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Assessment of the Impact of Panama Canal Transit Cost Changes on Ecuador's Economy

ACP
AUTORIDAD DEL CANAL DE PANAMA

MERCER
Management Consulting

Contents

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Executive Summary

In 2004, the Autoridad del Canal de Panama (ACP) performed a detailed analysis to determine the impact of Canal transit cost increases on the Canal's customers. This research indicated that an increase in Canal transit costs would not have significant adverse effects on traffic, although the impact would vary by Canal customer segment. Given the mix of commodities that transit the Canal and the political and economic importance of the countries of origin, the ACP determined that it was important to explicitly assess and understand the impact of different pricing options on the economies of stakeholder countries.

This report provides a high-level overview of Ecuadorian trade in relation to the Panama Canal and a detailed analysis of the impact of potential new Canal pricing options on the export and import commodities transiting the Canal that are most important to Ecuador's economy, representing approximately 80 percent of total volume that trades through the Canal to and from Ecuador. For each commodity, the analysis examines the relevance of Canal-based traffic to Ecuador's overall imports and exports and the impact of transit cost increases on overall landed costs and Ecuador's economy.

Ecuadorian Waterborne Trade

Between 1993 and 2003, Ecuador's GDP grew by an average of 5.9 percent per year, to US$26.8 billion. Total international Ecuadorian trade has grown faster than GDP over the past decade, with imports outpacing exports. In 2003, Ecuadorian exports and imports each represented nearly 23 percent of the country's GDP.

Approximately 80 percent of Ecuador's international trade value, and 76 percent of trade tons, move by sea. Between 2000 and 2002, seaborne export tons declined by 0.5 percent per year, while seaborne imports grew by 21 percent per year.

Ecuador's three largest trading partners are the United States, the European Union, and the Andean Community (Peru, Colombia, Bolivia, and Venezuela). On the export side, the US, EU, and Andean Community account for 75 percent of total exports. For imports, trade originating in the US has decreased significantly since 1999, while Asia has become a more important source of imports for Ecuador.

Ecuador's exports are primarily composed of raw materials and natural resources; in particular, Ecuador is one of Latin America's largest crude oil exporters, and is the world's largest exporter of bananas. Together, minerals and fruits account for 62 percent of total exports. In contrast to its exports, Ecuador's imports are composed primarily of manufactured goods and industrial products.

Ecuadorian Trade Through the Panama Canal

Ecuador's most important Canal-relevant sea trade lanes are to/from the East Coast US, Europe, and East Coast South America. In 2003, more than half of Ecuador's Canal-relevant imports and 80 percent of its exports by weight were traded with the US and Europe. The East Coast South America also accounts for nearly a third of imports.

Ecuador's total sea trade in 2002 was 24.7 million tons, of which 12 million tons or 48 percent transited the Canal. Canal-relevant exports have been decreasing by 1 percent per year since 1999, while imports have grown by 4 percent per year. Approximately 35 percent of Ecuador's exports pass through the Canal, with bananas making up nearly half of export tons, and crude oil 28 percent. Additionally, three-quarters of Ecuador's imports transit the Canal. Principle import commodities include containerized cargo, fuels, and fertilizers.

Methodology for Canal-Relevant Commodity Analysis

For the purposes of this study, the ACP analyzed Ecuadorian export commodities and import commodities, representing 80 percent of Ecuador's trade volume through the Canal.

As mentioned previously, these commodities were analyzed with the objective of determining the potential impact of an increase in Canal transit costs on landed cost, and therefore the relevance of transit cost increases to Ecuadorian trade and Ecuador's economy.

The methodology for analysis of export commodities was threefold:

1. The relevance of Panama Canal tonnage transits for 1999-2003 to the overall trade in the commodity for Ecuador was determined.

2. If the commodity tonnage transits through the Canal were above a certain threshold (percent of country trade) then the commodity was analyzed further to determine the relevance of a potential increase in Canal transit cost on landed cost. The components of total landed cost include FOB, Canal transit cost (toll plus other marine services), other freight costs, and insurance.

3. A sensitivity analysis was then applied to determine a range of impacts on landed cost given different Canal transit cost increase scenarios.

For imports, the ACP undertook a more general analysis of the impact of Canal transit cost increases, focused on the final landed cost of each commodity and the impact of the aggregated value of Canal-relevant imports on total Ecuadorian imports and GDP.

Export Commodities Analysis

Overall, Panama Canal-relevant Ecuadorian exports represent 23 percent of Ecuador's total goods exports by value. As shown in Exhibit 1-1, the export commodities analyzed for this study represented approximately 67 percent in value of total Ecuador merchandise exports in 2003; approximately 34 percent of this value transited the Panama Canal.

Of the five commodities analyzed in this report, the most important in terms of high Canal share is bananas, of which 72 percent of total exports by value transit the Canal. In the case of three other commodities, only 20-50 percent of exports transit the Panama Canal (wood & wood articles, fish & crustaceans and vegetable & fruit preparations). For crude oil, only 14 percent of exports transit the Canal.

Some of the analyzed commodities represent an important portion of total Ecuadorian exports: In 2003, crude oil exports accounted for 39 percent of total Ecuadorian exports by value, and bananas accounted for 18 percent. The other analyzed commodities represent less than 6 percent of total exports each.

With the exception of bananas, the analysis determined that even a Canal toll increase of 200 percent would have an impact on the landed cost of each commodity of less than 2 percent. Further analysis was carried out to understand the potential effects of an increase in Canal tolls on the demand for both bananas and crude oil, given the relevance of these two commodities to Ecuador's economy.

▪   *Bananas:* Bananas are transported as bulk in reefer vessels or in refrigerated containers. If Canal tolls were increased by 200 percent, CIF would increase by 2.6 percent for bulk bananas and 1.9 percent for containerized bananas.

    Bulk bananas represent 91 percent of Ecuador's total banana exports transiting the Canal, and 90 percent of these were destined for Europe in 2003. An analysis of ocean freight rates determined that the time charter rate alone have increased the CIF price for bulk bananas by 7 percent in the last four years, more than two times the estimated

2.6 percent impact of a 200 increase in the Canal toll. And despite this significant increase in ocean freight rates, exports to Europe still increased by 61 percent between 2001 and 2003. Therefore, a Canal toll increase would be unlikely to affect the Ecuadorian banana trade.

- *Crude oil*: Crude oil is a medium value commodity and a 200 percent increase in Canal tolls would impact the CIF of crude oil by only 1.8 percent. A more important issue, however, is the reopening of the Trans-Panama Pipeline. ACP studies estimate that the cost to move crude via the PTP is slightly lower than present Canal toll levels. Therefore, the increase in the Canal toll would not affect Ecuador's crude oil exports but would potentially change the transportation mode from waterborne to pipeline.

Exhibit 1-1
Canal-Relevant Ecuadorian Exports Analyzed

Commodity	1. FOB Value of Canal Exports (US$M)	2. Canal Share of Total Exports	3. Total Export Value (US$M)	4. Commodity Exports Share of Ecuador Exports	5. Canal Transit Cost Share of CIF	6. 200% Toll Increase Impact on CIF
Crude Oil	$ 338	14%	$ 2,372	39%	1.1%	1.8%
Banana - Reefer Bulk	$ 718	65%	$ 1,099	18%	1.6%	2.6%
Containerized cargo						
Bananas	$ 77	7%	$ 1,099	18%	1.3%	1.9%
Wood & Wood Articles	$ 39	46%	$ 85	1%	0.4%	0.8%
Fish & Crustaceans	$ 166	45%	$ 372	6%	0.0%	0.1%
Vegetable & Fruit Prep.	$ 21	20%	$ 102	2%	0.3%	0.7%

Source: International Monetary Fund World Economic Outlook Database (September 2004), UN COMTRADE, ACP database.
Description of columns:
1 The merchandise FOB value of the Canal-relevant portion of exports for each commodity
2 The percent of the total FOB export value for each commodity that transited the Canal
3 The total FOB value of all Ecuador exports of each commodity, regardless of transportation mode or route
4 The percent of total Ecuador exports FOB value in dollar accounted for by each commodity
5 The percent of the final landed cost (CIF) of each commodity accounted for by the total Canal transit costs (toll, other marine services) of that commodity
6 The percent change in the CIF as a result of a 200 percent increase in the Panama Canal toll for ships carrying this commodity

Import Commodities Analysis

In 2003, Ecuador's imports transiting the Panama Canal accounted for 16 percent of its total merchandise imports (valued in CIF terms). Additionally, Ecuador's imports transiting the Panama Canal represented 4 percent of Ecuador's GDP in 2003.

