must conform with the requirements of sections 201.6, 207.3, and 207.7 of the Commission's rules. Please be aware that the Commission's rules with respect to electronic filing have been amended. The amendments took effect on November 7, 2011. See 76 FR 61937 (Oct. 6, 2011) and the newly revised Commission's Handbook on E-Filing, available on the Commission's Web site at *http://edis.usitc.gov.*

In accordance with sections 201.16(c) and 207.3 of the rules, each document filed by a party to the reviews must be served on all other parties to the reviews (as identified by either the public or BPI service list), and a certificate of service must be timely filed. The Secretary will not accept a document for filing without a certificate of service.

Determination.—The Commission has determined to exercise its authority to extend the reviews period by up to 90 days pursuant to 19 U.S.C. 1675(c)(5)(B).

Authority: These reviews are being conducted under authority of title VII of the Tariff Act of 1930; this notice is published pursuant to section 207.62 of the Commission's rules.

By order of the Commission.

Issued: March 22, 2012.

James R. Holbein,

Secretary to the Commission.

[FR Doc. 2012–7345 Filed 3–27–12; 8:45 am]

BILLING CODE 7020–02–P

[1] A record of the Commissioners' votes, the Commission's statement on adequacy, and any individual Commissioner's statements will be available from the Office of the Secretary and at the Commission's Web site.

[2] The Commission has found the responses submitted by domestic producers Carpenter Technology Corporation, Crucible Industries, LLC, Electralloy a G.O. Carlson Inc. Co., Universal Stainless & Alloy Products, Inc., and Valbruna Slater Stainless, Inc. to be individually adequate. Comments from other interested parties will not be accepted (*see* 19 CFR 207.62(d)(2)).

INTERNATIONAL TRADE COMMISSION

[Investigation No. 332–524]

Brazil: Competitive Factors Affecting U.S. and Brazilian Agricultural Sales in Selected Third Country Markets

AGENCY: United States International Trade Commission.

ACTION: Extension of date for transmitting report.

SUMMARY: Following the receipt of a letter on March 22, 2012, from the Committee on Finance of the United States Senate (Committee), the Commission has extended to April 26, 2012, the date for transmitting its report to the Committee in investigation No. 332–524, *Brazil: Competitive Factors In Brazil Affecting U.S. and Brazilian Agricultural Sales in Selected Third Country Markets.*

DATES:

March 22, 2012: Receipt of the letter from the Committee.

April 26, 2012: New date for transmitting the Commission's report to the Committee.

Backround

The Commission published notice of institution of the investigation in the **Federal Register** on May 24, 2011 (76 FR 30195). In its original notice of investigation, the Commission indicated that it would transmit its report to the Committee on March 26, 2012. The notice is also available on the Commission Web site at *http://www.usitc.gov.* All other information about the investigation, including a description of the subject matter to be addressed, contact information, and Commission addresses, remains the same as in the original notice. The public record for this investigation may be viewed on the Commission's electronic docket (EDIS) at *http://www.usitc.gov/secretary/edis.htm.*

By order of the Commission.

Issued: March 23, 2012.

James R. Holbein,

Secretary to the Commission.

[FR Doc. 2012–7472 Filed 3–27–12; 8:45 am]

BILLING CODE 7020–02–P

DEPARTMENT OF JUSTICE

Drug Enforcement Administration

[Docket No. 10–54]

Zhiwei Lin, M.D.; Decision and Order

On September 19, 2011, Administrative Law Judge (ALJ) Timothy D. Wing issued the attached recommended decision (also ALJ). Therein, the ALJ found that Respondent is currently without authority to dispense controlled substances in California, the State in which he practices medicine and holds his DEA Registration and therefore recommended that his registration be revoked. Thereafter, Respondent filed two motions[1] and the Government filed a response to the motions. Having reviewed the record in its entirety including the ALJ's recommended decision and the various pleadings, I have decided to adopt the ALJ's rulings, findings of fact, conclusions of law, and

[1] The motions were titled ''Motion for Reconsideration—Opposition for Summary Disposition'' and ''Amended Motion for Reconsideration—Exceptions to Order of Summary Disposition.''

APPENDIX C
Summary of Views of Interested Parties

Summary of Views of Interested Parties

In the Commission's institution notice for this investigation, interested parties were invited to file written submissions. This appendix summarizes the views expressed to the Commission and reflects the principal points made by a particular party. The views expressed in the summarized materials should be considered to be those of the submitting parties and not the Commissioners or Commission staff. In preparing this summary, Commission staff did not undertake to confirm the accuracy of, or otherwise correct, the information summarized. For the full text of the written submissions, see entries associated with investigation 332-524 at the Commission's Electronic Docket Information System (http://edis.usitc.gov/).

Association of Brazilian Beef Exporters (ABIEC)[1]

In a written submission, the Association of Brazilian Beef Exporters (ABIEC), which states that its members account for the majority of beef exported from Brazil, provided information on Brazil's beef production and exports. ABIEC noted that although the cattle herd in Brazil was nearly twice the size of the U.S. herd, Brazil produces less beef than the United States. According to ABIEC, since 2006, Brazil has produced approximately 25 percent less beef than the United States from a cattle herd that is 86 percent larger, due to both a lower reproduction rate in Brazil's cattle herd and lower beef yield from individual animals.

According to ABIEC, Brazil's beef exports grew more rapidly than its production from 2000 to 2006 because the average unit value of Brazil's beef exports was lower than that of other major exporters such as Australia and the European Union, but since 2006, higher prices for Brazil's beef exports have led to a decline in exports and an increase in domestic consumption. ABIEC asserts that the increased purchasing power of Brazil's consumers has favored domestic consumption over exports and that future increases in Brazil's population and per capita income will continue to keep production increases focused on the domestic market.

ABIEC asserts that the Brazilian government provides no direct subsidies to cattle or beef producers or to beef exporters. According to ABIEC, Brazil's government support for beef production is limited to the provision of below-market credit to small and medium-sized cattle producers in order to encourage long-term increases in productivity within the sector. Favorable credit terms are available to compensate these producers for what ABIEC describes as interest rates that are among the highest in the world.

[1] Association of Brazilian Beef Exporters, written submission to the USITC, December 16, 2011.

Blue Diamond Growers[2]

Blue Diamond Growers, a 100-year-old nonprofit marketing cooperative composed of almond growers, provided a written statement outlining its trading relationship with Brazil. In its statement, Blue Diamond also identified itself as the world's largest processor and marketer of almonds and noted that in the United States almonds are commercially grown almost exclusively in California and constitute the number one agricultural export from that state—about $2 billion in 2010.

In its written statement, Blue Diamond identified Brazil as a large global producer of Brazil nuts and cashews, but not of almonds. In light of the continued strong growth of the Brazilian economy, Blue Diamond depicted Brazil as a small, but growing, almond consumer market, which it ranks in its top 14 targeted markets. The cooperative projected that annual almond consumption in Brazil could grow approximately 7.3 percent over the next five years, particularly for snacking end uses. Blue Diamond noted that Brazilian applied tariffs on almonds currently range from 10 percent for in-shell and shelled raw almonds to 14 percent for prepared and preserved almonds. Blue Diamond asserted that the removal of the current Brazilian duties on U.S. almonds would boost U.S. exports further and encouraged the U.S. government to pursue this result.

National Farmers Union (NFU) and United States Cattlemen's Association (USCA)[3]

In a joint written submission, the National Farmers Union (NFU), which described itself as a national organization representing 250,000 farm, ranch, and rural resident members across the country, and the United States Cattlemen's Association (USCA), which described itself as a national association of cattle ranchers with a mission to present an effective voice for the U.S. cattle industry, provided comments focusing on the competitive factors affecting U.S. and Brazilian exports of cattle and beef products.

The submission noted that Brazil is the world's number one exporter of beef and the second largest cattle producer, and asserted that U.S. producers face competition with Brazilian products in markets around the world. The U.S. cattle herd has shrunk since 2006, while the Brazilian cattle herd has increased, although Brazil exports many more cattle than it imports and the United States imports many more cattle than it exports. The submission asserts that while Brazil's beef consumption is growing, the Brazilian cattle industry continues to be more export-oriented than the U.S. industry.

The submission states that these trends are likely to intensify in the coming years due to aggressive government support programs for Brazil's cattle herd launched in 2011. According to their submission, these programs seek to increase the size of Brazil's herd

[2] Blue Diamond Growers, written submission to the USITC, October 6, 2011.

[3] National Farmers Union and United States Cattlemen's Association, written submission to the USITC, October 13, 2011.

and improve its quality, recover pastureland, and raise production levels. In addition, NFU and USCA state that the Brazilian government has implemented a new program in 2011 to subsidize exports of Brazilian goods, including beef.

