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What the 2008/2009 World Economic Crisis Means for Global Agricultural Trade

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Abstract

The global economic crisis that started in late 2008 has led to a sharp curtailment of international trade, including a short-term decline in the value of global agricultural trade of around 20 percent. While not uniform across commodities and regions, the trade impact appears to be stronger on crops than on livestock. Global agricultural trade after slowing will continue to grow in the future. Economic growth prospects of emerging and developing countries will be important in determining composition of trade toward increased high-value products. The crisis is leading to a realignment of exchange rates, and the ultimate resolution of the crisis will depend on adjustments in the exchange value of the U.S. dollar. The U.S. agricultural sector would benefit from a depreciating dollar, which results in high export earnings, high agricultural commodity prices, increased production, and increased farm income.

Keywords: World economic crisis, international agricultural markets, international agricultural trade, agricultural imports, agricultural exports, world economic growth

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Economic Crisis Will Transform Global Financial System

The ongoing global economic crisis that started in the United States in late 2008 and quickly spread to Europe and other economies around the world will have a far-reaching impact, particularly in the short term. Not only is the global financial system being transformed by it, but a worldwide, likely permanent restructuring of the international economy is occurring. In the short term, with negative growth in world gross domestic product (GDP), trade will decline and agriculture as a heavily trade-dependent sector will have to adjust accordingly. While the timeframe and severity of the global crisis is still largely unknown, some of its possible effects can be inferred for sectors such as agriculture, using projections based on likely alternative macroeconomic outcomes.

The volume of global trade in 2009 will decline for the first time since 1982 (World Bank, 2009). The International Monetary Fund (IMF) projects that the volume of goods imported by developed countries will decline by 3.1 percent this year and the emerging and developing countries will experience an unprecedented 1-percent decline in the volume of their exports. These projections appear to be conservative, as current information indicates that the decline in the value of merchandise trade in the first quarter of 2009 is 20 percent or more (see box, "Global Merchandise and Agricultural Trade Are Declining in the Short Run"). The value of China's exports in the first quarter of 2009 declined on a year-to-year basis by 20 percent, and the value of U.S. exports also fell during the first 2 months of 2009 by 22 percent, compared with 2008 exports' value. The value of merchandise imports of the European Union (EU), South Korea, Mexico, and the United States declined by 30 percent during the first several months of 2009 in comparison to the previous year. The discrepancy between the IMF estimate of the percentage decline in trade and the reported declines in value of trade indicate that a substantial part of the decline in value is due to falling prices. This suggests that consumption is not falling as sharply as the decline in the value of trade. Preliminary results show that there will be short-term declines in agricultural trade. This decline will result in lower agricultural prices and reduced farm incomes around the world.

The worsening of global economic conditions is also creating the potential for much more serious food-security challenges in traditionally food-insecure developing countries, as well as in some countries that have not experienced major food insecurity in recent years (Shapouri et al., 2009). Declines in export earnings for some countries as well as fewer remittances returning to those countries' economies from their citizens working abroad are eroding purchasing power while food prices, despite declining agricultural commodity prices, remain higher than they were before the 2008 price spike.

The global financial crisis and recession will affect each country differently depending on the country's linkages to the world economy, its economic condition before the crisis, and the degree to which it participates in the global financial markets. For example, China and India are likely to emerge from this crisis in relatively strong economic positions in contrast to developed coun-

tries such as the European Union, partly because they started out with very strong economic growth prior to the recession. In addition, the way in which the macroeconomic imbalances that contributed to the crisis are resolved will affect the realignment of exchange rates and economic growth prospects worldwide. The impact of that resolution and realignment is being felt in new trade patterns in 2009. While Canada and Mexico have continued to be the largest two markets for U.S. agricultural exports over the past few years, by the end of 2008 and into 2009, China had become the third most important destination for U.S. agricultural exports (USDA, FATUS, 2009).

Global Merchandise and Agricultural Trade Are Declining in the Short Run

The latest data on the value of total and agricultural merchandise trade show a broad-based decline in the value of exports and imports compared with a year ago (World Trade Atlas, 2009). The data also show that the decline in merchandise trade has accelerated considerably during the first quarter of 2009. This is consistent with a deepening of the economic recession worldwide.

Total and agricultural merchandise trade should recover when the recession ends and economies begin to grow again. Many forecasts indicate that this is not likely to occur until the last quarter of 2009 or first quarter of 2010. If this is the case, then the decline in value of agricultural trade in the last quarter of 2008 and first quarter of 2009 will likely continue through the remainder of 2009.

Global agricultural trade shows decline in the short run

		Agricultural trade value		Value of total merchandise trade	
Country/region	Latest month of available data	Fourth quarter (Oct-Dec) 2007-2008	First quarter (Jan-March) 2008-2009	Fourth quarter (Oct-Dec) 2007-2008	First quarter (Jan-March) 2008-2009
		----------Percent change (value of exports)[1]----------			
China	March 2009	-0.4	-17.3	4.0	-19.7
Japan	March 2009	-15.6	-53.7	-9.8	-38.6
United States	February 2009	-5.5	-24.3	-4.0	-22.5
European Union	January 2009	-10.0	-33.7	-11.4	-33.2
		----------Percent change (value of imports)[1]----------			
South Korea	March 2009	-3.3	-32.0	-9.0	-32.9
Mexico	January 2009	-2.7	-26.4	-6.1	-30.0
United States	February 2009	6.1	-11.7	-9.2	-30.4
European Union	January 2009	-11.8	-31.9	-10.6	-30.3

[1]Represents year-over-year percentage change.
Source: World Trade Atlas, 2009.

How Shocks to the Global Economy Affect Agriculture

The economic crisis will affect international agriculture trade primarily through the realignment of real (adjusted for inflation) exchange rates and that realignment's effect on real incomes. The economic crisis has resulted in major recessions[1] in most of the major countries of the world, with world GDP expected to decline in 2009 by more than 2 percent (table 1). The slowing of the growth in demand for agricultural commodities worldwide—resulting from the fall in global income—has led to a slowing of the growth in the volume of agricultural commodities traded.

In addition, the large global imbalances in financial and merchandise trade that existed before the crisis likely will lead to substantial changes in exchange rates. Already the current crisis has led to the appreciation of the U.S. dollar against the currencies of those countries most affected by the crisis as investors seeking safe returns increased their purchases of U.S. Treasury bonds. This movement of funds led to a 15-percent appreciation of the dollar relative to its major trading partners between July 2008 and March 2009 (USDA, ERS Agricultural Exchange Rate Data Set, 2009). The appreciation of the U.S. dollar creates a competitive advantage in global markets for other major agricultural exporters, such as the EU, Australia, Canada, and Brazil. As U.S. products become relatively higher priced when the U.S. dollar increases in value, world demand increases for imports from countries whose currencies have declined in value relative to the U.S. dollar.

In addition to the impact on agriculture from these exchange-rate shifts, there are also the implications for agriculture of the effect of the crisis on energy prices and demand (fig. 1). With the decline in GDP around the world and dramatically lower crude oil prices, profitability and prices of biofuels

Table 1
The global recession is broad-based

- United States
- Canada
- Mexico
- Argentina
- Brazil
- Chile
- Colombia
- Costa Rica
- European Union
- Norway
- Switzerland
- Baltic States
- Russia
- Ukraine
- Hungary
- Turkey
- Iran
- Japan
- Korea
- Taiwan
- Hong Kong
- Singapore
- Malaysia
- Thailand
- Australia
- New Zealand
- South Africa

Note: This is a partial list of countries with negative projected annual economic growth rate as of July 2009. Relatively small economies were not included in the list.
Source: Global Insight, 2009.

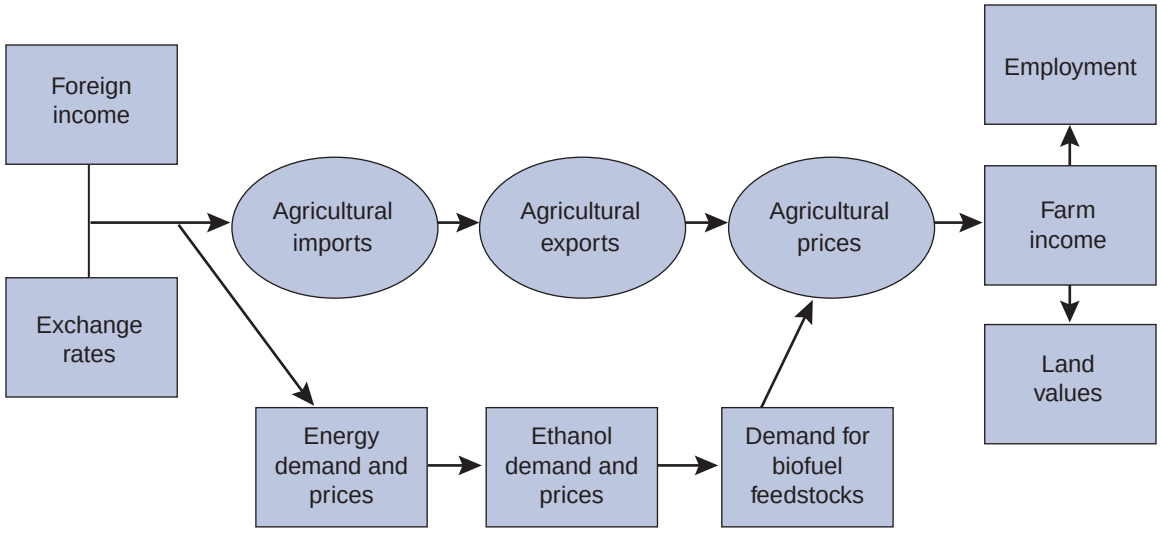
[1]Most economists agree that negative gross domestic product (GDP) growth over more than two quarters qualifies as a recession.