In 2003, Ecuador's current account deficit was US$461 million, or 1.7 percent of GDP. The analysis determined that an increase in import prices, due to an increase in Canal tolls, would have a minimal impact on Ecuador's deficit and national income: Even if tolls were increased by 200 percent for all Ecuadorian imports that transit the Canal, the cost of total goods imports would grow by only 0.18 percent, the current account would increase to 1.8 of GDP, and national income would drop by about 0.04 percent, with an negligible impact on inflation.

Exhibit 1-2
Canal-Relevant Ecuadorian Imports Analyzed

Commodity	Canal Share	Canal Transit Tons 2003 (thousands)	Average CIF/Ton		CIF Value of Canal Transit Tons (US$M)	
Gasoline & Diesel oil	18%	699.29	$	347	$	238.51
Iron & steel	13%	485.79	$	470	$	228.49
Liquefied gas	9%	344.32	$	382	$	131.62
Fertilizers, misc.	9%	319.99	$	188	$	60.24
Corn	6%	209.07	$	139	$	28.97
Paper and paper products	5%	180.06	$	497	$	89.48
Container cargo	4%	141.30	$	2,037	$	287.82
Other	37%	1,776.96				
Total CIF Value of Panama Canal Transit Tons (US$M)					**$**	**1,065.13**

Source: Mercer analysis, UN COMTRADE, US Waterborne Commerce 2003.

Conclusions

The analyses above demonstrate that given either the small proportion of a particular import/export commodity that transits the Canal, or the relatively small percentage of the landed cost represented by the Canal cost, the effect of a Panama Canal transit cost increase would not have a significant impact on Ecuador's economy, nor on the principal industries that provide Canal-relevant export commodities.

Finally, the larger question facing Ecuador's economy with regard to the Canal is less whether the transit cost changes examined would have a significant impact, but rather whether the Canal will have sufficient capacity available to meet demand in the future, while providing an adequate level service. The implications for the critical supply chains that serve Ecuador's economy of a deterioration in service – due to increased wait times or decreased reliability, for example – in the event that capacity is insufficient to meet demand, would be substantially more important than the analyzed Canal transit cost increases. Hence, the need to add capacity to the Canal – recognizing that the capital expense will have to be paid for through tolls – is the more critical issue facing Ecuador's economy, rather than the essentially negligible impact of the transit cost increases examined in this study.

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Introduction

2.1 Study Context

The Panama Canal is a critical and unique element of the global marine transportation industry. Its construction almost a century ago remains a well-known triumph of vision, engineering, and determination. Its efficient, safe handling of more than 13,000 transits per year has made the Canal an important element of the global transport network. Growing trade volumes, however, and the increasing reliance by shipping companies on vessels larger than can physically pass through the Canal's locks (post-Panamax vessels) have raised questions about what the Canal's future investments and pricing policies should be, including whether or when a third set of locks should be built.

In 2004, the Autoridad del Canal de Panama (ACP) performed a detailed analysis to determine the impact of toll price increases on the Canal's customers. This research indicated that an increase in Canal transit tolls would not have significant adverse effects on traffic, although the impact would vary by Canal customer segment. Given the mix of commodities that transit the Canal and the political and economic importance of the countries of origin, the ACP determined that it was important to explicitly assess and understand the impact of different pricing options on the economies of stakeholder countries.

This report provides a high-level overview of Ecuador's trade in relation to the Panama Canal and a detailed analysis of the impact of potential new Canal pricing options on the export and import commodities transiting the Canal that are most important to the Ecuadorian economy.

The overall objectives of this study were as follows:

- Generate a clear understanding of Ecuador's maritime trade

- Review historical Canal transit data to determine principal imported and exported commodities for Ecuador

- Determine the relevance of this Canal-based traffic to Ecuador's overall commodity imports and exports

- Develop an analysis of the impact of Canal transit cost increases on the overall landed costs of selected commodities

- Develop an analysis on the overall impact of the Canal cost increases on the Ecuadorian economy

- Appraise the ability of different industries within Ecuador to continue to compete despite the toll difference

2.2 Approach to the Study

To address the commodities that are most relevant to the Ecuadorian economy, this report focuses on the highest-volume and highest-value imported and exported commodities that transit the Canal. The report assesses Ecuador's imports and exports at a commodity level, aiming for a detailed analysis of approximately 80 percent of total volume that trades through the Canal to and from Ecuador.

The analysis examines, for each commodity, the relevance of Canal-based traffic to overall country commodity imports and exports; the impact of transit cost increases on overall landed costs; the expected ability to pass on cost increases to end customers; and the overall impact on the country's economy.

The analysis involved the following work steps:

- *Overview of Ecuador's maritime trade:* Development of a high-level description of current Ecuadorian sea trade, including commodities and main partners. This overview allowed the ACP to understand Ecuador's principal and alternative trade routes, the overall impact of the Panama Canal on shipping, and the impact of key commodity trades on the Ecuadorian economy.

- *Commodity identification:* Identification of the principal commodities to be analyzed, based on commodity volume and value transiting the Panama Canal.

- *Commodity analysis:* Two-part work step: 1) High-level analysis involving estimation of commodity value, principal transportation cost components, and the percentage of the commodity that transits the Canal. This analysis allowed the ACP to decide which commodities transiting the Canal are significant to the Ecuadorian economy. 2) For the selected key commodities, a more detailed analysis was completed to determine the impact on shipping costs of a change in Canal transit costs.

- *Economic impact on Ecuador:* Determined the possible economic impact of potential Canal cost increases for Ecuador, based on the previous analyses, and assessed whether such cost increases would have a significant impact on the Ecuadorian economy and foreign trade.

The ACP commissioned Mercer Management Consulting, Inc. to undertake the analyses involved in this project. Mercer, which has one of the largest consultancies in the world dedicated to transportation, provided a seasoned team of professionals with extensive knowledge of worldwide trade and transportation, and of the Panama Canal's market and customer base specifically.

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# Overview of Ecuador's Sea Trade

3.1 Imports and Exports

Between 1993 and 2003, Ecuador's GDP grew by an average of 5.9 percent per year, to US$26.8 billion. The widespread Latin American economic crisis in 1999 caused a brief year over year drop in Ecuador's GDP, by 28 percent, and in its imports, by 46 percent. Since 1999, however, GDP growth has accelerated to 13 percent per year.

In 2003, Ecuadorian exports and imports each represented nearly 23 percent of its GDP (Exhibit 3-1) at approximately US$6 billion each. Over the past 10 years, imports have been growing faster than the exports, increasing annually by 11 percent, while exports grew by about 7 percent (Exhibit 3-2). Overall, international trade has grown faster than GDP since 1993, at 9 percent per year, and is becoming increasingly important to Ecuador's economy.

In 2004, Ecuador had a total trade surplus for the first time in recent years, mainly due to the high increase in crude oil prices. Its merchandise export/import trade deficit however is estimated to be about US$1.2 billion.[1]
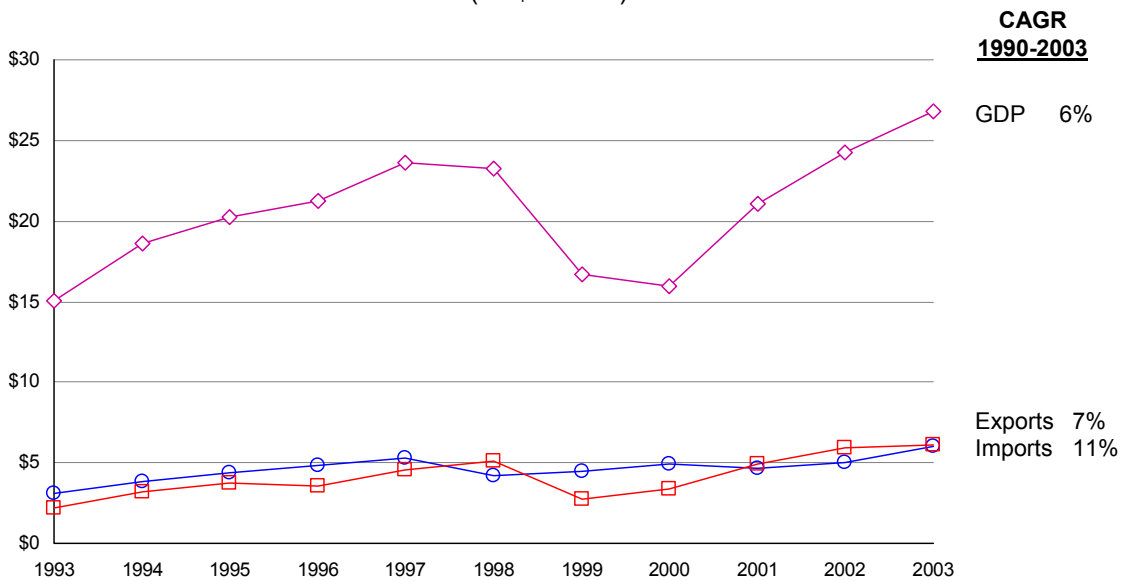
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[1] Barclays Capital.