The submission also stated that because Brazil is home to some of the largest multinational beef companies in the world, including JBS, Marfrig, and Brasil Foods, as these companies expand, their global presence will facilitate increased beef exports from Brazil. While both the United States and Brazil face nontariff barriers in many export markets, recognition of disease-free areas on a subnational basis by third-country markets may assist Brazil in overcoming barriers related to foot-and-mouth disease (FMD). NFU and USCA state that no such regionalization route appears to be available to U.S. exporters facing barriers related to bovine spongiform encephalopathy (BSE).

The joint submission states that while Brazil produces more cattle than the United States, the U.S. industry produces more beef than Brazil, in part because U.S. producers are more efficient at meat extraction. The United States produced 12 million mt (carcass weight equivalent) of beef and veal in 2010, more than any other country, and Brazil was the second-largest producer, with 9.1 million mt produced in that year. NFU and USCA state that while the U.S. produces more beef than Brazil, Americans typically consume more beef than the U.S. industry produces. On the other hand, Brazil typically has excess beef production and exports its surplus. Therefore, Brazil is the world's largest exporter and the United States is third.

According to the submission, U.S. beef exports have been recovering in recent years as certain importing countries have eased the restrictions put into place when BSE was found in an animal in the United States in 2003. But U.S. exports have not recovered to their 2003 levels. By contrast, Brazil exported 34 percent more beef in 2010 than in 2003, and nearly 50 percent more than the United States. NFU and USCA state that Brazil and the United States compete in major beef markets around the world, noting that while the United States has performed better in Japan and China, Brazil outpaced the U.S. in exports to Europe and Russia.

The submission notes that the Brazilian government stated in its World Trade Organization subsidy notifications for the 2004/05 and 2005/06 marketing years (MY) that it granted no export subsidies to the beef sector. It notes that those notifications list four programs that are claimed to be exempt from Brazil's reduction commitments as rural development programs: low-interest loans and input subsidies to beef producers under the PRONAF program; funds for investments in equipment and animal services; and the rescheduling of producers' debts under the PRONAF and PROCERA programs. The submission asserts that the total subsidy amounts under the four programs were $626 million in MY 2004/05 and $764 million in MY 2005/06. The notifications also list expenditures for disease control in cattle, marketing and promotion, and infrastructure that may benefit cattle producers as "green box" measures that are exempt from Brazil's support commitments.

NFU and USCA state that in Brazil's Crop and Livestock Plan for MY 2011/12, the government announced a number of new programs that will confer significant benefits on domestic cattle and beef producers. In total, according to the submission, the plan will spend more than R$107 billion ($67 billion) for Brazilian farmers and ranchers, and it is the first Brazilian plan to focus on improving cattle production as a core objective. The new programs include an increase in credit funding limits for livestock producers, the creation of a specific credit line for improving the genetic profile of Brazil's cattle herd, low-interest loans (at annual rates of 6.25–6.75 percent) with repayment terms as long as 5–8 years, and loans at annual rates of 5.5 percent and 15-year repayment periods for the integration of forest and livestock operations with management activities under Brazil's Low Carbon Agriculture Program. In addition, under the REINTEGRA program, through the end of 2012, exporters of goods made in Brazil may receive a refund equal to 3 percent of their export revenue. The submission further states that the Brazilian government has created an export financing fund, called FFEX, to be administered by the Banco do Brasil. FFEX will be given government capital totaling one billion *reais* ($574 million) and have an overall financing limit of R$209 billion ($120 billion). It notes that USDA predicts that Brazil's new support programs will increase Brazil's cattle inventories by three percent in 2012.

NFU and USCA state that the Office of the United States Trade Representative has noted that major third country markets for beef, such as China, Japan, Korea, and Russia, limit U.S. beef exports due to concerns about BSE in a manner that does not comply with World Organisation for Animal Health (OIE) standards. Europe maintains restrictions on imports of beef from cattle raised with certain growth hormones, and Taiwan inspects shipments of U.S. beef for ractopamine, a drug used in some cattle.

The submission states that Brazil also faces certain export restrictions, particularly with regards to FMD. However, the United States recently recognized the state of Santa Catarina as an FMD-free region within Brazil, and Brazil hopes that other markets will recognize the state as FMD-free in the future. The Brazilian government has also taken a number of steps, including a domestic traceability program, to help producers gain access to the European market.

APPENDIX D
Brazilian Agribusiness Additional Information

TABLE D.1 Selected agribusiness companies in Brazil's meat and grains industries, 2011

Company	Primary sector(s)	Operating revenue (latest reported year)	Headquarters location	Employment	Notes
C. Vale Cooperativa Agroindustrial	Grains, oilseeds, poultry	$1.1 billion (2009)	Paraná	5,420 employees	Cooperative
Copacol	Poultry	$643.2 million (2010)	Paraná	6,649 employees	Cooperative
Cooperativa Agroindustrial Lar	Grains, poultry	$792.4 million (2009)	Paraná	8,600 employees	Cooperative
Imcopa	Soybeans	$519.9 million (2009)	Araucaria, Paraná	460 employees	All non-GMO soybeans.
Coopavel Agroindustrial Cooperativa	Grains and oilseeds	R$1.1 billion	Cascavel, Paraná		Although Coopavel, an agricultural cooperative, is the largest producer of grains in Brazil, 60 percent of its gross revenue is from poultry, pork, beef, and dairy. The poultry is roughly 50 percent exported and 50 percent domestic sales. There are no pork exports. The cooperative's primary competitors are foreign-based companies, such as Cargill and Bunge.
COAMO Agroindustrial Cooperativa	Soybeans, corn, wheat	R$4.4 billion (2010), rising to R$5.4 billion (2011)	Paranaguá, Paraná	5,234 employees	COAMO was founded in 1970, and is the largest cooperative in Latin America, with almost 23,000 members. Storage capacity: 4.77 million tons. Exports through Paranaguá, Santos, and São Francisco; total exports of R$761.6 million in 2010.[b]
Cocamar	Soybeans, grains, coffee, juice	$705.1 million (2009)	Maringa, Paraná	2,020 employees	Cocomar also owns a road/freight transport company (Transcocamar Transportes e Comercio Ltda).
Foreign-based					
Rabobank	Finance		Netherlands		Founded in the Netherlands as a rural credit bank, Rabobank entered Brazil in 1989, began commercial bank operations in 1995, and began offering loans to farmers in 2004.
Bunge Alimentos (Brazil unit)		$9.1 billion operating revenue (2009)	United States	6,500 employees	Globally for 2010, Bunge had operating revenue of $48.1 billion, and 33,021 employees.
Cargill Agrícola	Grains and oilseeds	$7.8 billion (2009)	United States	26,622 employees	Globally for 2010, Cargill had sales revenue of $101.3 billion and employment of 131,000 in 66 countries.
ADM do Brasil	Soybeans, corn, wheat	Not reported	United States	Employees: 2,075	Globally for 2011, ADM reported operating revenue of $80.7 billion and 30,700 employees.

See footnotes at end of table.

TABLE D.1 Selected agribusiness companies in Brazil's meat and grains industries, 2011—***Continued***

Company	Primary sector(s)	Operating revenue (latest reported year)	Headquarters location	Employment	Notes
Louis Dreyfus Commodities Brasil	Soybeans, cottonseeds, orange processing, coffee, sugar, and ethanol	$2.4 billion (2010)	France	18,000 employees	
Tyson do Brasil Alimentos Ltda	Poultry	$138.3 million (2009)	United States	3,000 employees	Subsidiary of Tyson Foods Inc.; 107,000 employees worldwide.
Doux-Frangosul SA	Poultry	$966.1 million (2009)	France	7,500	Subsidiary of Doux SA, which is controlled by Agropar (France).
Glencore and Noble Glencore do Brasil Comercio e Exportação Ltda	Trading	$2.3 million (2009)	United Kingdom		Glencore and Noble, a private firm, is a subsidiary of Glencore International. The company produces, sources, processes, refines, transports, stores, finances, and supplies commodities (agricultural but also mineral and energy) to industries around the world. Global operating revenue for 2009 was $106.8 billion.

Sources: Company Web sites; company reports, Bureau van Dijk, Orbis database; industry representatives, interviews with USITC staff, Brazil, August and September, 2011; *Poultry International, Brazil Meat Monitor,* various issues.

Notes: For nonpublic companies, data may be estimated.

[a]Not available.
[b]COAMO Web site, August 19, 2011.