(ethanol and biodiesel) have decreased. Declining prices are not all bad, however, and the lower input and animal feed costs implied by the reduced energy prices will be beneficial to agricultural producers.

Changes in GDP and real exchange rates are emphasized in this analysis because of their importance in determining agricultural trade (Shane et al., 2008). Changes in the macroeconomy affect trade mainly through its impact on income and relative prices. GDP determines the amount a country has to spend while exchange rates determine how much it costs to exchange exported goods for imported ones. Both have major impacts on the quantity of goods produced and consumed and on trade patterns. A similar approach emphasizing the importance of income and relative prices on trade was used in analysis of impacts of past financial crisis on U.S. and international agriculture (Shane and Stallings, 1987). The other major determinants of trade—differences in production technology, factor endowments, and productivity—are implicit in the analysis while other macroeconomic variables—inflation, savings, investments, and interest rates—are accounted for in our macroeconomic model.

The potential effects of the resolution of the economic crisis on international trade are important for U.S. agriculture. Highly dependent on world agricultural trade, the United States is a major participant in global markets for grains, oilseeds, cotton, and meat. A long-term reduction in worldwide import demand for agricultural commodities is likely to lead to a reduction in U.S. agricultural exports and to constrain U.S. farm income and agricultural commodity prices for some time to come.

Figure 1
Foreign macroeconomic linkages to agriculture



Source: ERS analysis.

These effects were already evident in the early results from 2009. The declines in incomes around the world as a result of the evolving global recession combined with the short-term appreciation of the U.S. dollar is likely to result in significant declines in U.S. agricultural exports and lower agricultural prices, farm income, and employment in the American farm sector. But, because U.S. agriculture came into the crisis following record-high prices and income, and because U.S. farm balance sheets contain a much smaller percentage of debt than most other businesses, the impact of the crisis will likely be less on U.S. agriculture than on other sectors of the economy (Shane et al., 2009). However, in 2009 and perhaps 2010, U.S. agricultural producers are expected to operate in a less favorable economic environment and experience a decline in farm income before most macroeconomic factors start to return to historic trend levels. Agricultural households also might suffer from declining income from off-farm jobs, as the economic recession in the United States ripples though to rural-based businesses.

More important perhaps than the immediate effects of the economic crisis on world agricultural markets is the effect the economic crisis will have on trade and world consumption in the longer term. As we have already seen, exchange rates and changes in economic growth and income can have a major impact on total agricultural commodity and merchandise trade. Consequently, how exchange rates and economic growth evolve as the world economy recovers also will have a major impact on the volume of international agricultural commodity trade and the outlook for agriculture in major trading countries, such as the United States.

There is much uncertainty about how the macroeconomic imbalances that existed before the crisis will be resolved and the impact the resolution of these imbalances will have on exchange rates and on economic growth prospects. This uncertainty focuses in large part on whether China and other developing countries will continue to run large trade surpluses with the United States and other developed countries. Those importers' decision on whether or not to maintain surpluses will determine the economic growth prospects for the United States and other countries and whether the realignment of exchange rates will lead to a depreciation of the U.S. dollar or not (see box, "Global Trade and Financial Imbalances Contribute to the Economic Crisis").

Even though the manner in which the macroeconomic imbalances will be resolved is unknown, the likely impact of the worldwide economic slowdown can be explored for agriculture using projections based on the existing macroeconomic conditions as of December 2008 and assumptions about the likely ways that the imbalances will be resolved. To do this, we developed three sets of assumptions about how the financial and merchandise trade imbalances will be resolved. Using those three scenarios, we analyze the potential impacts on economic growth, the realignment of exchange rates, global agricultural markets, and international trade.

Global Trade and Financial Imbalances Contribute to the Economic Crisis

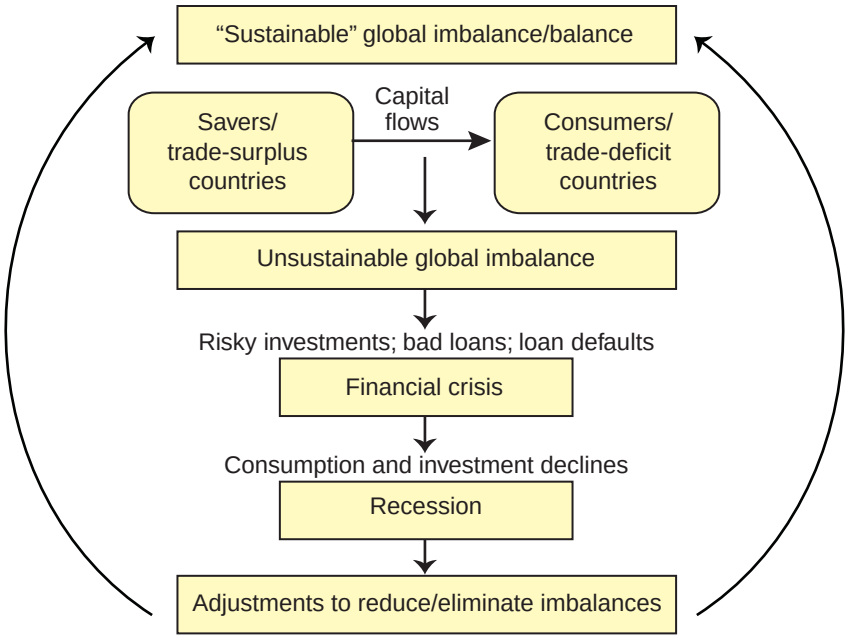
The global macroeconomic imbalances that preceded the ongoing economic crisis can be summarized by describing what happened between two groups of countries. On one side are the "savers" (trade-surplus countries). China is a good example. On the other side are the "consumers," (trade-deficit countries) such as the United States.

In general, the saver countries maintained large trade surpluses by, among other things, maintaining an undervalued exchange rate. This resulted in large trade deficits in the consumer countries. These trade imbalances also were accompanied by savings and consumption imbalances between the two groups. These large global trade and macroeconomic imbalances led to large capital flows from the trade-surplus countries to the trade-deficit countries, resulting in a large stock of loanable funds in recipient countries. The increased liquidity in the banking systems and weak regulatory environment led to a large pool of risky loans and investments. Once interest rates began to rise and housing values began to fall in late 2007, the number of bad loans and loan defaults began to rise rapidly. All of these were the consequence of the unsustainable global imbalances, the outcome of which is the financial crisis.

The financial crisis, along with the bursting of the real-estate bubble in developed countries and high energy prices, reduced consumption and investment, which eventually lead to a full blown recession spreading across countries.

Adjustments to reduce or eliminate the imbalances will occur. If the adjustments that take place lead to an appreciation of the U.S. dollar, then the global economy will follow a path that will lead to continued unsustainable global imbalances. However, if the adjustments that take place lead to a depreciation of the dollar, the resulting reduction or elimination of global trade and financial imbalances will put the world on a more sustainable growth path. A sustainable growth path is characterized by the highest possible rate of economic growth that does not generate resource inflation, a situation where resource demand does not outstrip resource supplies. This more balanced economy can persist until, eventually (although not inevitably), another unsustainable global imbalance develops and leads to another crisis, thus, another cycle.

Unsustainable global imbalances contribute to financial crisis



Source: ERS analysis.

Scenarios Create Different Economic Futures

The reference scenario was developed to reflect the onset of the economic crisis and the likely adjustments that will take place in the economic growth and relative prices (exchange rates) in response to assumed changes in the macroeconomic imbalances due to the crisis. The front end of the reference scenario is the 2008 USDA long-term projections modified by replacing its exogenous macroeconomic information with Oxford global macroeconomic results based on December 2008 assumptions and the simulated impact of these changes in macroeconomic variables on world crop and livestock commodity supply and use (USDA, 2008).

The two alternative scenarios characterize two possible movements of real exchange rates, real economic growth rates, and other macroeconomic variables corresponding to how the global imbalances are resolved. The first considers a continuation of major trade and savings imbalances, assuming that they lead to a sustained movement toward appreciation of the U.S. dollar, while the second assumes a significant reduction in trade and savings imbalances and a major depreciation of the U.S. dollar.

Reference scenario. The reference scenario is based on the Oxford Model's longrun forecast of the global economy as of December 2008 (Oxford Economics, 2008). It reflected a consensus view at the time that the world and U.S. economies will recover by late 2009.[2] This scenario assumes modest adjustment in U.S. domestic savings, a slow appreciation of the U.S. dollar—19 percent over 10 years—and modest growth in U.S. and world GDP. U.S. economic growth through 2017 (2.5 percent per annum) is projected slower than experienced during the previous 10 years (3 percent per annum). It also assumes that future economic growth in other economies of the world will be slightly higher, at 4 percent per annum, than was true over the last decade.

Since December 2008—when assumptions were formulated—until mid-year 2009, the near-term prospects for economic growth have deteriorated with U.S. GDP declining by 5.5 percent in the first quarter of 2009 and the value of the dollar increasing. Whatever these events portend about economic growth in the short term, they are not yet viewed as determining the long-term exchange rate pattern or long-term growth prospects of the United States and other countries. While the December 2008 Oxford forecast was less severe than may be currently indicated, it captured much of the pattern which appears to be evolving and the overall longer term pattern of adjustment will likely be within the range of alternatives considered in this paper.