Exhibit 3-1
Ecuador's Total Exports and Imports as a Percent of GDP: 1993-2003
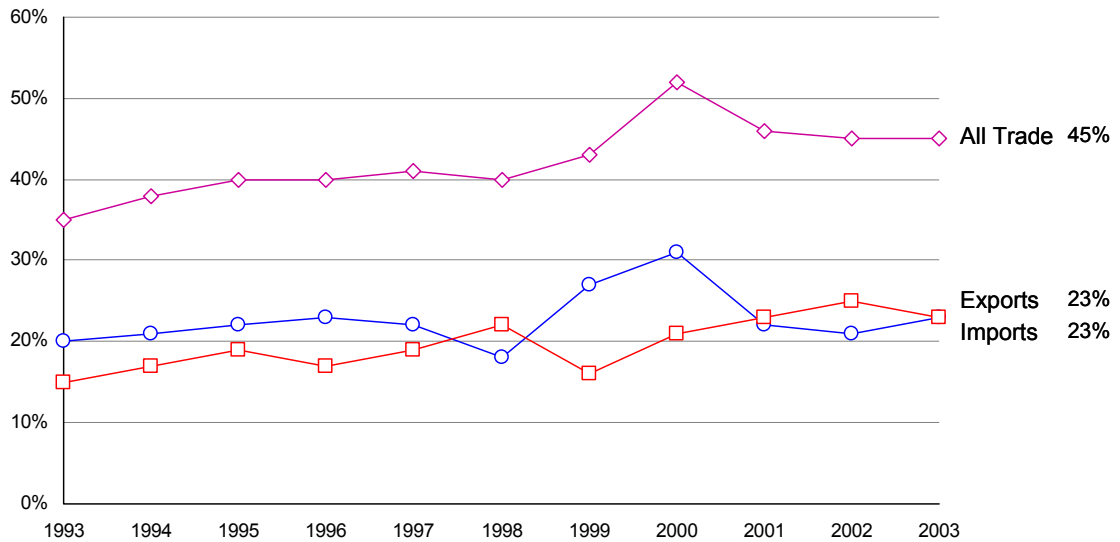
Source: Banco Central Del Ecuador, National Monthly Accounts Report.

Exhibit 3-2
Value of Imports and Exports Compared to Ecuador's GDP
(US$ billions)

Source: Banco Central Del Ecuador, National Monthly Accounts Report.

Ecuadorian Maritime Trade

In 2002, approximately 80 percent of Ecuador's international trade value, and 76 percent of trade tons, was transported by sea (Exhibit 3-3). Additionally, a significant share of

Ecuadorian cargo moves by air, including commodities that require rapid transportation due to freshness restrictions, e.g., fruits, fish, crustaceans, and fresh flowers.

In 2002, Ecuadorian crude oil exports represented 72 percent of sea exports by weight, but only 48 percent by value.
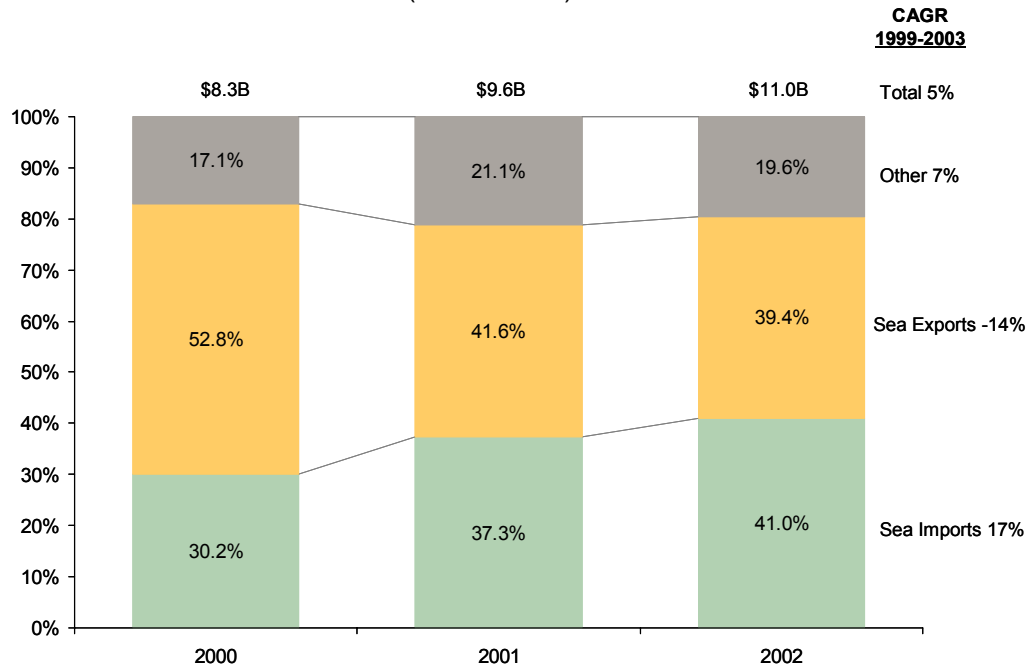
Between 2000 and 2002, Ecuador's seaborne imports in value terms increased by 17 percent annually, from 30 percent of trade in 2000 to 41 percent in 2003. Over this same period, seaborne exports in value terms declined by 14 percent per year (Exhibit 3-4) from 53 percent of total trade to 39 percent.

Exhibit 3-3
Ecuador's Cargo by Mode: 2002
(percent of metric tons and value)

	Weight	Value	
Truck	4%	7%	
Airborne	20%	12%	
Waterborne	76%	80%	
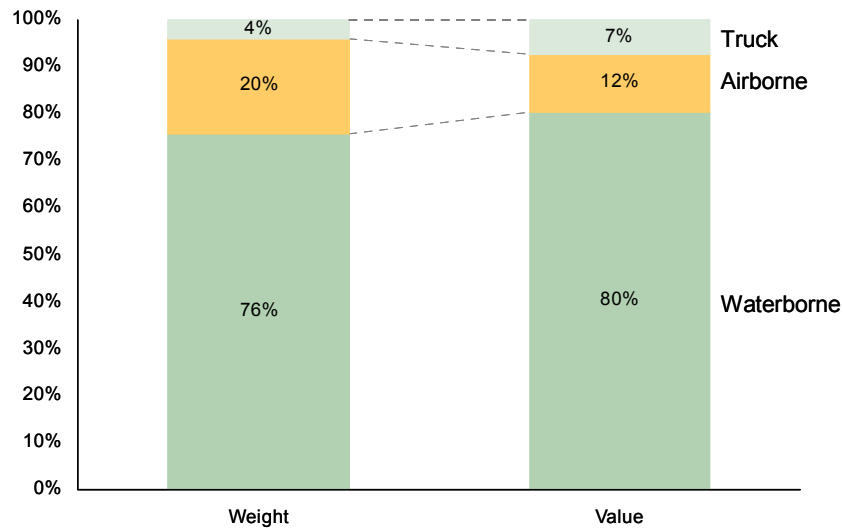
Source: Economic Commission for Latin America and the Caribbean.

Exhibit 3-4
Ecuador's Total Trade vs. Sea Trade: 2000-2002
(US$ millions)

Source: Economic Commission for Latin America and the Caribbean.