TABLE D.2 Inbound FDI in Brazil's meat, oilseed, and grain sectors

Date	Investing company	Source country	Target company	Reported investment value	Type of investment	Project description
				Million $		
8/9/11	Upravlyayushchaya Kompaniya Sodruzhestvo	Russia	Lider Armazens Gerais	([a])	Acquisition 100%	A São Paulo-based grain storage and transportation services provider. Lider will be incorporated into Carol-Sodru, the joint-venture between Sodrugestvo and CAROL. Financial terms were not disclosed. The acquisition allows Sodrugestvo to increase its storage capacity in the states of São Paulo, Minas Gerais and Goiás.
7/7/11	EW Nutrition Gmbh	Germany	Grasp Indústria e Comércio	([a])	Acquisition 51%	EW Nutrition has acquired a 51% stake in Grasp Indústria e Comércio Ltda, a Paraná, Brazil-based animal feed additive manufacturer and wholesaler, for an undisclosed consideration.
6/10/11	Limagrain	France	Brasmilho Indústria e Comércio	([a])	Acquisition 100%	Brasmilho acquired this Brazil-based corn, sorghum, and soybean producer and distributor from Grupo Otávio Lage, following the signing of an agreement on 09/06/11. Financial terms were not disclosed. Limagrain intends to increase its market share in Brazil from 1.5% to10% within 10 years.
6/1/11	Cargill	United States		13.0	Greenfield	New laboratories area to serve customers in the beverage, baking, confectionery, convenience foods, and dairy sectors.
5/6/11	Mitsui & Co.	Japan	Multigrain	([a])	Acquisition 25%	Mitsui acquired a 25% stake in Multigrain from CHS.
5/1/11	Mitsui & Co.	Japan		100.0	Greenfield	Agricultural commodities distributor Multigrain, a subsidiary of Mitsui (Japan), plans to boost soybean exports at its Brazilian unit by 50% by 2016. The company will add storage and port facilities in the country to help meet its target of 3 million mt of soybeans a year.
4/1/11	Chongqing Grain Group	China		2,537.0	Greenfield	The project includes an industrial complex for processing soy, a fertilizer-processing unit, and a grain storage and logistics system. It will crush 1.5 million mt of soy and have capacity to refine 300,000 mt of oil and store 400,000 mt of soy.
2/1/11	Cargill	United States		210.0	Greenfield	A new corn processing plant.
2/1/11	Tereos	France		136.0	Greenfield	Corn processing plant in Brazil. The new facility will produce starches and sweeteners and will increase the company's strength in the sugar and starch sectors.

See footnotes at end of table.

TABLE D.2 Inbound FDI in Brazil's meat, oilseed, and grain sectors—***Continued***

Date	Investing company	Source country	Target company	Reported investment value	Type of investment	Project description
				Million $		
12/8/10	Upravlyayushchaya Kompaniya Sodruzhestvo	Russia	Carol-Sodru	([a])	Joint venture 100%	Created a new company, named Carol-Sodru, to be based in Brazil with a focus on soybean processing and fertilizer distribution. It is planned to operate 14 silos and 31 fertilizer, seed, and agrochemicals distribution centers in the states of São Paulo, Goiás, Minas Gerais, and Tocantins, and three soybean seed selection units and one crushing plant with a daily capacity of 1,250 mt. Sodrugestvo was to invest R$200 million in the new company during its first year of operation and owns a 55% stake in the joint venture. It was also reported that Sodrugestvo intends to acquire the remaining 45% stake in Carol-Sodru over the next few years.
12/1/10	Stern-Wywiol Gruppe Holding	Germany		72.0	Greenfield	Manufacturing.
Announced 9/13/2010	LSI	United States	JBS and LSI's Brazilian meat processing joint venture			
8/1/10	Grupo Bimbo	Mexico		33.0	Greenfield	Commercial baked goods.
7/26/10	Imerys	France	Pará Pigmentos	70.0	Acquisition 86.2%	
5/1/10	Noble Group	Hong Kong		150.0	Greenfield	A new soy-crushing plant in Mato Grosso state. The operation was intended to process 1.3 million mt of soy annually. The plant will be operational in 2012, with construction scheduled to commence in early 2011.
1/11/10	Asociados Don Mario Semillas	Argentina	Brasmax Indústria Comércio Importação e Exportação	([a])	Acquisition increased from 76% to100%	Asociados Don Mario Semillas acquired the remaining stake it did not own in Brasmax Indústria Comércio Importação e Exportação Ltda, a Rio de Janeiro-based seeds and grain farming services company.
11/2/09	Nutreco Holding	Netherlands	Fri-Ribe	([a])	Acquisition 51%	Nutreco Holding NV acquired a stake in Fri-Ribe, a São Paulo-based animal feed manufacturer, for an undisclosed sum.
9/1/09	Grupo Bimbo	Mexico		67.0	Greenfield	Commercial baked goods.
5/1/09	Eurogerm	France		3.0	Greenfield	Bread-making improvers, technological aids, and functional and nutritional cereal ingredients.

See footnotes at end of table.

TABLE D.2 Inbound FDI in Brazil's meat, oilseed, and grain sectors—***Continued***

Date	Investing company	Source country	Target company	Reported investment value	Type of investment	Project description
				Million $		
10/15/08	Dow Agrosciences	United States	Coodetec (Cooperativa Central de Pesquisa Agrícola's corn seed production unit)	([a])	Acquisition 100%	Dow AgroSciences, a U.S.-based pesticide and fertilizer manufacturer and developer, acquired the Paracatu-based corn seed production unit of Coodetec, a Paraná-based corn producer. The consideration has not been disclosed.
Announced 9/18/08	Tyson Foods Inc.	United States	Macedo Agroindustrial Ltda Avícola Itaiópolis Frangobras Indústria e Comércio de Carnes e Derivados Ltda	([a])	Acquisition 100%	Tyson Foods Inc, a U.S.-based beef and pork producer, signed an agreement for the acquisition of Macedo Agroindustrial Ltda, a Santa Catarina-based chicken products manufacturer. Tyson Foods will acquire the entire share capital of Macedo Agroindustrial for an undisclosed sum. Concurrently, Tyson Foods also agreed to acquire the entire share capital of Avícola Itaiópolis, a Santa Catarina-based chicken products manufacturer, for an undisclosed sum, and a 70% stake in Frangobras Indústria e Comércio de Carnes e Derivados Ltda, a Paraná-based chicken products manufacturer, also for an undisclosed sum.
9/2/08	Kraft Foods	United States	K&S Alimentos	18.1	Joint venture 100%	Sadia, a Brazilian poultry and pork processing services company, and Kraft Foods Inc., an Illinois-based food producer and marketer, signed an agreement to form a joint venture. The new company was to be based in Brazil and was to focus on the manufacture and retailing of cheese. The initial investment in the company was to be R$30 million. Sadia would hold a 49% stake in the new company, while Kraft would have a 51% stake.

See footnotes at end of table.

TABLE D.2 Inbound FDI in Brazil's meat, oilseed, and grain sectors—***Continued***

Date	Investing company	Source country	Target company	Reported investment value	Type of investment	Project description
				Million $		
7/1/08	Cargill	United States		70.0	Greenfield	Cargill Agricola planned to invest $70.1 million to increase the corn-processing capacity at the firm's facilities in Uberlândia, Brazil, up to 70%. This would raise production levels of starches, sweeteners, and other food ingredients.
Announced 6/24/2008	Banco UBS Pactual	Brazil	Sementes Selecta	([a])	Acquisition 100%	Grupo Los Grobo (Argentina), together with Banco UBS Pactual (Brazil), announced they would acquire Sementes Selecta, a Goiás-based company that produces soybeans, by-products, and seeds. The operation was to include soybean origination assets and soybean industrialization assets of Sementa.
6/16/08	Evialis	France	Cargill Nutrição Animal Ltda's pet food manufacturing operations	([a])	Acquisition 100%	Evialis, a France-based animal food manufacturer, was to acquire Cargill's Brazilian animal nutrition business from Cargill Nutrição Animal Ltda, a São Paulo-based animal food for horses, sheep, goats, ostriches, rabbits, dairy and beef cattle manufacturer, for an undisclosed sum.
4/1/08	NutraCea	United States		50.0	Greenfield	Manufacturing.
2/22/08	NutraCea	United States	Irgovel, Indústria Riograndense de Óleos Vegetais	19.4	Acquisition 100%	NutraCea, a Phoenix-based nutrient research and dietary supplement development services company acquired Irgovel, a Pelotas-based vegetable oil manufacturer.
1/1/08	Novus International	United States		50.0	Greenfield	First animal feed input plant.
10/22/07	Evialis	France	Zoofort Suplementação Animal Indústria e Comércio	([a])	Acquisition 80%	Evialis, a Saint-Nolff Cedex-based animal food manufacturer acquired a stake in Zoofort Suplementação, its Brazilian counterpart.
9/11/07	Monsanto Company	United States	Agroeste Sul Sementes	100.0	Acquisition 100%	Monsanto Company acquired a Brazilian corn seed manufacturer and wholesaler. Under the terms of the agreement, Monsanto also acquired Agroeste's businesses, including its corn seed brands.

See footnotes at end of table.