High dollar scenario. The first alternative scenario (high dollar scenario) of the global macro economy lays out a case in which exchange rates and financial and macroeconomic imbalances return to pre-crisis levels. This could occur if developing countries, including China, continue to run large trade surpluses with developed economies such as the United States and the former continue to invest their excess savings in the latter. If that pattern continues, it would keep interest rates low, stimulate U.S. capital formation and economic

[2]Many forecasts continue to indicate that economic recovery is likely to occur toward the last quarter of 2009 or first quarter of 2010.

growth and bid up the value of the U.S. dollar. As a result, U.S. economic growth in 2017 would be higher than it was in the reference while economic growth in the other countries of the world would be lower. The accompanying appreciation of the U.S. dollar, up 40 percent from 2008-17 reference levels, will make the value of the dollar higher than any other time since 1990 and 20 percent higher than its last peak in 1991.

Low dollar scenario. The second alternative scenario (low dollar scenario) of the global macro economy sets out a case in which global trade and financial imbalances decline and economic growth is renewed at long-term sustainable rates. For the United States, this would mean a real slowdown in the inflow of developing country savings, giving rise to lower U.S. trade deficits, higher domestic savings, and relatively low real investment. This is accompanied by a depreciation of the U.S. dollar against major foreign currencies. These assumptions are consistent with slower economic growth relative to the reference scenario for both the United States and the rest of the countries of the world through much of the time path of the analysis. The weaker U.S. dollar would mean it would take less foreign currency to equal a dollar, making U.S. agricultural exports less expensive for the rest of the world.

The effect of these changes on a specific country will depend both on the magnitude of the changes in income and exchange rates they face and the responsiveness of their agricultural markets to them. Hence, the impact of these changes will vary by country and by commodity. In addition, some countries account for a large share of the international export market and their responses will affect world prices significantly. The populations in most developing countries account for a small share of international trade and are price takers, which means they do not affect world commodity prices. Those populations spend a high proportion of income on food, so changes in world agricultural commodity prices will significantly affect the food consumption of these developing economies. To account for these differing responses to changes in macroeconomic conditions, we utilize a dynamic global agricultural trade model called Dynamic PEATSim (see box, "PEATSim Model Calibrates Each Country's Agricultural Activities to USDA Long-Term Projections").

The Oxford Model (2008), a global macroeconomic model, was used to develop consistent projections of the different macroeconomic variables including GDP, exchange rates, consumer price indexes (CPIs), and petroleum prices for each scenario or adjustment path. The projections were created by making assumptions about adjustments in trade and savings imbalances and seeing the resulting impact on the macro economy and on the above variables. Some of the Oxford outcomes (economic growth, exchange rates, and inflation) were then introduced into the PEATSim model as exogenous variables to determine the potential impact of these outcomes on agricultural commodity prices, consumption, production, and trade in different countries and regions of the world.

Given the extent of the economic crisis and the size of the economies affected, it is not possible to isolate the changes in GDP from changes in exchange rates, inflation, and other macroeconomic variables. They are all linked to each other and determined simultaneously. These dynamic interactions among the

macroeconomic variables were captured by the Oxford model. Consequently, the scenarios used in PEATSim do not arbitrarily allow one variable such as GDP to change, while all other variables remain constant, as this will not relate to any relevant path of adjustment of the macro economy. Thus, the agricultural PEATSim model adopted scenarios that reflect relevant paths of adjustments in the corresponding set of macroeconomic variables generated by the Oxford model.

PEATSim Model Calibrates Each Country's Agricultural Activities to USDA Long-Term Projections

Dynamic PEATSim is a partial-equilibrium, multi-commodity, multi-region global gross trade model of the agriculture sector. It uses supply-and-demand equations to capture the economic behavior of producers, consumers, and markets in a global framework. It includes variables for production, area, yields, consumption, exports, imports, stocks, world prices, and domestic producer prices. Identities such as supply and utilization, consumption and related items (food, feed, fuel, crush, other) hold for all commodities and regions in the model. The model calibrates each country's agricultural activities to the USDA's long-term projections (USDA, 2008).

The model balances supply and demand, and consequently prices are determined at market clearing levels that permit global market equilibrium to be achieved. PEATSim includes 13 countries or regions: the United States, the European Union,[3] Japan, Canada, Mexico, Brazil, Argentina, China, India, Australia, New Zealand, South Korea, and the rest of the world (ROW). Agricultural commodities covered include grains, oilseeds, and livestock products. The model's innovative and flexible specification gives it the ability to analyze a variety of scenarios. The PEATSim model is written in the GAMS (General Algebraic Modeling System) programming language utilizing PATH, a Mixed Complementarity Problem (MCP) Solver/Algorithm developed by Dirkse and Ferris (1995).

MCP allows PEATSim to generate a model with different production and consumption regimes, as well as utilize functions with discontinuities. It also allows an endogenous determination of which regimes are dominant for given market conditions and the evaluation of the consequences of regime shifts. The PEATSim model generates annual changes over a time path, in this case 2009-17. For a more exhaustive discussion of the PEATSim model's structural framework, see Peters et al. (2009).

[3]The European Union is comprised of 27 member countries: Austria, Belgium, Bulgaria, Cyprus, the Czech Republic, Denmark, Estonia, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Lithuania, Luxembourg, Malta, Netherlands, Poland, Portugal, Romania, Slovakia, Slovenia, Spain, Sweden, and the United Kingdom. The PEATSim model covers all EU-27 member countries except Bulgaria and Romania.

Reference Scenario: Major Impacts on Agriculture Will Occur in 2009-11

Under the reference scenario, the greatest impact of the economic crisis will likely be experienced in 2009-11. Global GDP declines by 2 percent in 2009. GDP growth rates between 2008 and 2009 decline across all countries and regions by 2-5 percentage points (table 2).

While many countries, including the United States, experience negative growth, China and India still maintain positive growth in real GDP in 2009. During the height of the crisis, in 2009, GDP declines in developed countries, but continues to increase for many emerging and developing countries. As shown in figure 2, income growth will rebound strongly in 2010 for most countries and continue to grow for several years through 2012. Economic growth will then begin to slow through 2014 before stabilizing around its new longrun trend through 2017. For most countries, income growth will start returning to near trend rates after 2011 as shown in figure 2.

Table 2

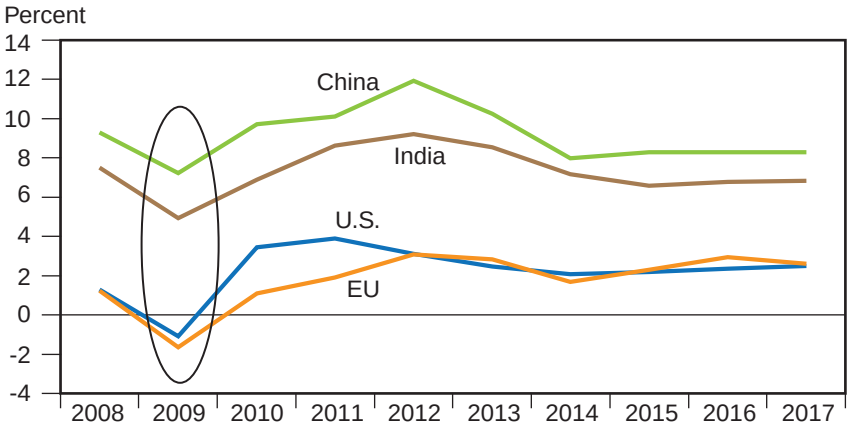
All countries experience income declines

Country/region	Percentage-point change in real GDP growth rates between 2008 and 2009
Argentina	-4.1
Australia	-2.1
Brazil	-3.8
Canada	-1.9
China	-2.1
European Union	-2.9
India	-2.5
Japan	-2.6
Mexico	-2.1
New Zealand	-3.1
South Korea	-4.7
United States	-3.2
Rest of the world (ROW)	-2.5
World (total)	-2.8

Note: GDP = Gross Domestic Product.
Source: Oxford Economics, December 2008.

Figure 2

Real GDP contracts in many countries in 2009



Source: Oxford Economics, December 2008.

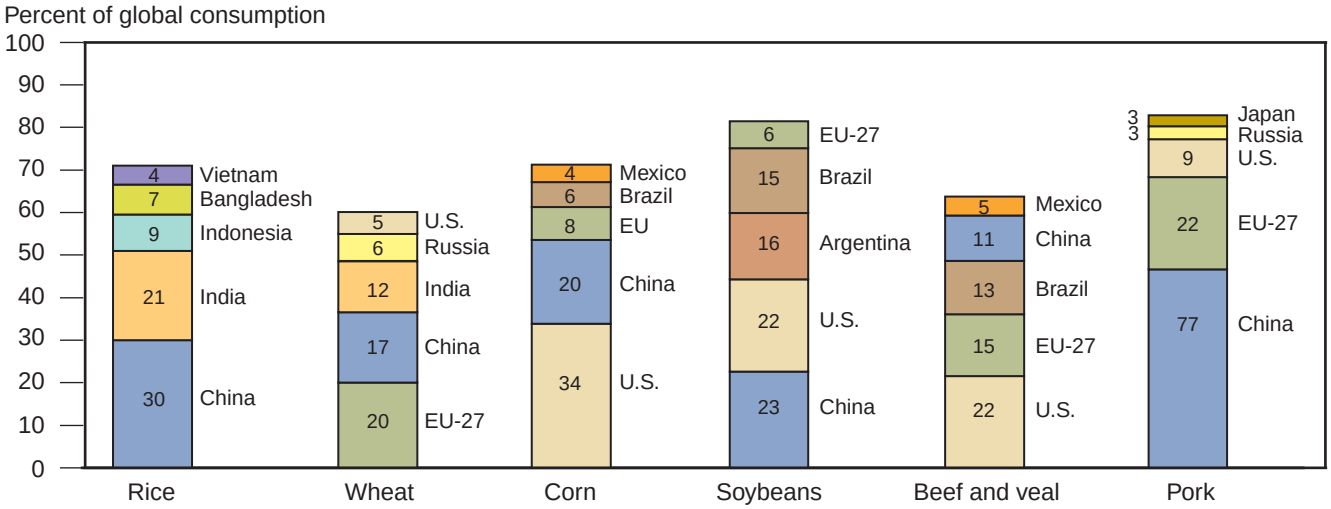
Agricultural Consumption Patterns Continue at a Reduced Rate

In the reference scenario, contraction in GDP growth in 2008 and 2009 does not lead to a contraction in consumption of most agricultural commodities. This is largely due to how the changes in GDP are distributed among the leading consuming countries. China, India, United States, and the EU-27 have been consistently among the top five consumers of many of the agricultural commodities (fig. 3). Given their consumers' high levels of per capita income and inelastic food demand, reductions in GDP are not likely to cause food consumption to decline in the United States or European Union. Consumers in China and India will be more sensitive to changes in GDP because of their low levels of per capita income. While GDP growth in these countries will slow, it is still expected to grow by more than 5 percent in 2009. Trends in consumption in emerging and developing countries that existed before the crisis, such as the movement of diets toward increased meat consumption, will likely continue although at a slower rate.