While Ecuador's seaborne imports and exports had very similar values in 2002, their respective tonnage was significantly different. Between 2000 and 2002, seaborne exports declined by 0.5 percent per year, from 19.3 million tons, or 83 percent of total sea trade by weight, to 19.1 million tons, or 77 percent of sea trade by weight (Exhibit 3-5). Seaborne imports grew by 21 percent per year over this same period, from 3.9 million tons in 2000 to 5.7 million tons in 2002.

A major reason for strong growth in imports was the implementation of dollarization (began Jan. 1, 2000), which allowed the Ecuadorian population to increase it international purchasing power.

Exhibit 3-5
Ecuador's Sea Trade: 2000-2002
(percent based on weight)

	2000	2001	2002
Exports	83%	81%	77%
Imports	17%	19%	23%
Total Seaborne Tons (millions)	23.2	23.8	24.8
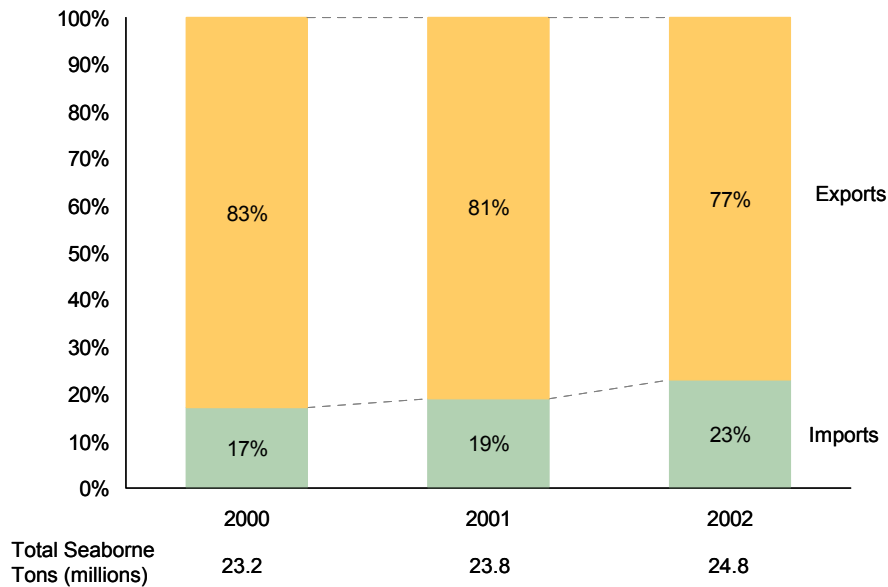
Source Economic Commission for Latin America and the Caribbean.
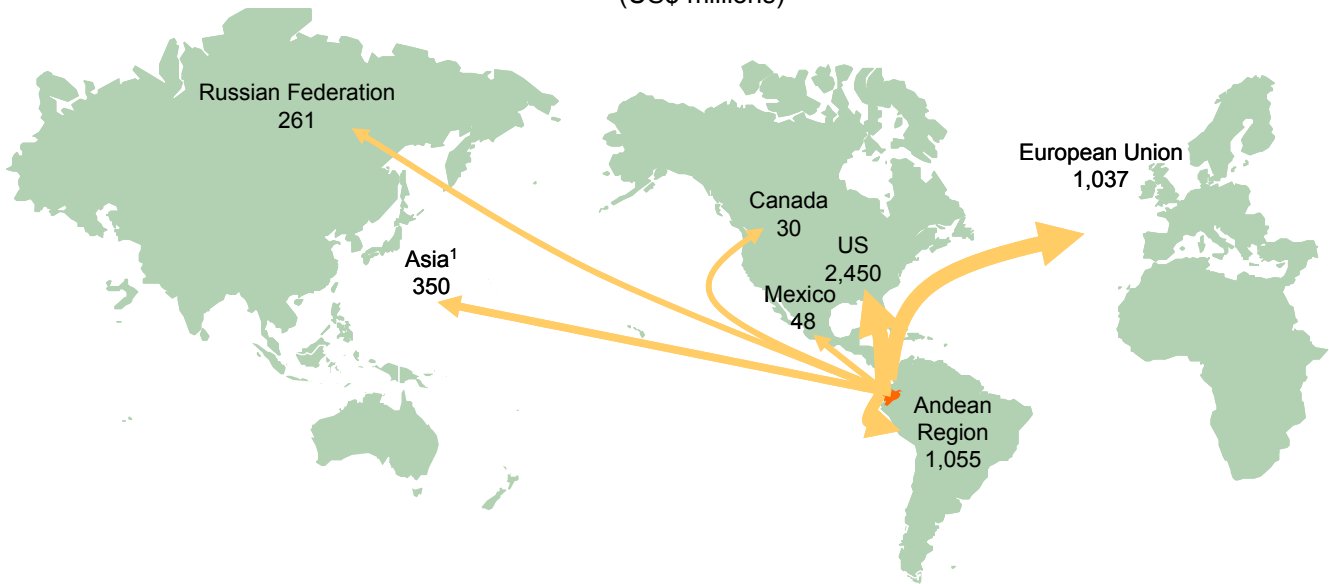
3.2 Key Trade Partners

In 2003, Ecuador's three largest trading partners were the United States, the European Union, and the Andean Community, primarily Peru and Colombia (Exhibits 3-6 and 3-7).

Approximately 41 percent of Ecuador's total exports, valued at US$2.5 billion, and 19 percent of imports, worth US$1.2 billion, were traded with the United States in 2003. Additionally, 17 percent of Ecuador's exports, valued at US$1.1 billion, and 23 percent of its imports, worth US$1.5 billion, were traded with its neighbors in the Andean Community (i.e., Bolivia, Colombia, Peru, and Venezuela). The European Union,[2] Ecuador's third largest trade partner, imported approximately 17 percent of Ecuador's exports in 2003, worth US$1.4 billion, and provided 13 percent of Ecuador's imports.

Asia is one of Ecuador's largest suppliers of merchandise, providing 19 percent of Ecuador's imports in 2003, valued at US$1.2 billion (of which Japan and China provided US$0.8 billion), but only imported 6 percent of Ecuador's exports, worth US$0.35 billion.
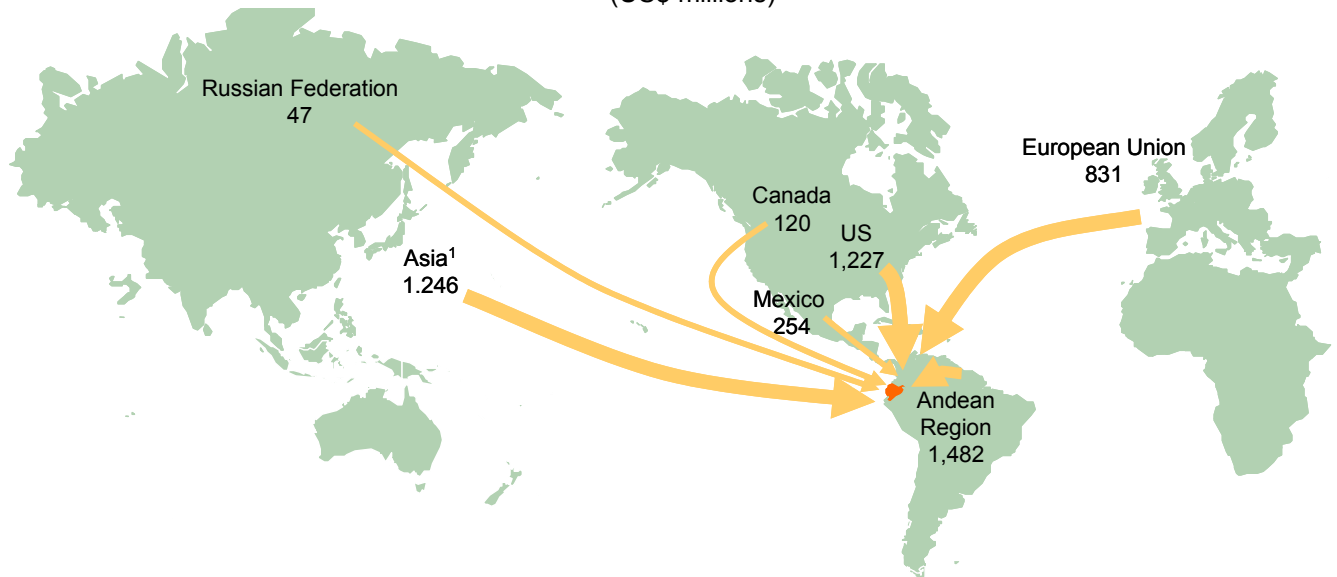
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[2] The original 15 member countries of the Europe Union were Belgium, Denmark, United Kingdom, Germany, France, Ireland, Italy, Luxembourg, Netherlands, Greece, Portugal, Spain, Austria, Finland and Sweden.