TABLE D.2 Inbound FDI in Brazil's meat, oilseed, and grain sectors—***Continued***

Date	Investing company	Source country	Target company	Reported investment value	Type of investment	Project description
				Million $		
7/27/07	Dawn Farm Foods	Ireland	Minerva Dawn Farms Indústria e Comércio de Proteínas	([a])	Joint venture 100%	Minerva announced that it had formed a São-Paulo-based meat products manufacturer company named Minerva Dawn Farms Indústria e Comércio de Proteínas, with Dawn Farms Foods Ltd. Minerva was to hold a 50% stake in the joint venture and planned to invest up to R$3 million.
Announced 6/25/2007	Perdigão Comércio e Indústria	Brazil	Unilever and Perdigão's Management Services Joint Venture	([a])	Joint venture 100%	Unilever NV, a Rotterdam-based food producer, and Perdigão Comércio e Indústria, a São Paulo-based poultry and pig farming and slaughter services company, announced that they would form a joint venture. The new company was to manage the Becel and Becel proactive heart-healthy brands in Brazil. Under the terms of the agreement Unilever would also sell its Doriana, Delicata and Claybom margarine brands, together with manufacturing equipment, to Perdigão.
5/1/07	Australian Wheat Board	Australia		15.0	Greenfield	Australian Wheat Board invested in two 30,000-tonne silos in Brazil as part of its expansion plan.
2/22/07	Marubeni Corporation	Japan	Agrenco Bio-Energia	120.0	Joint venture 100%	Marubeni, Japan's fifth- largest trading company, and Agrenco Group formed a Brazil-based joint venture. The new venture, Agrenco Bio-Energia, was to be owned as 33.3% by Marubei and 66.7% by Agrenco Group. The joint venture would have a capital of $120 million and would own and operate facilities producing biodiesel fuel and soybean meal.
1/1/07	Kaizen	Korea		50.0	Greenfield	Soybean processing plant.
8/24/06	CHS	United States	Multigrain	([a])	Joint venture 100%	CHS, an American crop growing and food production holding company, and Multigrain Comércio Exportação e Importação, a Brazilian grain wholesaler, were to form a joint venture to be called Multigrain, which would specialize in wholesale grain. No financial details were disclosed.

See footnotes at end of table.

TABLE D.2 Inbound FDI in Brazil's meat, oilseed, and grain sectors—***Continued***

Date	Investing company	Source country	Target company	Reported investment value	Type of investment	Project description
				Million $		
Announced July 2006	Tyson Foods Inc.	United States	Globoaves and Tyson Foods Chicken Processing Joint Venture	([a])	Joint venture 100%	Globoaves Agro Avícola Ltda, a Brazilian chicken farming company, and Tyson Foods Inc., a U.S. poultry products producer, announced that they would form a joint venture company. To be based in Brazil, the new company was to specialize in the production of poultry products.
7/1/06	Kermira Group	Finland		3	Greenfield	Sales, marketing, and support facility.
5/2/06	Cargill Inc.	United States	Vida Alimentos Olive Oil Brazil	24.7	Acquisition 100%	Cargill Inc., a U.S. fertilizer manufacturer, acquired Vida Alimentos, a Brazilian olive oil manufacturer.
7/19/05	Harvest Capital Asset Management (HCMA)	United States	Two Rivers Farm Project	14.6	Minority stake unknown %	HCMA has announced a private equity placement for its north central Brazil-based Two Rivers Farm project, to produce rice and soybeans. The capital was provided by U.S. institutional and private investors. HCAM also announced a round of seed financing for the Two Rivers Farm project of $17.2 million. The economies of scale on the fully irrigated 50,000-acre farm were expected to allow Two Rivers to become a global low-cost commodity producer.
7/1/05	Cobb-Vantress	United States		14.0	Greenfield	This new chicken-farm complex in Água Clara was expected to be the biggest in Latin America.
4/14/05	Archer Daniels Midland Company	United States	Molinos Rio de La Plata and ADM Company's edible oil joint venture	([a])	Joint venture 100%	Argentina-based Molinos Rio de la Plata formed a joint venture with ADM to enter the soy oil manufacturing business in Brazil. Molinos decided to enter the joint venture because ADM already had four soy oil plants established there. The venture was to be based at ADM's Campo Grande plant.
2/3/05	Mr. Terry Johnson	United Kingdom	Frigoclass Promissão-SP	8.0	Acquisition 100%	British businessman Terry Johnson acquired the Promissão-based unit of Frigoréfico Maraba, a meat processing business.
2/1/05	Provimi	Netherlands		50.0	Greenfield	Pet food.
1/1/05	Bunge	United States		88.0	Greenfield	Bunge planned to build a vegetable oil refinery with a capacity of 1,000 mt and 1,200 mt/day processing plant for cottonseed fiber, meal and oil, and five silos.

See footnotes at end of table.

TABLE D.2 Inbound FDI in Brazil's meat, oilseed, and grain sectors—***Continued***

Date	Investing company	Source country	Target company	Reported investment value	Type of investment	Project description
				Million $		
10/29/04	Cargill Fertilizer	United States	Seara Alimentos	130.0	Acquisition unknown stake	Cargill sold Seara to Marfrig Alimentos in 2010.
10/6/04	Cargill	United States	Smucker do Brasil	([a])	Acquisition 100%	Cargill acquired JM Smucker's Brazil operations.
8/1/04	Cargill	United States		17.0	Greenfield	Storage facilities.
8/1/04	Cargill	United States		15.0	Greenfield	Oil factory.
8/1/04	Cargill	United States		50.0	Greenfield	Double the production capacity of Cargill's soybean processing plant in the country.
7/1/04	Ajinomoto	Japan		86.0	Greenfield	Manufacturing.
4/1/04	Bunge	United States		144.0	Greenfield	Expand production of its soybean crushing plant to 4,000 tons per day.
1/1/04	Huaken Cereal & Oil	China		3.0	Greenfield	Open an office to negotiate grains.
11/1/03	Cargill	United States		10.0	Greenfield	Joint venture for production of products based on vegetable oils for various industrial areas.
9/1/03	Bunge	United States		50.0	Greenfield	100,000 mt/year wheat flour milling unit
9/1/03	Rhodia	France		500.0	Greenfield	Increase its food ingredients production to 50 mt/month from the current 10 mt/month.
8/1/03	Global Grain	Canada		50.0	Greenfield	Expand production from 750 million tons (in two plants) to 1,300 million tons of ground wheat per day.
4/1/03	Florentz	France		17.0	Greenfield	Double the capacity of its soybean crushing unit in Ponta Grossa
4/1/03	Florentz	France		35.0	Greenfield	Build a soybean crushing unit (6th of the group). This would increase its total capacity in the country to more than 10,000 mt of grain a day.
4/1/03	Florentz	France		17.0	Greenfield	Double capacity of soybean crushing unit in Jatai.
1/1/03	Archer Daniels Midland	United States		50.0	Greenfield	Double soybean crush capacity to 2,000 mt per day.
1/1/03	Cargill	United States		40.0	Greenfield	Build soybean crushing plant with capacity of 3,000 mt per day.
1/1/03	Cargill	United States		20.0	Greenfield	Build soybean crushing plant with capacity of 1,500 mt per day.

Sources: Financial Times, fDiMarkets database, Bureau van Dijk, Zephyr database.

Note: Investment values are estimated when official values are not released.

[a]Not available.

TABLE D.3 Outbound FDI by Brazilian meat, grains, and oilseeds companies

Date	Investing company	Destination country	Target company	Investment value	Type of investment	Project details
				Million $		
2/1/2010	Minerva	Paraguay		34.1	Greenfield	Minerva's affiliate, Ganadera, was to focus on cattle feedlot operations and on assuring stability in the raw material supply chain at the Paraguay plant.
12/17/2009	Camil Alimentos	Chile	Empresas Tucapel	([a])	Acquisition 100%	Camil Alimentos SA acquired Empresas Tucapel SA, a Santiago-based rice milling services company, for an undisclosed sum.
11/1/2009	JBS	Russia		136.8	Greenfield	In a joint venture with Cremonini (Italy), JBS was to invest in a manufacturing plant in Moscow. The new entity, Inalca JBS, would have an annual production capacity of 25,000 mt of hamburgers, and would supply frozen hamburgers to 140 McDonald's restaurants in Russia.
11/3/2008	Marfrig	United Kingdom	Kitchen Range Foods	900.0	Acquisition	Marfrig acquired the Brazil and Europe assets of OSI (United States), including 15 manufacturing facilities for further processed and industrialized products and poultry slaughtering, in a transaction worth an estimated $680 million. The assets in Brazil were meat products manufacturer Braslo Produtos de Carnes, poultry processor Penasul Alimentos and poultry processor Agrofrango Indústria e Comércio de Alimentos. In Europe, Marfrig intended to acquire OSI's Moy Park Ltd of Craigavon, with manufacturing facilities in Northern Ireland, England, France, and the Netherlands. The transaction included Cambs-based Kitchen Range Foods Ltd and Albert van Zoonen BV of the Netherlands. The consideration comprised a cash payment of $270 million, $130 million in assumed debt, and 20.1 million OSI shares.
11/1/2008	Marfrig	United Kingdom		3.2	Greenfield	Moy Park planned to invest £2.5 million at its Northern Ireland processing site. Investment would focus on the latest frying and fast chilling equipment and the best available energy-efficient technology.
10/23/2008	JBS	United States	Smithfield Beef Group	565.0	Acquisition 100%	JBS acquired Smithfield Beef Group, a Wisconsin-based beef processor, from Smithfield Foods. The acquisition was to include Five Rivers Ranch Cattle Feeding, a joint venture then held 50/50 by Smithfield Beef and Continental Grain Company. JBS also acquired National Beef Packing Company and Tasman Group, and was conducting a concurrent R$2.55 billion private placement.