The contraction in global GDP that occurs under the reference case does, however, lead to a significant slowing of growth in the consumption of agricultural commodities. Growth in world food crop and feed crop consumption begins slowing in 2009 as a result of the recession (table 3). World consumption of wheat and corn stagnates, up less than 0.5 percent above 2008 levels. Consumption of corn strengthens sharply in 2010, reflecting the upturn in GDP as the world economic situation improves. Wheat consumption strengthens somewhat in 2010, but growth remains below 1 percent. Beef and pork consumption remains fairly strong in 2009, growing by nearly 2 and 3 percent respectively. Beef and veal consumption moderates slightly in 2010, while growth in pork consumption slows by about 1 percentage point.

The decline in consumption growth is greater outside of the United States, reflecting international agricultural markets' greater sensitivity to the economic crisis relative to U.S. agricultural markets. Wheat consumption

Figure 3
China, India, United States, and EU-27 led global consumption in 2008



Source: USDA's Foreign Agricultural Trade of the United States (FATUS) database, 2009.

Table 3
GDP contraction slows consumption

Commodity	Country/ region	Quantity consumed, annual growth rates, reference scenario				
		2009	2010	2015	2016	2017
				Percent		
Food crops						
Rice	World	-0.4	1.0	1.0	0.8	1.0
	Less U.S.	-0.5	1.0	1.0	0.8	1.0
Wheat	World	0.4	0.8	1.2	0.8	1.3
	Less U.S.	0.3	0.7	1.2	0.8	1.4
Feed crops						
Corn	World	0.4	1.8	2.0	1.4	1.9
	Less U.S.	0.3	1.9	2.4	1.6	2.2
Other coarse grains	World	0.8	0.7	0.8	0.3	1.0
	Less U.S.	1.2	1.1	0.8	0.3	1.0
Livestock						
Beef and veal	World	1.7	1.5	2.2	1.1	2.9
	Less U.S.	2.5	2.1	2.3	1.2	3.4
Pork	World	2.7	1.5	2.4	1.8	2.7
	Less U.S.	2.8	1.9	2.6	1.9	2.9

Source: PEATSim results.

outside the United States slows in 2009, increasing only 0.3 percent above 2008 levels. Consumption strengthens slightly in 2010, but growth remains below 1 percent. Growth in consumption of corn outside the United States also slows substantially growing by 0.3 percent, but regains strength in 2010, increasing by nearly 2 percent.

Growth in foreign consumption of beef and pork remains stronger than U.S. growth, reflecting the continued increase in incomes in major emerging markets, such as China, where consumer diets continue to diversify away from grains and toward consumption of more meat. Consumption of beef and pork in other economies around the world grows by 2.5 and 2.8 percent in 2009 before slowing modestly to around 2 percent in 2010.

By 2015-17, growth in consumption of most commodities recovers and stabilizes to pre-crisis levels. As a result, growth in agricultural trade will likely strengthen over this time frame as well. Based on these results, it does not appear that the economic crisis will alter the ongoing changes in diet and food consumption in developing and emerging countries. Consumption of feed for animals and of meat outside the United States grow faster than consumption of food grains as slower, but positive growth in GDP continues in emerging and developing countries. However, a steeper decline in economic growth over a longer period could lead to a reversal of the change toward meat consumption, particularly if growth in GDP in emerging and developing countries turns negative.

World Agricultural Prices Decline While Agricultural Production Slows

The lower rate of consumption growth translates into decreased demand for agricultural commodities, which also affects commodity prices.

World prices (in real terms) of crops and livestock products decline rapidly from their peak in 2008, with most of the decline occurring in the end of 2008 and the beginning of 2009. The sharp decline is a result of the slowing of consumption growth due to the rapid increase in agriculture commodity prices from 2004-08, an increase in supply in response to the high prices, and the appreciation of the U.S. dollar. World and domestic producer prices stabilize around their trend starting in 2012 and remain stable through the remainder of the time period in the reference scenario.

The decline in producer prices from their peak 2007-08 levels leads to slowing of production. In general, production of most of the selected food crops, feed crops, and livestock products in the reference scenario slows or declines from 2009-10 and then begins to strengthen by 2011 as the economy recovers (table 4). For example, the production of wheat outside the United States slows sharply from a 5.9-percent increase in 2008 to a 1.2-percent increase in 2009.

Production continues to slow in 2010, turning negative as a time lag occurs for producers responding to the decline in real prices. Wheat production increases slightly in 2011. Growth in foreign production of feed crops, as reflected by corn, slows from 2.7 percent in 2009 to 1.9 percent in 2010 before increasing by 2.1 percent in 2011. Despite this decline in growth, feed crop production remains stronger than production of food crops, such as wheat, whose growth stagnates through 2011, down -0.1 percent in 2010 and up 0.2 percent in 2011.

The effect of lower prices on meat production does not become evident in this scenario until 2010, reflecting in part the time it takes for increases in feed costs to affect production decisions. Growth in beef production continues to contract in 2011, reflecting the length of time it takes to make adjustments in herd size in response to lower prices.

Growth in foreign production of meat, such as beef and veal, slows through 2011 as well, but at 1.4 percent, also grows faster than food grains production. The relative strength of growth in production of feed grains and meat reflects the continued shifting of diets to meat in emerging and developing countries even as global consumption growth slows.

Production changes for specific commodities in individual countries will depend on the relative changes in exchange rates, domestic policies, and economic conditions of a country or region. The top five producers worldwide

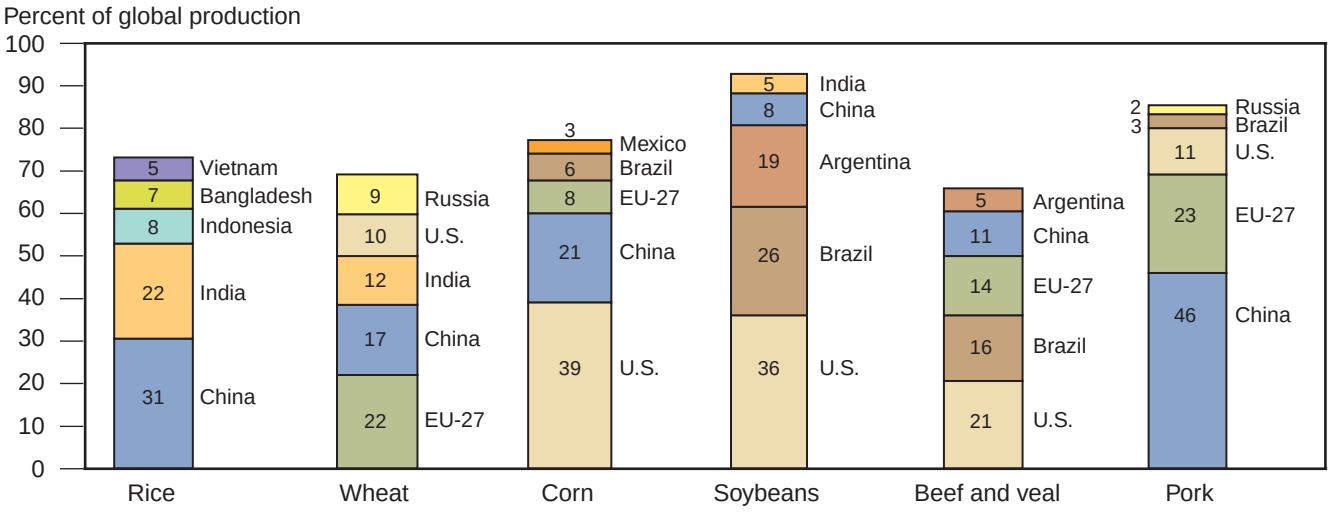
Table 4
Production slows with slackening of demand, but strengthens in 2011

Commodity	Country/region	2009	2010	2011
		Percentage change in production		
Food crop				
Wheat	World less U.S.	1.2	-0.1	0.2
Feed crop				
Corn	World less U.S.	2.7	1.9	2.1
Livestock				
Beef and veal	World less U.S.	2.9	1.8	1.4

Source: PEATSim results.

Figure 4

China, EU-27, United States, and Brazil were top global crop and meat producers in 2008



Source: USDA's Foreign Agricultural Trade of the United States (FATUS) database, 2009.

of selected crops and livestock products accounted for 70 to 90 percent of global production in 2008 (fig. 4).

China, India, EU, United States, Brazil, and Argentina rank near the top of the list for each of the different commodities. Consequently any change in world production will be dominated by changes in production in these countries that result from farmers responding to changes in demand.