Exhibit 3-6
2003 Ecuador Exports: Major Destinations
(US$ millions)

Source UN Comtrade.

Exhibit 3-7
2003 Ecuador Imports: Major Originations
(US$ millions)

Source UN Comtrade.

Trade is becoming more concentrated with Ecuador's top three trade partners, with the US, EU, and Andean Community accounting for 75 percent of total exports, up from 65 percent in 1999 (Exhibit 3-8). For imports, trade originating in the US has decreased significantly since 1999, while imports from the EU and the Andean Community have
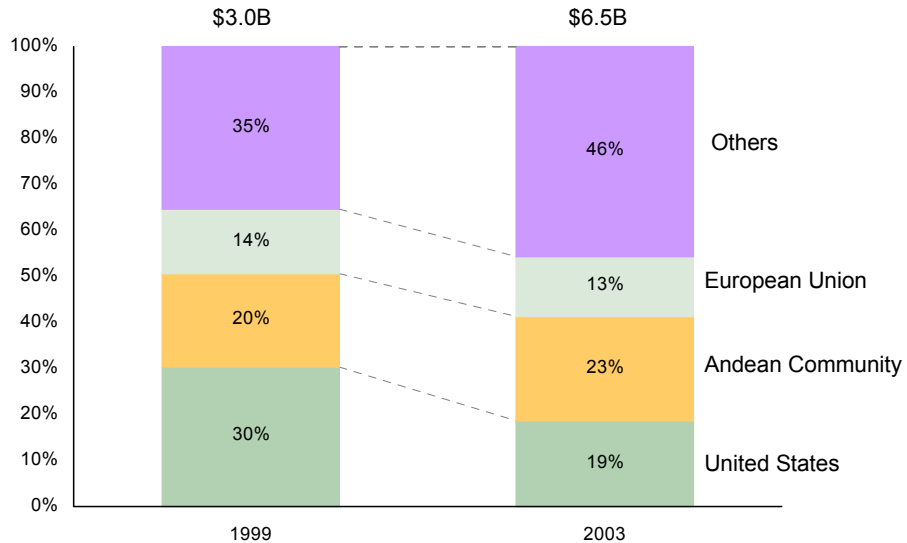
remained relatively stable. In 1999, the US provided 30 percent of Ecuador's imports, but by 2003 this had dropped to 19 percent (Exhibit 3-9).

Exhibit 3-8
Ecuadorian Exports: Trading Partner Shifts: 1999-2003
(percent based on value)
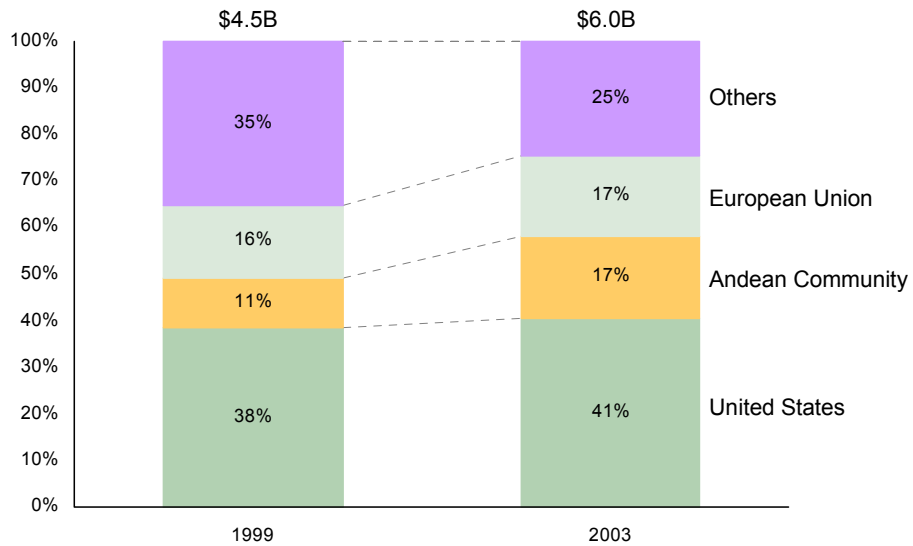
Source UN Comtrade.

Exhibit 3-9
Ecuadorian Imports: Trading Partner Shifts: 1999-2003
(percent based on value)

Source UN Comtrade.

Region-Specific Key Trade Partners

United States

The United States is Ecuador's principal trading partner. In 2003, Ecuador imported US$1.2 billion in merchandise from the US, and exported US$2.4 billion to the US.[3]

The US has several trade agreements with the Andean Community, of which Ecuador is a member. Over the past ten years the Andean Trade Preferences Act (ATPA) has greatly benefited Ecuador's trade by granting it duty-free privileges for certain products exported to the United States. It also has received additional trade benefits under the Andean Trade Promotion and Drug Eradication Act (ATPDEA) begun in 2002. However, these benefits will expire in 2006.

In 2004, the United States started commercial negotiations to create a Free Trade of the Americas Economic Agreement with Ecuador, Peru, and Columbia. This new agreement is expected to further increase trade between these economies and the United States, by reducing trade tariffs and other economic barriers.

ALADI (Asociación Latino Americana de Integración) [4]

Ecuador has seen strong trade growth with the ALADI member countries. Between 1999 and 2003, exports to these countries increased by 10 percent per year and imports by 27 percent per year. Total ALADI trade with Ecuador was worth US$ 3.8 billion in 2003.[5]

Although South America has more than 500 million potential consumers, it remains economically unstable. This is evident when looking at year over year trade with countries in this region, which shows high trade variances in comparison to stable trade patterns with regions like the EU and the United States.

However, the different trade agreements between Ecuador and the ALADI countries, and other regional association agreements such as the Andean Community, are considered to be important drivers of growth. Additionally, these countries have been historically dependent on interregional trade, given the distinct resources available in each country.

Andean Community

Ecuador also is a member of the Andean Community, which seeks to integrate the political and economic infrastructures of Bolivia, Peru, Venezuela, Colombia and Ecuador, by promoting free trade between its members. Within this community,

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[3] UN Comtrade.
[4] México, Cuba, Venezuela, Colombia, Ecuador, Perú, Bolivia, Paraguay, Uruguay, Argentina, Chile, Brazil.
[5] UN Comtrade.

merchandise trade is deregulated and duty free. Another current objective of the Community is to facilitate the development of a mutually beneficial energy sector, including electric and natural gas networks.

In 2003, Ecuadorian trade within Andean Community members was worth US$ 2.5 billion,[6] up from 2.0 billion in 1999. Of this, 58 percent is imports and 42 percent exports.

European Union

Europe is an important market for Ecuador, particularly as a destination for bananas. In 2003, exports to the European Union totaled US$1.04 billion, and imports totaled US$830 million.

The EU's relations with the Andean Community are based on a range of instruments, including the 1993 Regional Framework Agreement, which came into force in 1998. Although this agreement seeks to develop and diversify trade and investment, it does not contain any preferential market access provisions. Instead, the members of the Andean Community are beneficiaries of the EU's Generalized System of Preferences (GSP) Scheme. The GSP aims to encourage developing countries to export to the EU by allowing their products preferential access. Under the GSP, special arrangements are granted to the Andean Community and certain other developing countries combating the illicit production and trafficking of drugs in the form of duty free access to the EU for certain of their products. As a result, 90 percent of Andean exports to the EU enter duty free.[7]

Mexico

In 2003, Ecuador exported around US$48 million worth of goods to Mexico, and imported US$254 million worth of goods, making this nation the eight largest source of imports for Ecuador.[8]

Ecuador exports a wide range of products to Mexico, including fruits and vegetables, seafood, palm oil, cocoa and coffee, textiles, etc., including many non-traditional products that are popular with Mexico's domestic market. However, trade between Ecuador and Mexico is below its capacity potential based on relative pricing, proximity, and several additional economic factors.

Key Ecuadorian imports from Mexico in 2003 included medicine (14 percent), machinery for the manufacturing of pipes (5.6 percent), integrated circuit chips (4.6 percent), cars (4 percent) laminated products (2.5 percent), and digital processing units (2.4 percent).[9]

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[6] UN Comtrade.
[7] UK Department of Trade and Industry, http://www.dti.gov.uk.
[8] UN Comtrade.