See footnotes at end of table.

TABLE D.3 Outbound FDI by Brazilian meat, grains, and oilseeds companies—***Continued***

Date	Investing company	Destination country	Target company	Investment value	Type of investment	Project details
				Million $		
10/1/2008	Marfrig	France		13.4	Greenfield	Marfrig planned to invest €6 million in its meat facilities in France. Products consisted of frozen cooked beef, bacon, sausages, beef cubes, minced knuckles, and steaks.
8/6/2008	Minerva	Paraguay	Friasa	([a])	Acquisition 70%	Minerva acquired a 70 per cent stake in Paraguay-based meat products manufacturer Friasa.
7/1/2008	JBS	Argentina		26.9	Greenfield	JBS reopened a beef-processing plant in Buenos Aires province.
6/1/2008	Sadia	Austria		28.8	Greenfield	Sadia selected Vienna as its European headquarters.
5/23/2008	JBS and Cremonini	Italy	Inalca	346.7	Minority stake 48.6%	Cremonini and JBS signed an agreement for a strategic alliance. The first part of the deal involved JBS paying €150 million to subscribe to new shares in Inalca. In the second phase, JBS was to pay a further €52.5 million, and Cremonini would pay €7.5 million to subscribe to more new shares in Inalca. The European Commission approved the transaction. In a related transaction, JBS acquired shares representing a 3.6% stake in Inalca from Cremonini. As a result of this deal, Cremonini and JBS each owned a 50% stake in Inalca, which was renamed Inalca JBS. The capital increase was expected to let Inalca accelerate its development in Europe, Russia, and Africa.
1/31/2008	Perdigão Comércio e Indústria	Netherlands	Plusfood Groep	44.3	Acquisition 100%	Plusfood Groep, with approximately 370 employees at the time, manufactures poultry and beef-based products and owns two European brands, Fribo for hamburgers and Friki for poultry products. The company had an installed capacity for manufacturing of approximately 20,000 tons/year of finished products. The takeover process was expected to make Perdigão the first Brazilian company in the food sector with European-based industrial operations.

See footnotes at end of table.

TABLE D.3 Outbound FDI by Brazilian meat, grains, and oilseeds companies—***Continued***

Date	Investing company	Destination country	Target company	Investment value	Type of investment	Project details
				Million $		
12/3/2007	Argentine Breeders & Packers SA and Marfrig Alimentos	Argentina	Quickfood SA	266.8	Acquisition	Marfrig agreed to acquire a 70.51% stake in Quickfood, an Argentinean food products wholesaler, and also the entire share capital of Establecimientos Colonia, an Uruguay-based meat products manufacturer. Under the agreement, Marfrig's subsidiary, Argentine Breeders & Packers, an Argentinean animal slaughter and meat packing services company, also agreed to acquire the entire share capital of Best Beef and Estâncias del Sur, two Argentinean meat products manufacturers.
11/30/2007	Camil Alimentos	Uruguay	SA Molinos Arroceros Nacionales	110.0	Acquisition 100%	The Brazilian rice and beans production and exportation company, Camil Alimentos SA, agreed to acquire the Uruguayan rice production company SA Molinos Arroceros Nacionales (Saman). This transaction was intended to allow Camil to become the main grain exporter in Mercosul, to attract synergies and to accelerate its growth.
11/1/2007	Sadia	United Arab Emirates (UAE)		57.2	Greenfield	Sadia invested in a meat processing facility in the UAE. The factory would process beef and chicken to supply regional demand.
9/18/2007	Marfrig	Chile	Frigorifico Patagonia	8.5	Acquisition 97.82%	Marfrig, through one of its subsidiaries, signed an agreement to acquire Frigorífico Patagonia, the Chile-based lamb meat specialist company.
7/25/2007	Marfrig	Chile	Quinto Cuarto	0.9	Acquisition increased from 50% to 100%	Marfrig acquired the remaining 50% stake in Chilean meat wholesaler Quinto Quarto. The consideration was $850,000.
7/12/2007	JBS	United States	Swift & Company	1,425.0	Acquisition 100%	In May 2007, JBS agreed to acquire Swift & Company for $1.425 billion, Booth Creek, and the assumption of approximately $1.2 billion in debt and all other expenses. The strategic combination of Swift and JBS would create the world's leading beef processor.
6/1/2007	Marfrig	Uruguay	Frigorífico La Caballada	([a])	Acquisition 100%	Marfrig acquired the Uruguayan slaughtering company Frigorífico La Caballada.

See footnotes at end of table.

TABLE D.3 Outbound FDI by Brazilian meat, grains, and oilseeds companies—***Continued***

Date	Investing company	Destination country	Target company	Investment value	Type of investment	Project details
				Million $		
11/2/2006	Marfrig	Uruguay	Frigorífico Elbio Pérez Rodríguez	([a])	Acquisition 100%	Marfrig acquired Uruguayan meat wholesaler Frigorífico Elbio Pérez Rodríguez. The financial terms were not disclosed.
10/5/2006	Marfrig	Argentina	Tacuarembo	35.0	Acquisition 100%	Marfrig acquired Tacuarembo, a Uruguay-based provider of meat processing services.
9/5/2005	JBS	Argentina	Swift Armour	200.0	Acquisition 85.3%	
8/1/2005	Perdigao	Japan		5.1	Greenfield	Opened a sales office to explore opportunities in Japan.
6/1/2005	Sadia	Russia		90.0	Greenfield	Opening of the Sadia factory in Kaliningrad, Russia. Initial capacity was 53,000 mt of meat products per year.

Source: Financial Times, fDiMarkets database, Bureau van Dijk, Zephyr database.

Note: Investment values are estimated when official values are not released.

APPENDIX E
Modeling Framework and Assumptions

Simulation Framework

In this study, an applied general equilibrium (AGE) global trade model is the basis of a quantitative analysis of the economic effects of preferential tariffs negotiated between Brazil and its Mercosul trading partners on U.S. and Brazilian exports of meat, grain, and oilseed products, as well as the economic effects of selected nontariff measures (NTMs) on U.S. and Brazilian exports of meat, grain, and oilseed products in major third-country export markets.[1]

The AGE model used has 50 sectors and 21 economies. Thirty-eight sectors represent food and agricultural products; the rest of the economy is represented by 12 sectors. In addition to the United States and Brazil, the model economies include Brazil's trade partners in Mercosul, China, the European Union (EU-27), Japan, Korea, Russia, Australia, Canada, New Zealand, and a rest-of-the-world (ROW) region representing all other economies in the world.

The Applied General Equilibrium Model

The AGE model is derived from the Global Trade Analysis Project (GTAP) model of world trade.[2] The GTAP framework consists of a simulation model and a database containing global data on international trade, together with interindustry relationships and national income accounts. In the GTAP model, domestic products and imports are consumed by firms, governments, and households. Product markets are assumed to be perfectly competitive, implying zero economic profits for firms. Imported products are viewed as imperfect substitutes for domestic products. Product prices are determined by market-clearing conditions that result in sectoral production equaling global demand. In addition to data on bilateral trade in each of the 50 sectors, the database includes data on domestic production and use for each sector, including intermediate use in the production of other commodities and services, as well as data on use of land, capital, and labor employment by sector. An additional component of the data is a set of parameters that, in the context of the model's equations, determine economic behavior. These parameters are principally a set of elasticities that determine, among other things, the extent to which imports and domestically produced goods are substitutes for one another.

The product and sector definitions in the database used in this report are different from those in the GTAP database. Several standard GTAP sectors in food and agriculture were disaggregated to identify the meat, grain, and oilseed products that are the focus of this report.[3] The product disaggregation was based on trade statistics from the United Nations

[1] Mercosul is discussed in more detail in chapter 2. For the purpose of the modeling simulations, the Commission has defined Mercosul as all current Mercosul members, associate members, and observers. In addition to Brazil, these include Argentina, Paraguay, Uruguay, Bolivia, Chile, Colombia, Ecuador, Mexico, Peru, and Venezuela.