Global Agricultural Trade Slows

In addition to its impact on prices, the slowing of consumption also leads to a slowing of growth in trade of agricultural commodities from 2009-10. The slowing in growth in trade in the reference scenario will have the greatest effect on U.S. producers and its major competitors in world export markets. Figure 5 shows leading exporters and importers of selected agricultural commodities in 2008.

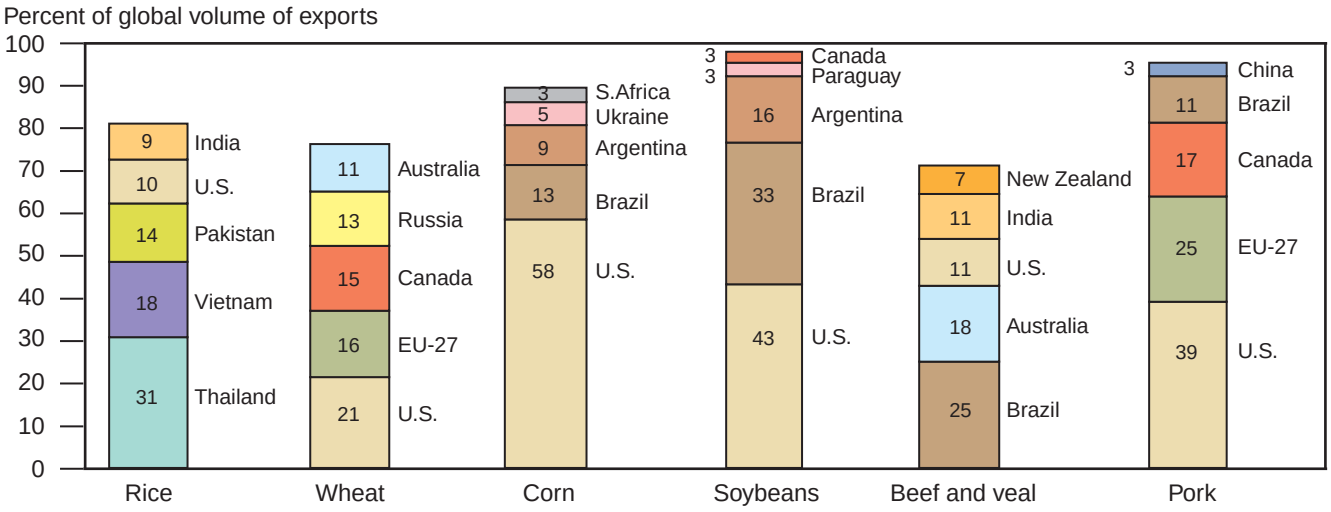
The United States is consistently one of the top exporters for all the agricultural commodities shown. Canada, Brazil, and EU are other major exporters. Japan, while not a major exporter, is a major importer of corn, other coarse grains, soybean seeds, soy meal, beef and pork. Mexico, a large trading partner of the United States, is a major importer of corn, and imports a considerable amount of the rest of the commodities as well. Canada, also a major U.S. trading partner, does not rank in the top five leading importers globally.

Some countries or regions that are major producers and consumers of agricultural crops and livestock do not play prominent or direct roles in international markets. However, domestic market conditions and events in these regions do affect global agricultural trade. For example, a major producer and consumer such as China may not be trading much in proportion to its total production and consumption for certain commodity, yet a significant decline in its domestic production or an increase in domestic consumption will raise China's import needs, putting pressure on the international market.

In addition, China historically has exported some commodities (e.g., rice, wheat, corn, other coarse grains, soybeans, soy meal, beef and veal, pork, and poultry) and continues to do so in the very beginning of the reference scenario's time path (2009-10). China, however, turns into a net importer of many agricultural commodities in later years of this scenario due to growing population and expected strong income growth. Thus, domestic conditions in large producing or consuming countries such as China can and will affect international markets.

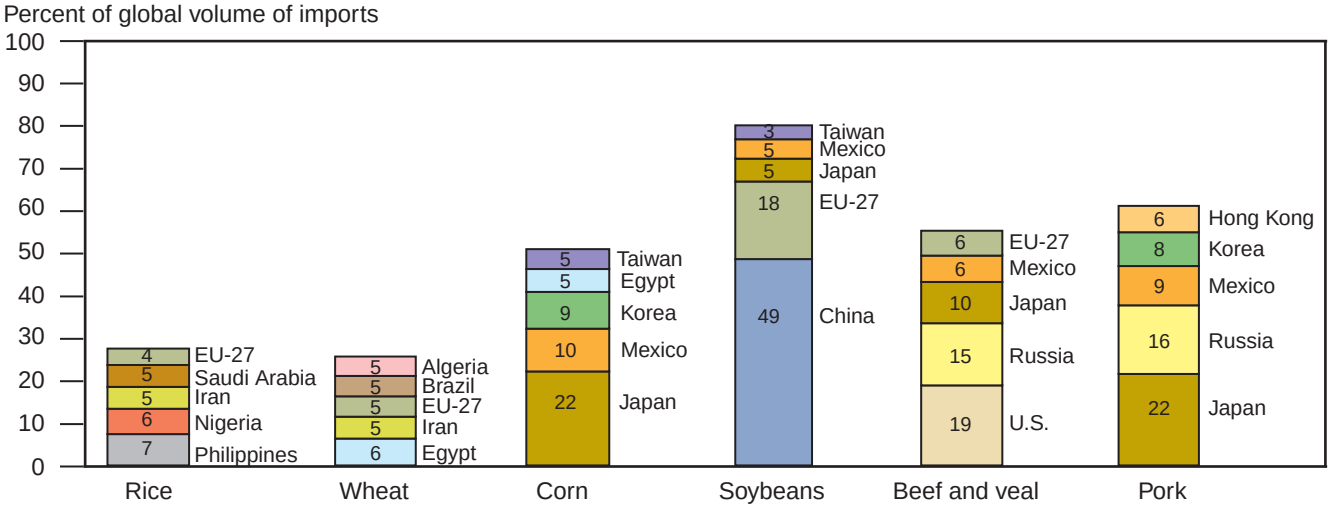
Table 5 shows the growth rate of global quantity imported (same as global quantity exported) of selected agricultural commodities over the period 2009-11 under the reference scenario.

Figure 5
United States led exporters globally in 2008



Source: USDA's Foreign Agricultural Trade of the United States (FATUS) database, 2009.

Figure 6
Major importers were generally not major producers of crops and meat, 2008



Source: USDA's Foreign Agricultural Trade of the United States (FATUS) database, 2009.

While the rate of growth in global imports slows through 2010 as a result of the slowing of consumption, it remains positive for most agriculture commodities as global imports continue to grow (table 5). The rate of growth in imports from 2009-11 remains positive for all commodities covered in this analysis, except for pork in 2009 and rice in 2010. As the economy recovers, by 2011 growth of global imports of all commodities, except poultry, starts to strengthen. Global import growth then remains strong for most commodities through 2017, with corn showing the weakest growth. The poor performance of corn possibly reflects the increasing diversion of corn for the production of ethanol in the United States during this period.

As with global imports, growth in the imports of countries outside the United States increases for all commodities, except pork in 2009 and rice in 2010. Growth in meat imports outside the United States generally slows in 2010, but remains positive, with beef and veal imports growing by 0.1 percent. Growth in foreign imports of feed crops slows in 2010 as well before gaining in strength in 2011. Foreign imports of corn slow to 2.4 percent in 2010 before increasing by 5.0 percent in 2011. Nonetheless foreign imports of feed crops generally grow faster than foreign food crop imports.

The continued strength in growth of foreign meat and feed crop imports are consistent with the consumption results. It is likely a result of the positive economic growth in emerging and developing countries which allows for the continued convergence of the composition of their diets toward the diets of developed countries and toward high-value products. The continued strength of foreign meat and feed crop imports also demonstrates that continued economic growth in the emerging and developing countries is a factor in the long-term increase in agriculture imports.

The strength of import growth outside the United States means some U.S. producers will be able to increase their exports during the economic crisis. Given the growth in foreign meat and feed crop imports, those commodities have potential for U.S. export growth.

Global exports of meat and food and feed grains mirror changes in global imports in our reference scenario. Global export growth slows but remains positive through 2010 before steadily increasing throughout the rest of the

Table 5
Growth in global agricultural import slows in 2009-10

		Growth rate in quantity traded, reference scenario		
Commodity	Country/region[1]	2009	2010	2011
			Percent	
Rice	World	7.2	-5.1	1.2
Wheat	World	5.6	1.2	4.5
Corn	World	5.7	2.4	5.0
Soybeans	World	4.4	3.3	5.4
Beef and veal	World	6.7	0.7	1.1
Pork	World	-3.6	1.3	3.4
Poultry	World	8.1	4.8	3.2

Source: PEATSim results.
[1]The United States is a minor importer, therefore world less U.S. growth rates will be very close to global growth rates.

projection period (table 6). In addition, growth of global meat exports is generally greater than growth in global exports of food crops.

There is, however, the potential for significant changes in trade patterns due to the effect of appreciation of the U.S. dollar on the rate of growth in exports for the United States and other countries. In the short term (2009-11), when the greatest impact of the economic crisis is felt, foreign exports of most agricultural products grow faster than U.S. exports. During this period, growth in U.S. exports—which are relatively higher priced—generally lag behind its competitors as foreign exports grow faster.

In particular, foreign exports of corn, wheat, and soybeans generally grow faster than U.S. exports during this period. This is mainly due to the increased cost of U.S. products in foreign markets due to the modest appreciation of the dollar. In the reference scenario, the main beneficiaries of this reduction in U.S. competitiveness are the European Union and Australia for wheat, Argentina for corn, and Brazil for soybeans.