China

Ecuador and China established formal diplomatic relations in 1980. Since then, the two sides have maintained a high level of political contact and trade and information exchange. In 2003, Ecuador exported US$13 million to China, and imported US$481 million. Overall, China was the third largest provider of Ecuador's imports in 2003.[10]

3.3 Key Trade Commodities

Ecuador's exports are primarily composed of raw materials and natural resources (Exhibit 3-10). Ecuador is one of Latin America's largest exporters of crude oil, and is vital to world energy markets. Oil is the nation's most valuable natural resource, representing approximately 12 percent of GDP in 2003.[11] Additionally, total exports of oil have accounted for approximately 40 percent of Ecuador's export earnings in recent years.[12]

Ecuador is also the world's largest exporter of bananas. Together, fruits and mineral fuels account for 62 percent of total exports. (Mineral fuels are 91 percent crude oil[13] plus various energy-related products, such as coal, peat, coke, miscellaneous oils, natural gas, and petroleum jelly.) In addition to these commodities, Ecuador also exports a significant amount of other agricultural product (e.g., coffee, cocoa, flowers) and seafood (e.g., shrimp and fish).

Since 1999, there have been significant changes in Ecuador's export commodity mix. Between 1999 and 2003, Ecuador's exports of mineral fuels increased annually by 15 percent, with relative share increasing from 32 to 43 percent of export value. Additionally, fish and crustacean exports decreased in value by 14 percent per year over this period, leading to a decline in export share from 15 percent to 6 percent (Exhibit 3-11).

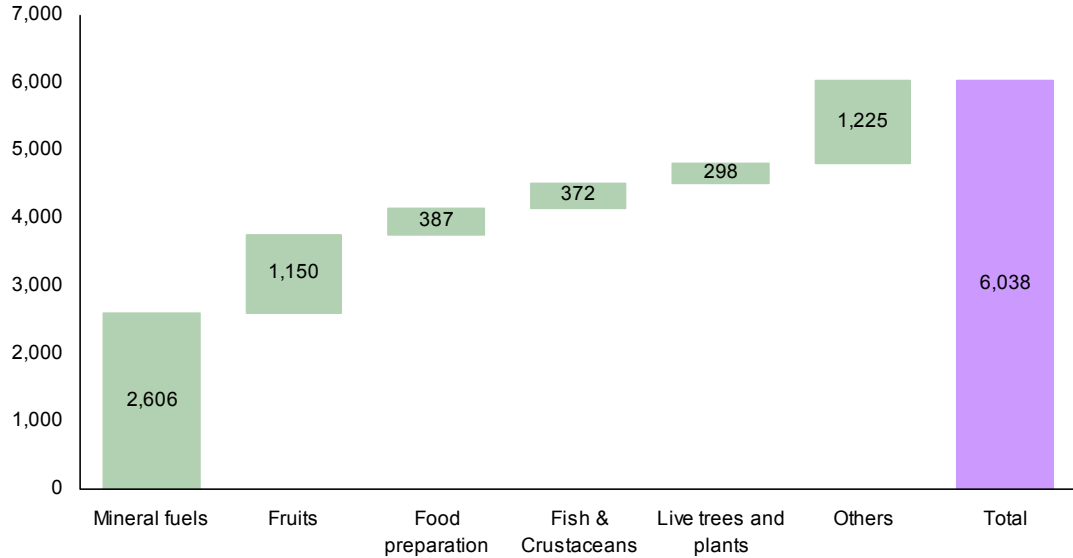[9] Servicio de Información Agropecuaria del Ministerio de Agricultura y Ganaderia del Ecuador.
[10] UN Comtrade.
[11] Banco Central Del Ecuador, National Monthly Accounts Report, Barclays Capital.
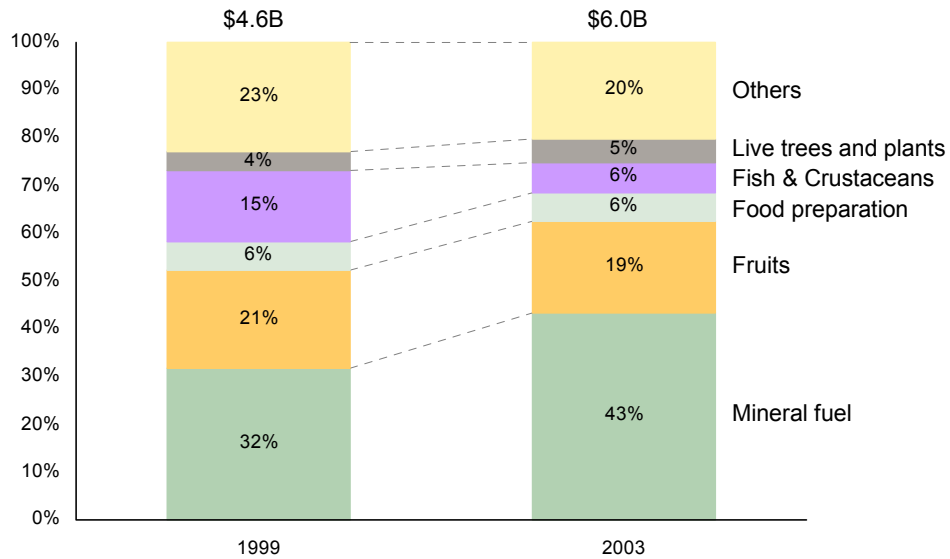[12] CIA World Factbook, UN Comtrade.
[13] UN Comtrade.

Exhibit 3-10
Ecuador's Major Commodity Exports: 2003
(US$ millions)

Source: UN Comtrade.

Exhibit 3-11
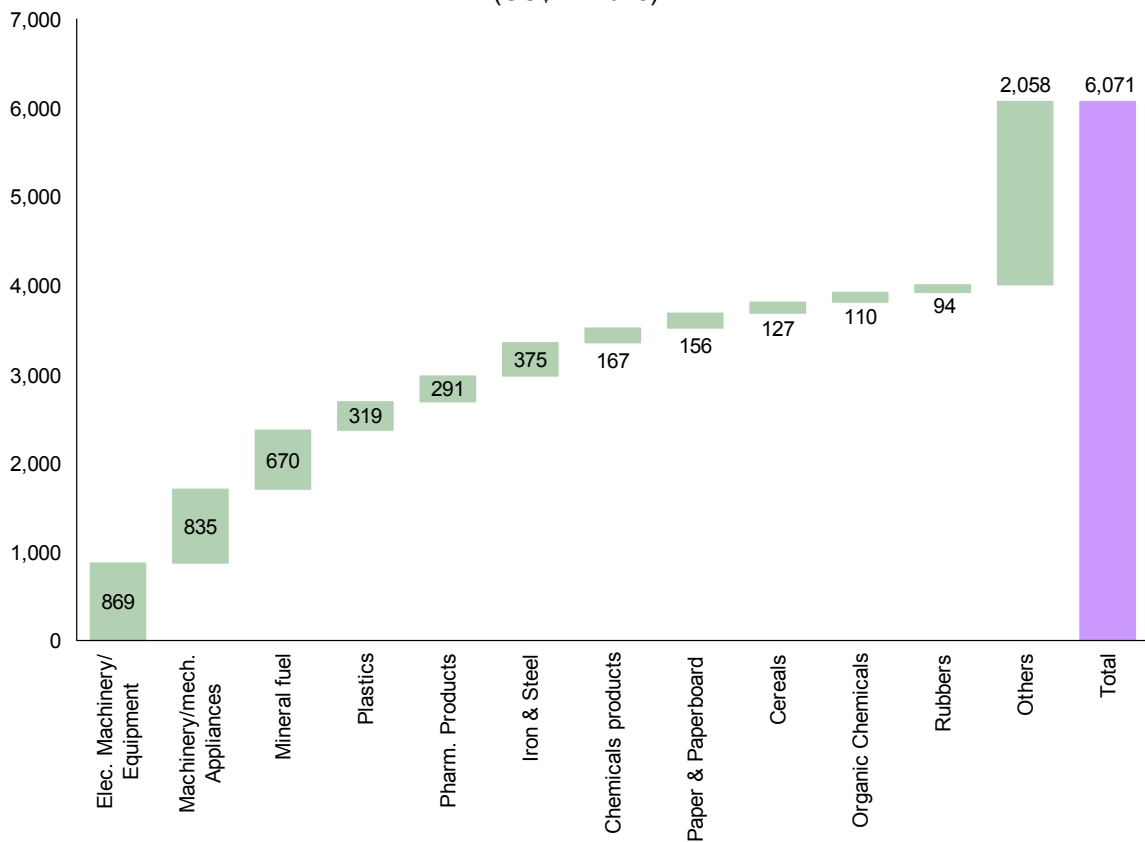## *Ecuadorian Export Commodity Mix: 1999-2003*
(percent based on value)

Source: UN Comtrade.