[2] For more information about the GTAP model, see Hertel, *Global Trade Analysis: Modeling and Applications*, 1997; Narayanan and Walmsley, *Global Trade, Assistance, and Production: The GTAP 7 Data Base*, 2008.

[3] To disaggregate products, two computer programs developed by Mark Horridge (Centre of Policy Studies, Monash University, Melbourne, Australia) were used: "SplitCom: Programs to Disaggregate a GTAP Sector," November 2005; and "GTAPAdjust: A Program to Balance or Adjust a GTAP Database," March 2011.

Commodity Trade Statistics (UN Comtrade) database and the Global Trade Information Services (GTIS) database for 2010, and production and consumption statistics from the FAOSTAT databases of the Food and Agriculture Organization of the United Nations (FAO).

Table E.1 lists the 21 economies that are identified in the AGE simulation model. In addition to the United States and Brazil, the simulation model identifies Brazil's 10 Mercosul trade partners, 5 large third-country markets (the EU-27, Japan, Korea, Russia, and China), and other significant agricultural producing economies.

TABLE E.1 Regions used in applied general equilibrium simulation model

1	United States of America	12	Mexico
2	Brazil	13	EU-27
3	Argentina	14	Japan
4	Paraguay	15	Russia
5	Uruguay	16	China
6	Bolivia	17	Korea
7	Chile	18	Australia
8	Colombia	19	New Zealand
9	Ecuador	20	Canada
10	Peru	21	Rest of the world (ROW)
11	Venezuela		

Sources: USITC staff; Hertel, *Global Trade Analysis*, January 1997; Narayanan and Walmsley, *Global Trade, Assistance, and Production*, 2008.

Table E.2 lists the 50 sectors in the simulation model. Sector numbers 1 to 38 in table E.2 represent agricultural and food sectors. As noted, the rest of the economy is represented by 12 sectors. Table E.3 specifies the HS 6-digit categories that have been aggregated into each one of 36 food and agricultural sectors in the simulation model. Model sectors "Dairy farming" and "Beverages and tobacco products" are not included in table E.3 because they have not been modified from their representation in the GTAP database.

The land use statistics in the standard GTAP database were also modified for this report. In the standard GTAP database, various producing sectors compete for a single type of land endowment. The database used in this report identifies several types of land endowments. These land classifications are based on agroecological considerations. In particular, land was disaggregated into 18 agroecological zones (AEZs).[4] These AEZs cover six different lengths of growing period spread over three different climate zones. Land-using activities include crop production, cattle, and forestry. Land is mobile (i.e., can be reassigned to different uses) between crop, livestock, and forestry sectors within the same AEZ. The total endowment of each AEZ land type is fixed—that is, land is not assumed to be mobile across AEZs.

[4] The data source is Lee, Hertel, Sohngen, and Ramankutty, "Towards An Integrated Land Use Data Base for Assessing the Potential for Greenhouse Gas Mitigation," GTAP Technical Paper No.25, December 2005.

TABLE E.2 Sectors in the applied general equilibrium simulation model

1	Paddy rice	26	Poultry, pieces and offal
2	Wheat	27	Prepared poultry
3	Corn	28	Sausage
4	Other grains	29	Animal fats, other edible animal products.
5	Vegetables, fruits, nuts	30	Soymeal
6	Soybeans	31	Soybean oil
7	Other oilseeds	32	Other vegetable oils and fats
8	Sugar cane, sugar beets	33	Dairy products
9	Plant-based fibers	34	Processed rice
10	Crops n.e.c.	35	Sugar manufacturing
11	Cattle	36	Processed, preserved agric. food products.
12	Swine	37	Frozen, prepared or preserved fish products.
13	Live poultry	38	Beverages and tobacco products
14	Eggs	39	Forestry
15	Other live animals	40	Fishing
16	Hides, skins, other nonedible animal products.	41	Mining
17	Dairy farming	42	Textiles
18	Wool and silk	43	Wearing apparel
19	Beef meat	44	Leather products
20	Beef offal	45	Petroleum and coal products.
21	Processed beef	46	Chemical, rubber, plastic products.
22	Pork meat	47	Manufactures n.e.c.
23	Pork offal	48	Retail and wholesale trade
24	Processed pork	49	Utilities
25	Poultry, whole birds	50	Services n.e.c.

Sources: U.S. International Trade Commission staff; Hertel, *Global Trade Analysis*, January 1997; Narayanan and Walmsley, *Global Trade, Assistance, and Production*, 2008.

Note: The acronym n.e.c. means not elsewhere classified.

TABLE E.3 Concordance between food and agricultural products in the simulation model and the HS 6-digit items contained in each product group

Product in simulation model	HS 6-digit items
Paddy rice	100610, 100620
Wheat	100110, 100190
Corn	100510, 100590
Other grains	100200, 100300, 100400, 100700, 100810, 100820, 100830, 100890
Vegetables, fruits, nuts	070110, 070190, 070200, 070310, 070320, 070390, 070410, 070420, 070490, 070511, 070519, 070521, 070529, 070610, 070690, 070700, 070810, 070820, 070890, 070920, 070930, 070940, 070951, 070959, 070960, 070970, 070990, 071310, 071320, 071331, 071332, 071333, 071339, 071340, 071350, 071390, 071410, 071420, 071490, 080111, 080119, 080121, 080122, 080131, 080132, 080211, 080212, 080221, 080222, 080231, 080232, 080240, 080250, 080260, 080290, 080300, 080410, 080420, 080430, 080440, 080450, 080510, 080520, 080540, 080550, 080590, 080610, 080620, 080711, 080719, 080720, 080810, 080820, 080910, 080920, 080930, 080940, 081010, 081020, 081040, 081050, 081060, 081090, 081310, 081320, 081330, 081340, 081350
Soybeans	120100
Other oilseeds	120210, 120220, 120300, 120400, 120510, 120590, 120600, 120720, 120740, 120750, 120791, 120799
Sugar cane, sugar beets	121291
Plant fibers	140420, 520100, 530110, 530210, 530310, 530500

TABLE E.3 Concordance between food and agricultural products in the simulation model and the HS 6-digit items contained in each product group—***Continued***

Product in simulation model	HS 6-digit items
Crops n.e.c.	060110, 060120, 060210, 060220, 060230, 060240, 060290, 060311, 060312, 060313, 060314, 060319, 060390, 090111, 090220, 090240, 090300, 090411, 090412, 090420, 090500, 090611, 090619, 090620, 090700, 090810, 090820, 090830, 090910, 090920, 090930, 090940, 090950, 091010, 091020, 091030, 091091, 091099, 120910, 120921, 120922, 120923, 120924, 120925, 120929, 120930, 120991, 120999, 121010, 121020, 121120, 121130, 121140, 121190, 121299, 121300, 121410, 121490, 180100, 230800, 240110, 240120, 240130
Cattle	010210, 010290, 051110
Swine	010310, 010391, 010392
Live poultry	010511, 010512, 010519, 010594, 010599
Eggs	040700
Other live animals	010110, 010190, 010410, 010420, 010611, 010612, 010619, 010620, 010631, 010632, 010639, 010690, 030760
Hides, skins and other non-edible animal products	050210, 050290, 050400, 050510, 050590, 050610, 050690, 050710, 050790, 051000, 051199, 152190, 410120, 410150, 410190, 410210, 410221, 410229, 410320, 410330, 410390, 430110, 430130, 430160, 430180, 430190
Wool and silk	500100, 510111, 510119, 510211, 510219, 510220
Beef meat	020110, 020120, 020130, 020210, 020220, 020230
Beef offal	020610, 020621, 020622, 020629
Processed beef	021020, 160250
Pork meat	020311, 020312, 020319, 020321, 020322, 020329
Pork offal	020630, 020641, 020649
Processed pork	021011, 021012, 021019, 160241, 160242, 160249
Poultry, whole birds	020711, 020712, 020724, 020725, 020732, 020733
Poultry, pieces and offal	020713, 020714, 020726, 020727, 020734, 020735, 020736
Preserved poultry	160231, 160232, 160239
Sausage	160100
Animal fats and other edible animal products	020410, 020421, 020422, 020423, 020430, 020441, 020442, 020443, 020450, 020500, 020680, 020690, 020810, 020830, 020840, 020850, 020890, 020900, 021091, 021092, 021093, 021099, 040900, 041000, 150100, 150200, 150300, 150410, 150420, 150430, 150500, 150600, 160220, 160290, 160300, 230110
Soybean meal	120810, 230400
Soybean oil	150710, 150790
Other vegetable oils and fats	120890, 150810, 150890, 150910, 150990, 151000, 151110, 151190, 151211, 151219, 151221, 151229, 151311, 151319, 151321, 151329, 151411, 151419, 151491, 151499, 151511, 151519, 151521, 151529, 151530, 151550, 151590, 151610, 151620, 151710, 151790, 152110, 152200, 230500, 230610, 230620, 230630, 230641, 230649, 230650, 230660, 230690
Dairy products	040110, 040120, 040130, 040210, 040221, 040229, 040291, 040299, 040310, 040390, 040410, 040490, 040510, 040520, 040590, 040610, 040620, 040630, 040640, 040690, 170211, 170219, 210500, 350110
Processed rice	100630, 100640
Sugar manufacturing	170111, 170112, 170191, 170199, 170220, 170310, 170390