U.S. exports of meat generally increase faster than foreign meat exports during this period, particularly, with respect to poultry and beef and veal. These results reflect in part the strong growth in foreign meat imports during 2009-11 and the ability of U.S. meat producers to maintain their comparative advantage.

These trends with respect to U.S. crop and meat exports tend to hold over the long term as well. U.S. crop exports generally lag behind foreign crop exports, while U.S. meat exports generally continue to grow faster than foreign meat exports. Consequently, U.S. market share of global exports of wheat, corn, and soybeans all decline. The decline in U.S. export share for these products can be attributed to the steady appreciation of the U.S. dollar that occurs throughout this scenario as well. As in the case of corn,

Table 6
Global export growth slows in 2009-10

		Growth rate in quantity exported					
Commodity	Country/region	2009	2010	2011	2015	2016	2017
				Percent			
Rice	World	7.2	-5.1	1.2	4.1	3.7	3.6
	World less U.S.	7.3	6.3	0.8	4.2	3.9	3.8
Wheat	World	5.6	1.2	4.5	4.1	2.3	2.9
	World less U.S.	7.8	0.1	6.1	5.1	2.9	3.5
Corn	World	5.7	2.4	5.0	1.7	0.8	1.5
	World less U.S.	8.7	1.0	15.3	-2.1	1.4	-2.4
Soybeans	World	4.4	3.3	5.4	3.4	1.6	3.1
	World less U.S.	16.3	2.2	8.2	4.2	2.3	3.9
Beef and veal	World	6.7	0.7	1.1	3.7	3.0	1.5
	World less U.S.	7.0	0.1	0.6	3.6	2.9	1.0
Pork	World	-3.6	1.3	6.4	3.3	3.7	3.7
	World less U.S.	8.3	-3.0	3.6	-0.8	2.2	-0.5
Poultry	World	8.1	4.8	3.2	2.1	4.5	2.7
	World less U.S.	26.4	2.8	2.0	-0.2	8.1	-0.3

Source: PEATSim results.

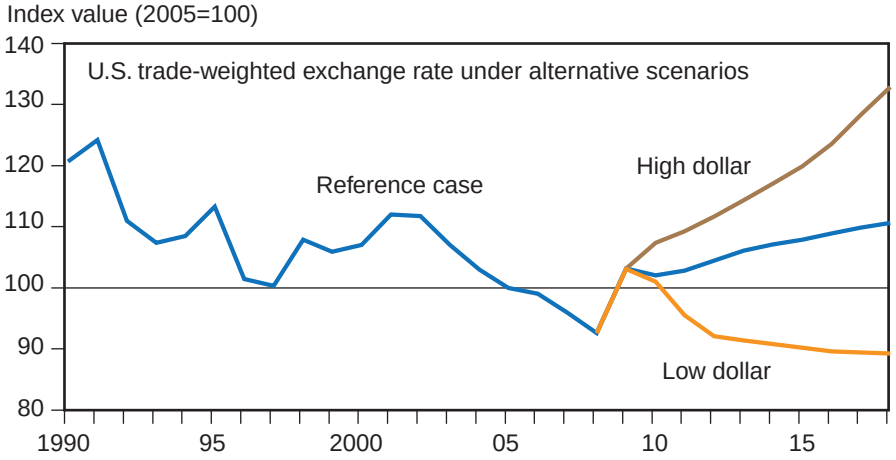
an increase in U.S. domestic use of corn for biofuel partly contributes to declines in exports as well. On the other hand, U.S. exports of poultry, pork, and beef and veal grow faster than foreign exports, enabling the United States to increase its market share of exports for these products.

Alternative Scenarios Rely on U.S. Dollar Appreciation or Depreciation

The two alternative scenarios (high dollar and low dollar) point to divergent paths for the resolution of financial and trade imbalances and the effect they will have on exchange rates and the value of the dollar (fig.7). The value of the dollar is determined using trade weighted exchange rates (ERS Exchange Rate Data Set, 2009). In the high dollar scenario, the value of the dollar continues to appreciate steeply against other currencies, eventually exceeding its 2005 value by over 30 percent. This would place the dollar higher than its previous peak, achieved in 1991. In the low dollar scenario, the value of the dollar returns to the path it was on before the economic crisis, steadily depreciating against major currencies through 2017. In this case, the depreciation of the value of the dollar bottoms out slightly below its value in 2008.

Whether or not exports of a specific commodity from a particular country/region increase depends on the effects of the appreciation of the domestic currency against the U.S. dollar relative to the appreciation of other foreign currencies against the U.S. dollar and on effects of changes in domestic income on domestic supply and resulting demand conditions. In general, the depreciation of the U.S. dollar benefits U.S. agricultural producers because it reduces the cost of their products in world markets, allowing them to increase their exports. Consumers outside the United States also benefit because they face lower prices. On the other hand, the depreciation of the U.S. dollar is unfavorable to U.S. consumers because their dollars buy fewer products and to agricultural producers in the other economies because their goods become more costly relative to U.S. goods.

Figure 7
Future value of the U.S. dollar is uncertain



Source: USDA, ERS, International Macroeconomic Data Set and ERS estimates.

High Dollar Scenario: Foreign Markets Have Fewer Means To Buy More Expensive U.S. Goods

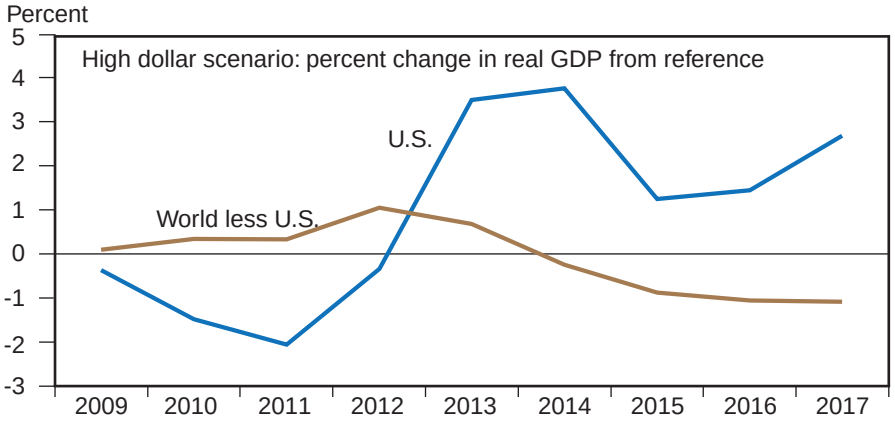
In the high dollar scenario, the U.S. recovery starts out weaker than in the reference case with U.S. real GDP in 2011 coming in about 2 percent lower (fig 8). U.S. GDP stays lower than the reference case through 2012. Starting in 2013, however, U.S. GDP moves permanently higher than the reference case (fig. 8).

The opposite trend is seen in the other economies of the world. The recovery in the world (less United States) begins stronger than in the reference scenario continuing through 2013, at which point it trends below the reference GDP level through 2017. By 2011, Mexico and Brazil have GDP about 3 percent higher than the reference case (table 7).

The stronger GDP is primarily due to trade-induced exchange rate effects that cut trade deficits in other countries. Only Argentina experiences a 3-percent smaller GDP in 2011. In the transition year of 2013, GDP in Argentina and

Figure 8

U.S. real GDP increases relative to other economies of the world



Source: Oxford Economics, December 2008.

Table 7

U.S. real GDP grows more when dollar appreciates

	Reference scenario			High dollar scenario			Low dollar scenario		
Country/region	2011	2013	2017	2011	2013	2017	2011	2013	2017
	GDP in $ billion (2000 dollars)			*Percent deviation from reference*			*Percent deviation from reference*		
United States	12,225	13,170	14,648	-2.1	3.5	2.7	1.8	-0.2	-1.8
European Union	9,887	10,420	11,423	0.0	0.3	0.0	-0.2	0.4	0.6
Japan	5,204	5,420	5,737	0.0	1.3	-0.9	-1.2	-0.3	0.9
Canada	932	995	1,127	0.5	0.0	-1.1	-0.5	-1.5	-4.8
Mexico	743	814	936	2.6	1.1	-6.4	-2.3	-6.5	-3.4
Brazil	926	1,008	1,160	3.5	4.7	-2.5	-3.7	-5.5	-7.1
Argentina	430	468	533	-2.6	-3.1	-5.9	-5.2	-8.8	-12.5
China	3,330	3,998	5,700	-0.4	-1.4	-3.3	0.0	2.8	-1.1
India	988	1,158	1,549	0.0	1.3	-2.3	-0.1	1.0	-1.6
Australia	538	577	663	1.0	1.4	2.3	0.5	0.7	0.2
New Zealand	69	74	82	0.5	-0.2	-0.5	0.3	0.2	0.4
South Korea	793	881	1,075	9.6	12.8	3.6	4.5	7.9	0.4
Rest of world	6,498	7,135	8,551	-0.2	0.0	-0.7	-0.2	0.0	-0.4

Source: Oxford Economics, December 2008; PEATSim results.

China is 3.0 and 1.5 percent weaker than in the reference case. Eventually all major countries start to have lower GDP than in the reference case. By the end of the high dollar scenario in 2017, only Australia and Korea have GDPs higher than in the reference scenario, about 2 and 4 percent higher respectively. Argentina's and Mexico's economies see GDP shrink the most from the reference case, with GDP coming in about 6 percent lower.

For the high dollar scenario, the slackening of economic growth and the increase in the value of the U.S. dollar relative to the reference scenario leads to a greater slowing of consumption relative to the reference case. This in turn leads to a decline in global demand. Thus, in the high dollar scenario, world agricultural prices (real terms), as expected, decline across all commodities throughout the time period.

Meanwhile, producer prices for agricultural commodities in the other countries/region of the world also decline. This reflects the decline in demand caused by reductions in income.