In contrast to its exports, Ecuador's imports are composed primarily of manufactured goods and industrial products. Overall, in 2003 Ecuador's main import categories were industrialized commodities, accounting for 70 percent of imports, agricultural products

with 13 percent, and construction sector goods with 8 percent.[14] More specifically, Ecuador's primary commodity imports in 2003 were machinery & mechanical appliances, electrical machinery and equipment, mineral fuels (58 percent of which was non-crude oils and other oils), plastics products, and pharmaceutical products (Exhibit 3-12).

During the past five years, the commodity import mix for Ecuador has remained stable (Exhibit 3-13). The only small changes involved a decrease in the share of imports of machinery & mechanical appliances and electrical machinery and equipment, and an increase in imports of mineral fuels.
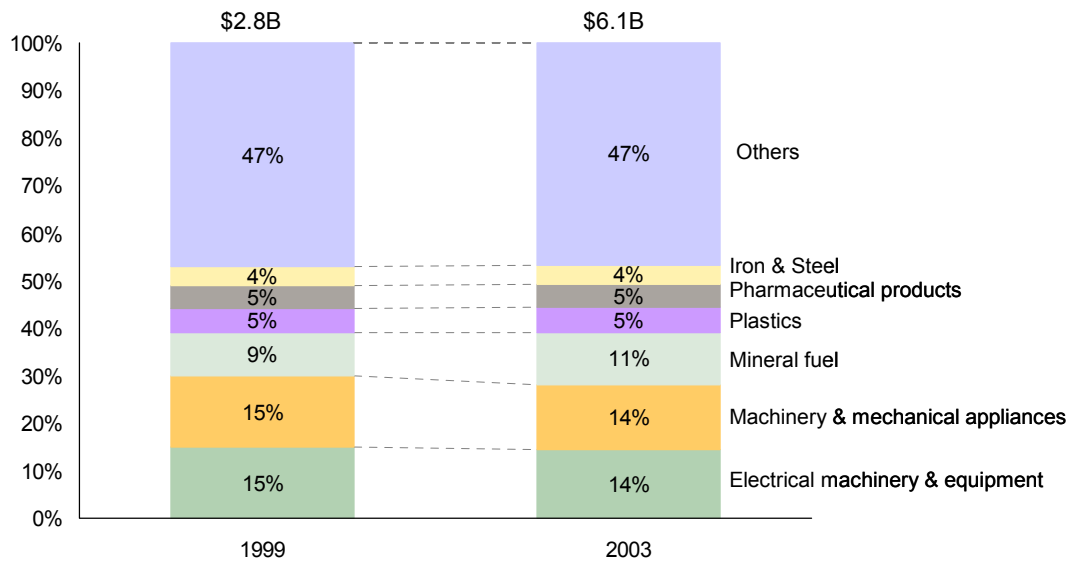
Exhibit 3-12
Ecuador's Major Commodity Imports: 2003
(US$ millions)

Source: UN Comtrade.

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[14] Banco Central del Ecuador.

Exhibit 3-13
Ecuadorian Import Commodity Mix: 1999-2003
(percent based on value)

	$2.8B	$6.1B	
	47%	47%	Others
	4%	4%	Iron & Steel
	5%	5%	Pharmaceutical products
	5%	5%	Plastics
	9%	11%	Mineral fuel
	15%	14%	Machinery & mechanical appliances
	15%	14%	Electrical machinery & equipment
	1999	2003	

Source: UN Comtrade.

3.4 Ecuador Market Trends and Challenges

Free trade agreements and increased international presence

Ecuador's application of free market principals, including the lowering of trade barriers, its participation in numerous international trade organizations, and a firm commitment to diversification of its economy and reform of its financial institutions, are helping to restore a favorable balance of trade and generally better the nation's economy.

Ecuador's active membership in global trade organizations and its participation in a number of regional free trade zones confirm the nation's trend toward liberalization and its commitment to open trade. Ecuador is a member of the World Trade Organization (WTO), the Andean Community, and the Latin American Integration Association (ALADI). In addition, Ecuador has concluded bilateral free trade agreements with Bolivia, Chile, Colombia, and Venezuela, is negotiating a trade agreement with Mexico, is engaged in trade talks with the Mercosur nations of Brazil, Argentina, Paraguay, and Uruguay, and fully supports the establishment of a free trade area for the Americas.

Diversification of export commodities

Ecuador is primarily an exporter of raw goods and natural resources, and an importer of manufactured products. Traditionally, Ecuador has focused its efforts on a few key commodities to drive domestic production and growth, mainly crude oil, coffee, and

bananas, but in recent years it has begun to diversify its exports in order to stabilize its economy and reduce its vulnerability to market changes for these few products. For example, in recent years, exports of cut flowers have risen rapidly and today Ecuador is the largest provider of flowers to the United States.

Trade partner diversification

While embracing globalization and free trade agreements, Ecuador is looking to diversify its export markets. It is primarily looking to gain momentum in the Andean region, which in 2003 accounted for 17 percent of its exports, up from 11 percent in 1999, and 23 percent of its imports, up from 20 percent in 1999.

Banana tariffs

Another challenge that Ecuador is facing is tariffs on its exports of bananas, one of its principal export commodities. The EU, which is the world's largest importer of bananas with 3.4 million tons purchased annually, has tried to place tariffs on banana imports from Latin America while allowing duty free imports of bananas from former European colonies in Africa.

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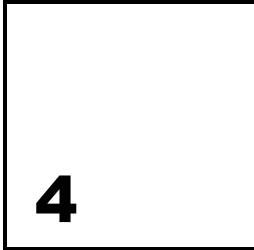
Ecuador and the Panama Canal

4.1 Trade Routes Relevant to the Panama Canal

Ecuador has many important trade partners throughout the world, and its geographical location makes the Panama Canal a very important part of its international trade. Two of its largest trade partner regions are the European Union and the East Coast of the United States (ECUS), both of which are most accessible via transit through the Panama Canal. In 2003, 51 percent of Ecuador's imports and 79 percent of its exports were traded with these regions.

Overall, in 2002 Ecuador's total sea trade was 24.7 million tons, of which 12 million tons or 48 percent transited the Canal.[15] Additionally, Ecuador's Canal-relevant sea trade represented 6 percent of total tons moving through the Canal in 2002.

In 2002, Ecuador's most important Canal-relevant sea trade lanes were to the ECUS, Europe, and East Coast South America (ECSA) (Exhibit 4-1).

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[15] No sea trade data is available for Ecuador beyond 2002.

Exhibit 4-1
Ecuador's Panama Canal-Relevant Trade Routes: 2002
(million tons)

Source: ACP.

East Coast US

In 2002, Ecuador exported 2.1 million tons of merchandise to the ECUS, and imported 1.7 million tons, representing 31.5 percent of Ecuador's Canal trade and 15 percent of total Ecuadorian sea trade.

On average between 1999 and 2003, the main Canal-relevant exports to the ECUS were crude oil, which accounted for 62.4 percent of exports transiting the Canal, miscellaneous refrigerated products (9.4 percent), bananas (7.1 percent), container cargo (6.8 percent), and residual fuel oil (4 percent).

The most important imports from this region included containerized cargo (17.4 percent), corn (16.3 percent), paper and paper products (11.6 percent), wheat (10.4 percent), and diesel oil (8.6 percent).

Europe

In 2002, Ecuador's exports to Europe via the Panama Canal amounted to 2.9 million cargo tons, while its imports were 0.9 millions tons, representing 32 percent of Ecuador's Canal-relevant trade, and 15 percent of Ecuador's total sea trade.