TABLE E.3 Concordance between food and agricultural products in the simulation model and the HS 6-digit items contained in each product group—***Continued***

Product in simulation model	HS 6-digit items
Processed and preserved agricultural food products	040811, 040819, 040891, 040899, 051191, 071010, 071021, 071022, 071029, 071030, 071040, 071080, 071090, 071120, 071140, 071151, 071159, 071190, 071220, 071231, 071232, 071233, 071239, 071290, 081110, 081120, 081190, 081210, 081290, 081400, 090112, 090121, 090122, 090190, 090210, 090230, 110100, 110210, 110220, 110290, 110311, 110313, 110319, 110320, 110412, 110419, 110422, 110423, 110429, 110430, 110510, 110520, 110610, 110620, 110630, 110811, 110812, 110813, 110814, 110819, 110820, 110900, 130211, 130212, 130213, 130219, 130220, 130231, 130232, 130239, 160210, 170230, 170240, 170250, 170260, 170290, 170410, 170490, 180200, 180310, 180320, 180400, 180500, 180610, 180620, 180631, 180632, 180690, 190110, 190120, 190190, 190211, 190219, 190220, 190230, 190240, 190300, 190410, 190420, 190430, 190490, 190510, 190520, 190531, 190532, 190540, 190590, 200110, 200190, 200210, 200290, 200310, 200320, 200390, 200410, 200490, 200510, 200520, 200540, 200551, 200559, 200560, 200570, 200580, 200591, 200599, 200600, 200710, 200791, 200799, 200811, 200819, 200820, 200830, 200840, 200850, 200860, 200870, 200880, 200891, 200892, 200899, 200911, 200912, 200919, 200921, 200929, 200931, 200939, 200941, 200949, 200950, 200961, 200969, 200971, 200979, 200980, 200990, 210111, 210112, 210120, 210130, 210210, 210220, 210230, 210310, 210320, 210330, 210390, 210410, 210420, 210610, 210690, 220900, 230210, 230230, 230240, 230250, 230310, 230320, 230910, 230990, 350211, 350219, 350510
Frozen, prepared or preserved fish products	030270, 030311, 030319, 030321, 030322, 030329, 030331, 030332, 030333, 030339, 030341, 030342, 030343, 030344, 030345, 030346, 030349, 030351, 030352, 030361, 030362, 030371, 030372, 030373, 030374, 030375, 030376, 030377, 030378, 030379, 030380, 030411, 030412, 030419, 030421, 030422, 030429, 030491, 030492, 030499, 030510, 030520, 030530, 030541, 030542, 030549, 030551, 030559, 030561, 030562, 030563, 030569, 030611, 030612, 030613, 030614, 030619, 030729, 030739, 030749, 030759, 030799, 160411, 160412, 160413, 160414, 160415, 160416, 160419, 160420, 160430, 160510, 160520, 160530, 160540, 160590, 230120

Source: Compiled by USITC staff.

Notes: Model sectors "Dairy farming" and "Beverages and tobacco products" are not included in this table because they have not been modified from their representation in the GTAP database. The acronym n.e.c. means not elsewhere classified.

The model simulations performed in this report reflect long-term adjustments in the markets for primary factors—land, labor, and capital. In the model, the availability of labor, in all economies, and of specific land resources in Brazil is responsive to real wages and real returns to land, respectively. Labor supply adjustments are based on a labor supply elasticity of 0.2.[5] Land availability in two agro-ecological zones (AEZ5 and AEZ6) in Brazil was allowed to expand because savannah and grassland could be brought into production. The availability of capital resources, in all economies, adjusts so that returns to capital do not change because of the simulation.

The data used in the simulation framework have been updated from their 2007 base-year to 2010, the most recent year for which statistics are available, using statistics on trade and on gross domestic product for all economies in the model.

The simulated effects are given in ranges which are calculated by performing sensitivity analysis of the simulated effects with respect to two key model parameters: the elasticities of substitution between domestic and imported products (GTAP parameter ESUBD) and between different suppliers of imports goods (GTAP parameter ESUBM). Values for ESUBM are based on Hertel, et al., which provides the mean ESUBM values used in the simulations, and the associated standard deviations for those values, which are

[5] Boeters and Savard, "The Labour Market in CGE Models," 2011 suggest using the value of 0.2 in Ballard et al., "A General Equilibrium Model for Tax Policy Evaluation," 1985 for the compensated elasticity.

employed in the sensitivity analysis.[6] ESUBD and ESUBM are held in a fixed relationship, the so-called "rule of two."[7]

Brazil's Preferential Tariffs

In order to estimate the economic effects of Brazil's negotiated free trade agreements, the analysis simulated the removal of the bilateral preferential tariffs between Brazil and its Mercosul trading partners. The analysis used 2010 bilateral applied preferential tariff rates and 2010 applied MFN rates for trade between Brazil and its Mercosul partners, downloaded from the United Nations Conference on Trade and Development's Trade Analysis and Information System (TRAINS) database using World Integrated Trade Solution. The TRAINS database contains bilateral applied preferential tariff rates and applied MFN rates at the HS-6 subheading level. These tariff rates include the ad valorem equivalents of non-ad valorem tariffs.[8] Tariff rates were downloaded for all HS-6 products and represent the average ad valorem equivalent applied to imports of a HS-6 product.[9] In order to calculate tariffs applied on the products specified in the simulation model seen in table E.3, the HS-6 product tariff rates were aggregated by trade-weighting the tariffs rates using 2010 trade values. The economic effects of Brazil's negotiated bilateral preferential tariffs were estimated by simulating the removal of these preferences. The simulation replaced the preferential tariff rates between Brazil and its Mercosul trading partners with applied most favored nation (MFN) rates.

Nontariff Measures on U.S. and Brazilian Exports of Meats, Grains, and Oilseeds

The USITC conducted a quantitative analysis of trade-restricting NTMs facing US and Brazilian exports of meat, grain, and oilseed products to certain major third-country export markets. The analysis assumes that NTMs raise the import price of goods and create a price gap between the import price and the world price. This price gap can be calculated and interpreted as the equivalent of a tariff. An analysis of the effects of NTMs on U.S. and Brazilian exports was performed by simulating the removal of the tariff equivalents for the products and markets where the existence of a trade-restricting measure could be confirmed by USITC staff research and industry information. As a result, exports of certain focus products were excluded from the analysis if the product was determined not to face any NTMs in a specific market. Table E.4 gives the full list of products and markets for which the analysis considered the existence of possible NTMs

[6] Hertel et al., "How Confident Can We Be in CGE-Based Assessments of Free Trade Agreements?" 2004.

[7] Jomini, Watts, and Dee, *The SALTER Model of the World Economy*, 1994.

[8] For tariff lines including tariff-rate quotas (TRQs), TRAINS calculates the tariff as an average of the under quota and over quota rates, when available. When both the under quota and over quota rates are unavailable, the tariff rate is calculated as only the over quota rate. Specific rates are converted to ad valorem equivalents using the UNCTAD method 1 for calculating a reference price. For further details, see WITS, "Ad-Valorem Equivalents of non Ad-Valorem Tariffs", 2010.

[9] The TRAINS database contains bilateral applied tariffs and MFN rates at the HS-6 level. The HS-6 tariff rates are the simple average ad valorem equivalents of the HS-8 ad valorem equivalents contained in a HS-6 subheading. Preferential and MFN tariff rates were downloaded in June 2011 and reflect the latest available applied tariff rates for 2010 in the TRAINS database at the time of download.

TABLE E.4 Set of products and markets considered for the NTM simulation analysis

Product	Third-country market				
	China	EU-27	Japan	Korea	Russia
Wheat	✓		✓	✓	
Corn	✓	✓	✓		
Beef	✓	✓	✓	✓	✓
Beef offal	✓	✓	✓	✓	✓
Processed beef		✓			
Pork	([a])	✓	✓	✓	✓
Pork offal	([a])	✓	✓	✓	✓
Processed pork	([a])				✓
Poultry, whole birds	✓	✓	✓		✓
Poultry, pieces and offal	✓	✓	✓		✓
Preserved poultry	✓	✓			
Soybeans					
Soybean meal					
Soybean oil					

Source: Compiled by USITC staff.