In the high dollar scenario, the weakened consumption growth in other countries of the world affects agricultural trade through lower GDP growth relative to the reference scenario over time. While starting out strong, the weakening of consumption over time in these countries causes world demand for agricultural imports to slow relative to the reference scenario.

Other country economies' imports of food and feed crops (table 8) track fairly closely the changes in GDP. Food and feed crop imports rise above the reference level through 2013. As GDP in these other economies starts to fall below the reference scenario, their imports of most food and feed crops start to drop below reference levels as well. By 2015, imports have declined 2 percent below reference levels for most food and grain crops, and remain below reference levels throughout the rest of the scenario. Reflecting greater sensitivity of meat consumption to the appreciation of the dollar, foreign imports of meat fall below reference levels from the onset and remain substantially below reference scenario levels through 2017.

Effects for individual countries are mixed and depend on several factors, including relative changes in value of their own currencies against the U.S. dollar. Most countries though, experience declines in their imports from reference levels. The few countries with generally higher imports than the reference case include: EU for rice and beef; South Korea for corn; and United States for beef.

Exports of rice, wheat, and soybeans of the other countries of the world trend above their reference levels in the beginning of the time path, before falling below reference levels in 2015 and through the end of time path (table 8). The increase in their agricultural exports above reference levels through the first part of the time path reflects the rise in world (less United States) demand for agricultural imports during this period and the appreciation in the U.S. dollar. The latter development makes U.S. exports less competitive in international markets, allowing the other countries of the world to increase their market share. The effects of appreciation of the dollar and lower incomes relative to the reference scenario on global consumption eventually overwhelm the increase in their agricultural exports induced by changes in

Table 8

Exporters in other countries of the world increase market share

		High dollar scenario					
		Exports			Imports		
Commodity	Country/region	2010	2015	2017	2010	2015	2017
		Percent change of exports and imports from reference case					
Rice	World	2.6	-2.3	-4.6	2.6	-2.3	-4.6
	World less U.S.	3.2	-1.4	-3.7	2.6	-2.3	-4.7
Wheat	World	0.7	-2.4	-2.2	0.7	-2.4	-2.2
	World less U.S.	1.8	-1.9	-1.6	0.8	-2.4	-2.3
Corn	World	0.0	-6.6	-7.4	0.0	-6.6	-7.4
	World less U.S.	1.3	1.6	2.1	0.0	-6.6	-7.5
Soybeans	World	-0.2	-2.1	-2.0	-0.2	-2.1	-2.0
	World less U.S.	0.6	-0.9	-0.8	-0.2	-2.1	-2.0
Beef and veal	World	-1.1	-7.1	-6.0	-1.1	-7.1	-6.0
	World less U.S.	-1.1	-7.5	-6.1	-1.4	-8.7	-6.8
Pork	World	-0.9	-20.6	-22.6	-0.9	-20.6	-22.6
	World less U.S.	6.0	-1.1	1.8	-1.2	-23.1	-25.3
Poultry	World	-0.6	-11.4	-11.2	-0.6	-11.4	-11.2
	World less U.S.	2.5	5.2	7.4	-0.6	-11.4	-11.2

Source: PEATSim results.

exchange rates. As a result, over the last few years of the time path, exports of these crops drop below their reference levels.

Trade in each individual country/region reacts uniquely to the assumptions for the scenarios. In the high dollar scenario, countries that have significantly higher agricultural exports than in the reference scenario in the initial years include: India for rice, Australia for wheat, Brazil for corn, Brazil and Argentina for soybeans, and EU for pork and poultry. These gains are temporary, however, as by the end of the time path (2017) exports fall below their reference levels for nearly all countries and commodities.

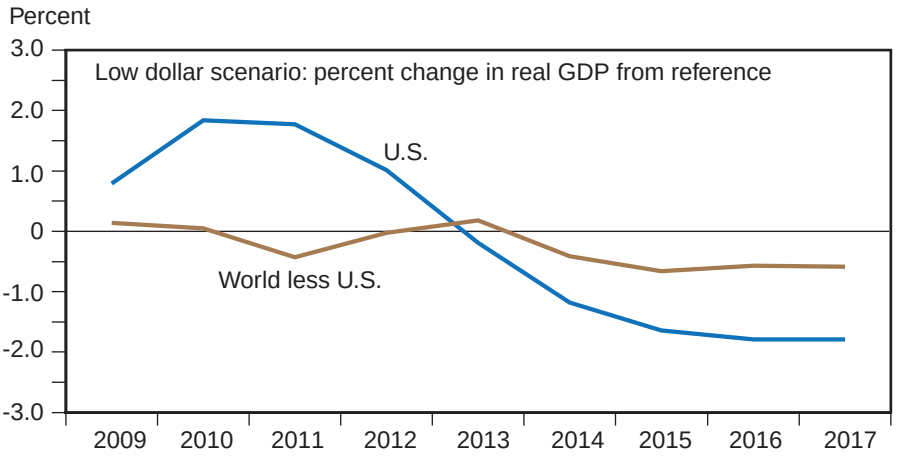
U.S. agricultural exports generally track lower than the reference levels for all commodities due to loss of market share resulting from the appreciation of the U.S. dollar. The departure from reference levels gets larger through time for most commodities due to the relatively lower GDP in countries outside the United States and the appreciation of the dollar. The lower aggregate demand reduces the foreign demand for agricultural exports. At the same time, the strong appreciation of the dollar makes U.S. agricultural exports less competitive in international markets. Because of the overall decline in global agricultural imports neither the United States nor foreign exporters benefit from the changes in trade flows.

Low Dollar Scenario: U.S. Agriculture Would Benefit

Turning to the low dollar scenario, the United States' recovery starts out stronger than in the reference case for the first few years of analysis. U.S. real GDP in 2011 is about 2.5 percent higher due to a relatively weaker dollar, resulting in an improved trade balance. U.S. GDP stays above the reference level from 2009-12. However, by 2013 U.S. GDP falls below the reference level and continues to weaken relative to the reference case until the end of the time path, as the U.S. dollar steadily depreciates and consumer savings and investment slows relative to the reference case (fig. 9).

Figure 9

U.S. economy slows more than economies of other countries



Source: Oxford Economics, December 2008.

Meanwhile, the GDP of other economies around the world tracks relatively closely to the time path for GDP in the reference scenario, fluctuating around the reference scenario by less than half a percent until 2014. By 2015, however, foreign economic growth stabilizes slightly below the reference level. The results by country are mixed. In 2011, in Brazil and Argentina, GDP is 4 and 5 percent lower respectively, while Korea's GDP is almost 5 percent higher than the reference case. While most countries and regions exhibit higher GDP by the end of the scenario, Canada (-5 percent), Mexico (-3 percent), Brazil (-7 percent), Argentina (-13 percent), and even China (-1 percent) and India (-2 percent) experience declines in GDP relative to the reference-level GDP.

In the low dollar scenario, the depreciation of the U.S. dollar leads to higher world agricultural commodity prices (real terms), but as we have seen, the impact on domestic producer prices by country/region is mixed. In some countries, the decrease in demand—due to declines in income—reinforces the effects of cheaper imports on domestic prices leading to a decline in demand for domestic production and a reduction in producer prices below their reference case levels. In other countries, the effects of cheaper imports on domestic prices are offset by increases in demand due to higher incomes (GDP), so producer prices increase.

In the low dollar scenario, exports of other economies outside the United States start out higher for wheat, corn, and beef and veal, as global trade increases due to decline in world prices (table 9). At the end of the time period, in 2017, however, agricultural exports from other economies around the world fall below the reference scenario for all commodities except beef (where there is not much change), as lower economic growth weakens demand.

For the United States, agricultural exports of most products in 2010 are higher compared with the reference case, and remain so through the end of the time path. Even for those commodities where other countries' exports increase against the reference case, their share of world agricultural exports decline. This trend continues over the entire scenario's time period and

reflects the increased competitiveness of U.S. agricultural products in world markets from the depreciation of the dollar.

On the import side, foreign (world less United States) agricultural imports of food and feed crops generally trend above the reference level through 2013 (table 10). As the GDP of other economies around the world starts to fall below reference levels, imports of most food and feed crops weaken and fall below levels in the reference scenario by 2015. This decline coincides with lower incomes, weakening demand, and reductions in domestic meat production due to higher levels of relatively cheaper meat imports from the United States. For these other economies, imports of poultry and pork rise from the

Table 9
U.S. exports benefit from low value of dollar

Commodity	Country/region	Low dollar scenario		
		2010	2015	2017
		Percent change of imports from reference case		
Rice	U.S.	0.7	6.6	6.6
	World less U.S.	-1.0	-0.5	-1.7
	World	-0.8	0.3	-0.8
Wheat	U.S.	0.4	1.1	1.1
	World less U.S.	0.8	-1.5	-1.7
	World	0.7	-1.0	-1.2
Corn	U.S.	0.9	0.4	1.4
	World less U.S.	0.2	-0.7	-2.3
	World	0.7	0.0	0.0
Soybeans	U.S.	1.1	13.0	17.6
	World less U.S.	-0.4	-3.7	-4.9
	World	0.0	-0.7	-1.1
Beef and veal	U.S.	0.3	4.1	4.9
	World less U.S.	1.2	1.3	0.1
	World	1.1	1.7	0.7

Source: PEATSim results.

Table10
Import growth slows by 2017

Commodity	Country/region	Low dollar scenario		
		2010	2015	2017
		Percent change of imports from reference case		
Rice	World	-0.8	0.3	-0.8
	World less U.S.	-0.9	0.3	-0.8
Wheat	World	0.7	-1.0	-1.2
	World less U.S.	0.7	-1.0	-1.2
Corn	World	0.7	0.0	0.0
	World less U.S.	0.7	0.0	0.0
Soybeans	World	0.0	-0.7	-1.1
	World less U.S.	0.0	-0.7	-1.1
Beef and veal	World	1.1	1.7	0.7
	World less U.S.	1.4	1.3	-1.1
Pork	World	1.5	6.0	5.3
	World less U.S.	1.7	7.1	6.3
Poultry	World	1.0	5.3	3.2
	World less U.S.	1.0	5.3	3.2

Source: PEATSim results.

start and remain substantially above reference levels throughout the projection period. Beef and veal imports rise through 2015, but then fall below the reference level by the end of the projection period in 2017, due primarily to the decline in global GDP.

Again, effects for individual countries are mixed. Initially, most countries' imports of grain increase above the reference scenario. Countries with crop imports below their reference scenario level in 2010 include Brazil for wheat and the EU and China for soybeans. At the end of the time path, however, these countries exhibit crop imports below their reference levels.

The Effects of the Global Economic Crisis on the Vulnerable

The economic crisis and resulting slowdown in global economic growth will have its greatest impacts on international agricultural markets and trade patterns in 2009. The economies of the United States and many industrialized/developed countries are projected to contract sharply. Countries such as China and India, which have experienced high growth rates in the past decade, are likely to continue to have positive income growth but still will experience a substantial slowing of their economies. As a result, the reference level for global GDP in 2009 is expected to decline by 2.0 percent from 2008. Declining global income slows demand which puts downward pressure on agricultural prices, and these lower prices will reduce incentives to production. With declining global income, global consumption growth will slow

Worldwide Food Insecurity Will Worsen as Global Economic Crisis Deepens

The global economic crisis will likely compound food insecurity in low-income countries and poor households worldwide. The impact of the ongoing economic crisis on food security may not seem disastrous when examining the consequences on a global or national perspective. But indicators of well-being and food security examined at more disaggregated levels strongly suggest that large segments of the population in low-income countries will become more vulnerable.

The slowing of economic growth tends to have a greater impact on food security in poorer countries because of their low per capita incomes and relatively high income inequality (see table below). The inequality in income distribution means that the effect of an economic slowdown will not be felt equally by all. Those in the lowest quintile of the income distribution will be affected the most, and the most negatively. Since the poor in these countries generally spend a much higher share of their income on food than their middle-income and high-income countrymen do, a slowing of economic growth will have a greater impact on the food intake of the poor. *(Continued on next page)*

Global economic crisis compounds food insecurity in developing countries

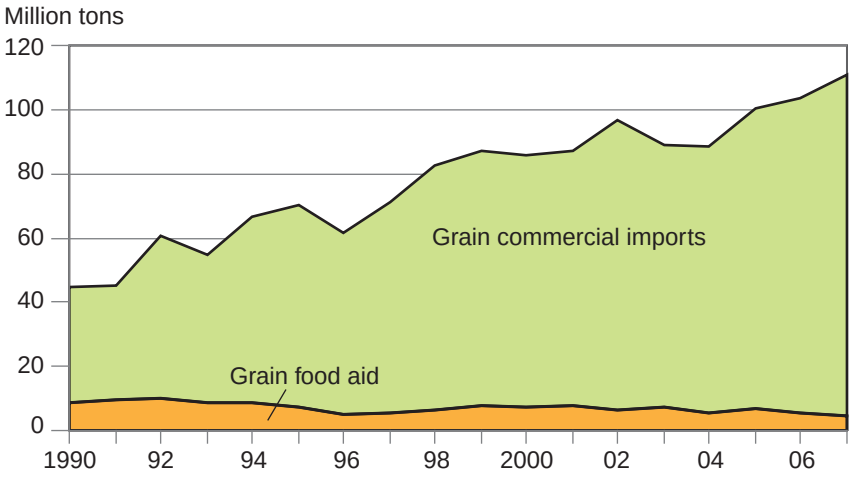
Country/ region	2008 GDP per capita per year	2008 GDP per capita per day	Gini coeff.[1] measure of income inequality	Share of food to total consumer spending on goods and services	Average daily caloric intake 2003-05	Undernourished population 2003-05	Daily deficit of undernourished population 2003-05
	--------*2000 US$*--------			*Percent*	*Kilocalories per person*	*Percent*	*Kilocalories per person*
United States	38,952	107	0.41	13.7	3,770	< 1	100
Japan	20,112	55	0.25	19.8	2,770	< 1	140
Canada	26,370	72	0.32	18.0	3,590	< 1	110
South Korea	15,038	41	0.35	23.1	3,030	< 1	130
China	1,922	5.3	0.47	39.8	2,990	9	240
India	707	1.9	0.37	49.5	2,360	21	260
Mexico	6,482	18	0.51	34.0	3,270	5	190
Argentina	9,459	26	0.49	33.4	3,000	< 1	130
Brazil	4,315	12	0.57	20.8	3,090	12	220
Madagascar	260	0.7	0.48	71.8	2,010	37	290
Zambia	413	1.1	0.51	64.0	1,890	45	330
Bangladesh	458	1.3	0.33	53.8	2,230	27	290

[1]The Gini coefficient measures the inequality of income distribution within a country.
Source: United Nations Food and Agriculture Organization (FAO) statistical yearbook; FAO, *The State of Food Insecurity in the World* (SOFI) reports; USDA, ERS International Macro Data Set.

to less than 0.5 percent for most crops in 2009. The slowing of economic growth and food consumption in lower income countries will likely translate into increases in projected levels of poverty and food insecurity around the world (box 4) as the burgeoning populations of these countries face reduced access to food. Consequently, many of these low-income countries may face financial constraints as they try to meet the food needs of their population in the midst of the economic crisis.

In addition, the growing dependence of low-income countries on food imports will accentuate the impact of the economic crisis on food security. Historical data indicate that developing economies have become increasingly dependent on food imports, including grains, a main staple in their national diets. Their increased reliance on food imports is largely driven by one or a combination of factors: economic growth, trade liberalization, improved transportation systems, slow domestic production growth, and relatively high population growth. Their growing dependency on grain imports renders these low-income countries at greater risk of food insecurity during tough times. In recent years, mounting balance-of-payment deficits, falling revenues from exports, and higher inflation have contributed to a weakening of food-importing countries' capacity to continue importing food at a rate high enough to feed the poor and the very poor in their countries.

Commercial grain imports are growing in 70 developing countries



Source: United Nations, FAOSTAT. For list of 70 countries, please see: www.ers.usda.gov/publications/GFA20/

The latest long-term food security outlook analysis conducted by the Economic Research Service shows that the developing countries that will be hardest hit by the global economic crisis are those with high levels of balance of payments deficits and high food import dependency. ERS estimates that there will be a 2-percent increase in the number of food-insecure people in 2009. To evaluate the impact of the global economic downturn, the report examines a scenario of reduced capital inflows and export earnings growth in 70 lower income countries. Results indicate the number of food-insecure people would rise by 12 percent from the baseline in 2009.

The report suggests that since most of these poor countries do not have the resources to assist the vulnerable segments of their populations, there will be continued need for food assistance from the more developed economies.

For more details, see the ERS report, Food Security Assessment, 2008-09, available at: www.ers.usda.gov/publications/gfa20/.

Conclusion

The world financial (economic) crisis of 2008-09 is the most serious world recession since the 1930s. While the impact on the United States is not as serious as in the Great Depression, the extent of the global recession and the number of countries involved is unique. This crisis, like all major economic events, will have profound impacts on the economies around the world. The short-term impact (caused by reduced demand) is a major decline in the value of both merchandise and agricultural commodity trade. Much of the decline in the value of trade has come from declining prices, but there are also declines in the volume of trade. The longer term impacts of the crisis will depend on the adjustment path to resolve the imbalances that have emerged in global trade and savings.

Substantial imbalances that led to the crisis have emerged between trade-surplus countries such as China and trade-deficit countries such as the United States. If the resolution of the crisis is an exchange-rate realignment which reduces the trade and savings imbalances and leads to a more sustainable world economic growth path, then the longer term outlook for renewed growth and prosperity is quite good. If on the other hand, the realignment in exchange rates leads to continued or widening trade and savings imbalances, the global adjustment is just being put off for another day, and future crises are likely. The realignment that would result in reduced imbalances involves the currencies of trade-surplus countries outside of the United States appreciating in real terms. This implies that the U.S. dollar will depreciate in real terms against both its trading partners and its competitors. A relatively low dollar has always been favorable to U.S. agriculture, providing robust export growth and relatively high agricultural commodity prices. In this sense, there is a confluence of interests between the agricultural sector and the global resolution of the crisis toward a more sustainable world economic growth path.

While the sustainable resolution of the crisis on a macroeconomic level implies reducing global imbalances, that resolution will also imply substantial changes to both the commodity composition of trade and the major markets for U.S. agricultural exports. On the commodity side, it is likely that there will be an acceleration of the movement toward higher value trade, particularly trade in meats and feed grains.

In the short term, the slowing of income growth in developing countries will likely lead to increases in food insecurity and poverty around the world. Income growth, however, is expected to rebound in most countries by the end of 2010 and continue to grow for several years through 2012 before stabilizing around its new longrun trend growth rates. As a result, agricultural imports, after declining in 2009, are likely to continue to grow into the future.

The continued strength of global agricultural imports is primarily a result of the growth of consumption in emerging and developing countries and the increase in meat consumption among those countries' consumers. Even during the initial period of the economic crisis and its recovery, economic growth in those countries remains positive and relatively strong. As a result, their consumption of food is likely to increase and trade in meat and feed grains will likely grow faster than trade in food grains. Over the longer term,

the most likely path of recovery for the global economy indicates that the growth in consumption and imports of agricultural products by emerging and developing countries will remain strong.

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