[a]Product was not included in the simulation analysis because a representative positive tariff equivalent of a known NTM could not be calculated.

and the product and market combinations where USITC staff research determined a policy affected exports from any supplier.[10]

Estimation of Nontariff Measure Price Gaps

The quantification of NTMs using the method of price gaps, or "tariff equivalents," has been frequently used in Commission studies on NTMs.[11] The NTM analysis in this study estimates supplier-specific gaps that allow for both quality differences and the possibility that the NTMs may have a greater or lesser impact on prices for imports from different sources.[12] Separate price gaps are estimated for imports from the United States, imports from Brazil and imports from the rest of the world, by comparing the price in each market of an imported variety (i.e., a good from a particular source) with the price of that

[10] In some cases, staff research indicated the presence of a trade-restricting policy; however, a positive tariff equivalent could not be calculated, and the product was excluded from the simulation analysis. This is true of pork imports from all suppliers into China and poultry imports from certain suppliers into China. For an analysis of Chinese NTMs affecting U.S. exports of pork and poultry products, see USITC, *China's Agricultural Trade*, March 2011.

[11] For the foundations of the method for estimating price gaps for NTMs at the Commission, see Linkins and Arce, "Estimating Tariff Equivalents of Non-Tariff Barriers," August 2002. For further descriptions of the price-gap method, as well as literature reviews, see Deardorff and Stern, *Measurement of Non-Tariff Barriers*, 1998; Ferrantino, "Quantifying the Trade and Economic Effects of Nontariff Measures," January 2006.

[12] In general, it is not feasible to correct for all possible quality differences while estimating NTM price gaps because some of these differences are unobservable. Certain countries consistently export products at higher unit values than other countries, however, suggesting a quality difference, particularly for relatively homogeneous goods. The methods used in this study exploit the observed quality differences arising from differences in exporter-specific unit values.

same variety in the world market.[13] The effects of removing these tariff equivalents are then analyzed using an AGE modeling framework. Table E.5 presents the estimated tariff equivalents.

TABLE E.5 Estimated ad valorem equivalents of known NTMs

		Third-country Market				
Product	Exporter	China	EU-27	Japan	Korea	Russia
Wheat	USA	46	([a])	40	30	([a])
	Brazil	1	([a])	2	1	([a])
	Other	([b])	([a])	46	18	([a])
Corn	USA	157	116	21	([a])	([a])
	Brazil	29	19	9	([a])	([a])
	Other	11	12	22	([a])	([a])
Beef meat	USA	44	118	23	8	23
	Brazil	3	101	9	12	6
	Other	12	38	([a])	([a])	9
Beef offal	USA	93	61	([a])	14	34
	Brazil	35	148	12	27	23
	Other	25	([a])	200	([a])	19
Processed beef	USA	([a])	118[c]	([a])	([a])	([a])
	Brazil	([a])	([a])	([a])	([a])	([a])
	Other	([a])	([a])	([a])	([a])	([a])
Pork	USA	([b])	([a])	([a])	([a])	15
	Brazil	([b])	66[d]	101[d]	70[d]	32
	Other	([b])	([a])	([a])	([a])	11
Pork offal	USA	([b])	([a])	([a])	([a])	9
	Brazil	([b])	66[d]	101[d]	70[d]	33
	Other	([b])	([a])	([a])	([a])	([b])
Processed pork	USA	([b])	([a])	([a])	([a])	63
	Brazil	([b])	([a])	([a])	([a])	24
	Other	([b])	([a])	([a])	([a])	7
Poultry, whole birds	USA	112	16	107	([a])	34
	Brazil	85	118	([a])	([a])	73
	Other	([b])	19	107	([a])	15
Poultry, pieces and offal	USA	18	69	63	([a])	1
	Brazil	([b])	24	([a])	([a])	12
	Other	([b])	35	84	([a])	([a])
Preserved poultry	USA	207	16	([a])	([a])	([e])
	Brazil	62	29	([a])	([a])	([a])
	Other	120	16	([a])	([a])	([a])

Source: USITC staff estimates.

[a]Staff research indicated no known trade-restricting NTM.

[b]Products were not included in the simulation analysis, although staff research indicated the presence of a trade-restricting NTM, because a representative positive tariff equivalent of the trade restrictiveness of the NTM could not be calculated.

[c]Staff research indicated that EU-27 imports of beef meat, beef offal, and processed beef from the U.S. are subject to the same NTMs. Because the U.S. is not a large exporter of processed beef, a representative price gap could not be calculated and the calculated price gap for U.S. beef meat exports to the EU-27 was used.

[d]The estimated NTM AVEs for Brazilian pork meat and pork offal are approximately equal within each market. Since the NTMs facing these imports are the same, same estimates were used for pork meat and pork offal within each market.

[e]Because known NTMs affect U.S. exports of prepared poultry to Russia indirectly and might not have a substantial trade-restricting effect, the estimated ad valorem equivalent of the known NTM was excluded from the analysis.

[13] This estimation procedure is similar to that used in recent Commission studies. See USITC, *India: Effects of Tariff and Nontariff Measures on U.S. Agricultural Exports*, November 2009; USITC, *China's Agricultural Trade: Competitive Conditions and Effects on U.S. Exports*, March 2011.

The estimation procedure uses unit values or “average prices” information from both bilateral and global trade statistics to estimate price gaps for meat, grain and oilseed products at the HS-6 subheading level. For U.S. goods, price gaps for each market are estimated by comparing unit values obtained from imports from the U.S. on a cost, insurance, and freight (c.i.f.) basis with unit values obtained from U.S. exports to the world on a free on board (f.o.b.) basis. These U.S. price gaps are adjusted for transportation costs, with transportation margins obtained from the Organisation for Economic Co-operation and Development (OECD) Maritime Transport Costs dataset, and represent transportation margins for U.S. exports to a specific market at the HS-6 subheading level. When transportation margins from the OECD dataset were not available, margins were obtained from the GTAP database at the GTAP sector level. For Brazilian goods, price gaps are estimated using a similar method.

Price gaps for imports into each market of non-U.S. or Brazilian goods are estimated in a similar fashion for each supplier, by comparing c.i.f. unit values by supplier in each focus market with the various suppliers’ f.o.b. unit values to the world. These non-U.S., supplier-specific gaps are then aggregated into a price gap for “other suppliers” for each good. This aggregation uses quantities imported into each market by supplier as weights, to adjust for systematic quality differences among different suppliers. The price gaps for other suppliers were adjusted for transportation costs by using transportation margin information obtained from the OECD Maritime Transport Costs dataset, where available, or else the GTAP database.

Import and export statistics at the HS-6 level were taken from the UN Comtrade database.[14] The analysis considered price data for the three most recent years for which data are available (2007–09) to account for variable effects of NTMs under different market conditions. Price gap estimates at the HS-6 level were aggregated to the 14 product categories representing meat, grain, and oilseed products (table E.4). Either the mean price gap for the three years or the most representative price gap out of these, based on available industry information, was used as the estimate. Because unit values may capture the effects of various domestic and world market conditions not related to NTMs, the tariff equivalent price gaps are not associated with any particular policy and should be thought of as an upper bound estimate of the price effects of NTMs in the importing country.

Negligible Trade and Quantity Gaps

The NTM analysis considered the possibility that some measures might prohibit U.S. and Brazilian agricultural exports to the selected third-country markets completely or almost completely over the period considered. For these products, obtaining a price of imports on which to base price gaps was impossible, or at best problematic. In cases of negligible trade, price effects were estimated indirectly from the quantity gap between the supplier’s share of imports and the supplier’s share of world imports, using available import

[14] Certain HS-6 trade observations that presented data difficulties were excluded. These difficulties included, inter alia, nonstandard units of measurement and thinly traded products exported from small countries, for which a reference price could not be established. The standard unit of measurement for almost all agricultural products is the kilogram or the metric ton.

demand elasticities.[15] These price effects are also analyzed as tariff equivalents, and their removal are analyzed in the described AGE model framework.

Model Limitations

Simulated effects from this simulation model are based on established trade patterns which may exist for such reasons as the distance between countries and the presence or absence of transport infrastructure. These factors are imperfectly captured by the simulation model. Furthermore, the model does not directly account for historical or cultural factors as determinants of trade patterns. The model assumes that these factors are unaffected by the simulated changes.

Economic models capture the most important factors for the question under consideration: existing trade flows and trade policies, and the degree to which consumer demand is sensitive to price changes. However, economic models are limited in their ability to reflect the degree of complexity evident in the real world.[16] Despite these limitations, the simulations performed here can be quite useful in providing insights on the effects of economic policies. The model presents a unified framework in which the likely effects of the policy can be assessed.

[15] Import demand elasticities at the HS-6 level were taken from Kee et al., “Import Demand Elasticities,” 2008.

[16] Examples of real-world complexities that are difficult to reflect in the model include the changing relative growth of different economies; politically motivated, export-oriented investment; relationships between multinational subsidiaries that influence trade patterns; and such events as catastrophic weather or violence that are inherently unpredictable (at least in their details).

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