On average between 1999 and 2003, the main Canal-relevant exports to Europe were bananas, which accounted for 85.8 percent of exports transiting the Canal, miscellaneous refrigerated products (7.1 percent), and container cargo (4.5 percent). The most important imports included fertilizers (29.3 percent), iron and steel (28.6 percent), and containerized cargo (20.7 percent).

East Coast South America

In 2002, Ecuador's Canal-relevant sea trade with the ECSA amounted to 0.2 million tons of exports and 1.5 millions tons of imports, which represented 14 percent of Ecuador's total Canal trade, and 7 percent of Ecuador's total sea trade.

On average between 1999 and 2003, the main Canal-relevant exports to the ECSA were containerized cargo, which accounted for 37.9 percent of exports transiting the Canal, crude oil (34.4 percent), and vegetable oil (7.1 percent). The most important imports included liquefied gas (24.6 percent), iron and steel (19.5 percent), containerized cargo (17.5 percent), diesel oil (14.2 percent), and gasoline (10.2 percent).

Trade Lane Trends

The following two graphs (Exhibits 4-2 and 4-3) show trends in Panama Canal-relevant trade lanes for Ecuador's imports and exports. For exports transiting the Canal, Exhibit 4-2 shows a trend over the past couple years of decreasing trade to ECUS and increasing trade to Europe. On possible reason for this is the increase in the value of the euro since 2001, which has increased the purchasing power of the EU's population.

Between 1999 and 2003, Canal-relevant imports from the ECUS decreased by 2.6 percent per year, from 40 percent to 30 percent of Ecuador's imports in this lane (Exhibit 4-3). During this same time period, imports from the ECSA grew by 8.6 percent per year by weight, to 31 percent of Ecuador's total Canal-relevant imports, while the share of imports from ECCA and the West Indies practically doubled.

Exhibit 4-2
Ecuador's Exports through the Panama Canal by Destination: 1999-2003
(percent of total tons)

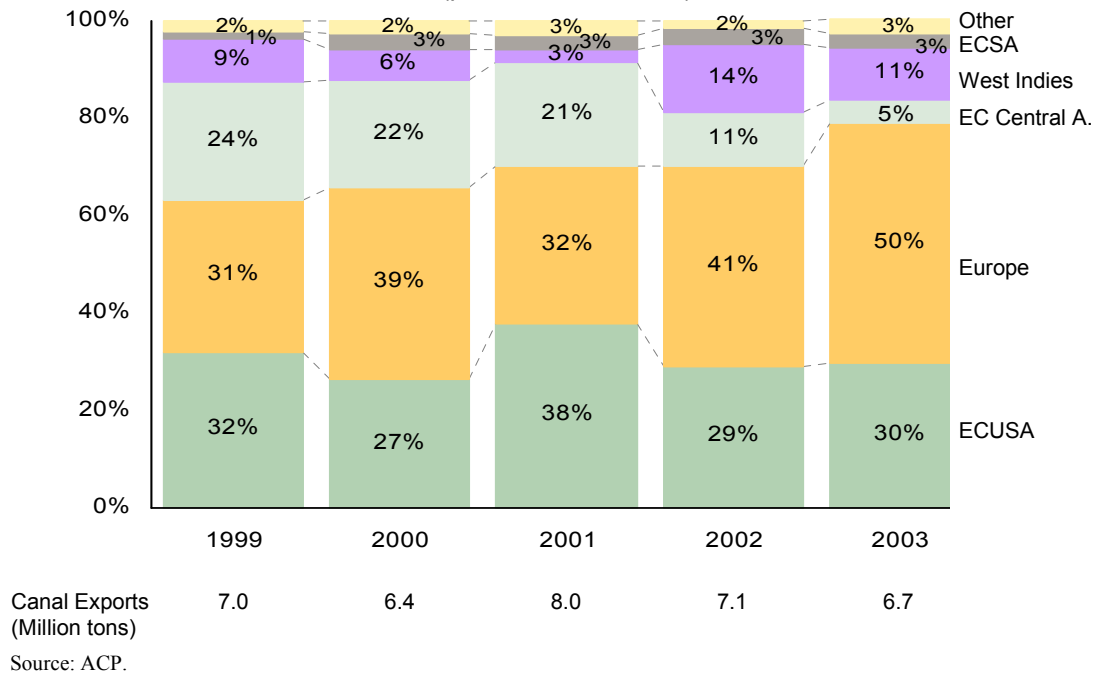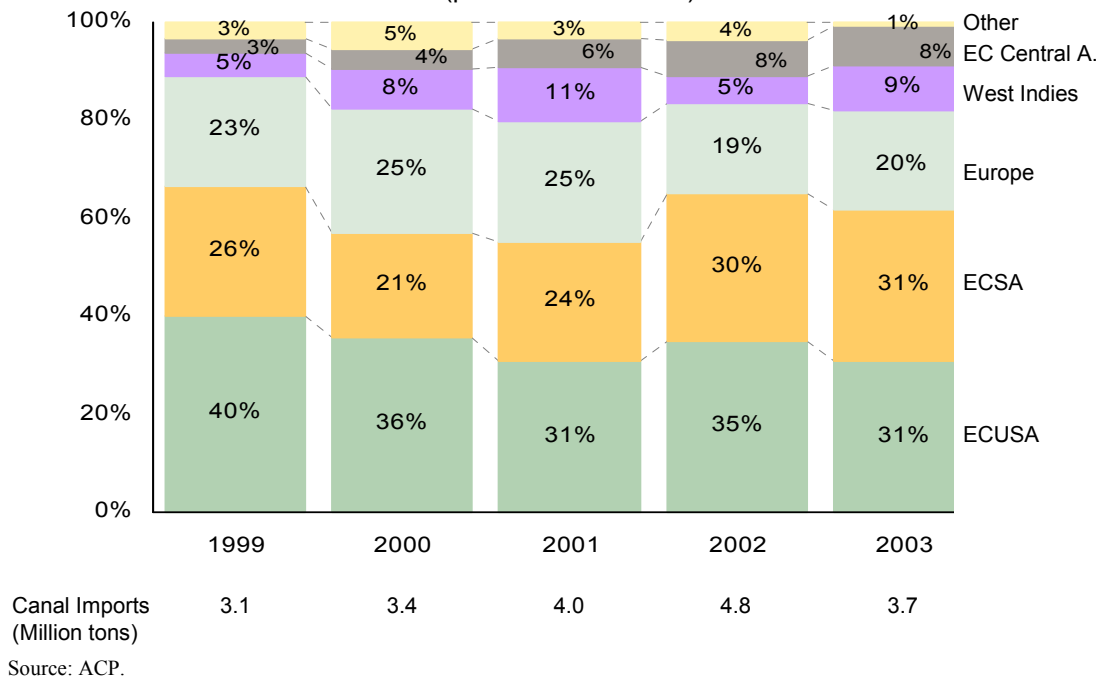| Canal Exports (Million tons) | 7.0 | 6.4 | 8.0 | 7.1 | 6.7 |

Source: ACP.

Exhibit 4-3
Ecuador's Imports via the Panama Canal by Origin: 1999-2003
(percent of total tons)

| Canal Imports (Million tons) | 3.1 | 3.4 | 4.0 | 4.8 | 3.7 |

Source: ACP.

## 4.2 Ecuadorian Imports/Exports Through the Canal

For the purposes of this report, we analyzed Ecuador's trade transiting the Panama Canal using the "80/20 rule," whereby those commodities comprising 80 percent of Panama Canal tonnage (in exports and imports) was analyzed.

The key export commodities are listed in Exhibit 4-4. The most prominent exports by weight are crude oil, bananas, containerized cargo, and refrigerated goods, which together accounted for 90 percent of export tonnage passing through the Canal in 2003.

The strongest annual growth in tons passing through the Canal between 1999 and 2003 occurred in bananas and gasoline, which grew by 9 percent and 13 percent respectively. As a result of this growth, the share of these commodities relative to Ecuador's exports through the Canal grew by 10 percent annually for bananas to 47 percent of exports, and by 14 percent for gasoline, to 4 percent of export tonnage.

The only significant decline in exports share was for crude oil, which declined by 13 percent per year in terms of total tonnage exported through the Canal. Petroleum's share of Ecuador's total Canal commodity decreased from 48 percent of Canal-relevant exports in 1999 to 28 percent in 2003.

Exhibit 4-4
Ecuador's Exports through the Panama Canal by Commodity: 1999-2003
(percent of total tons)

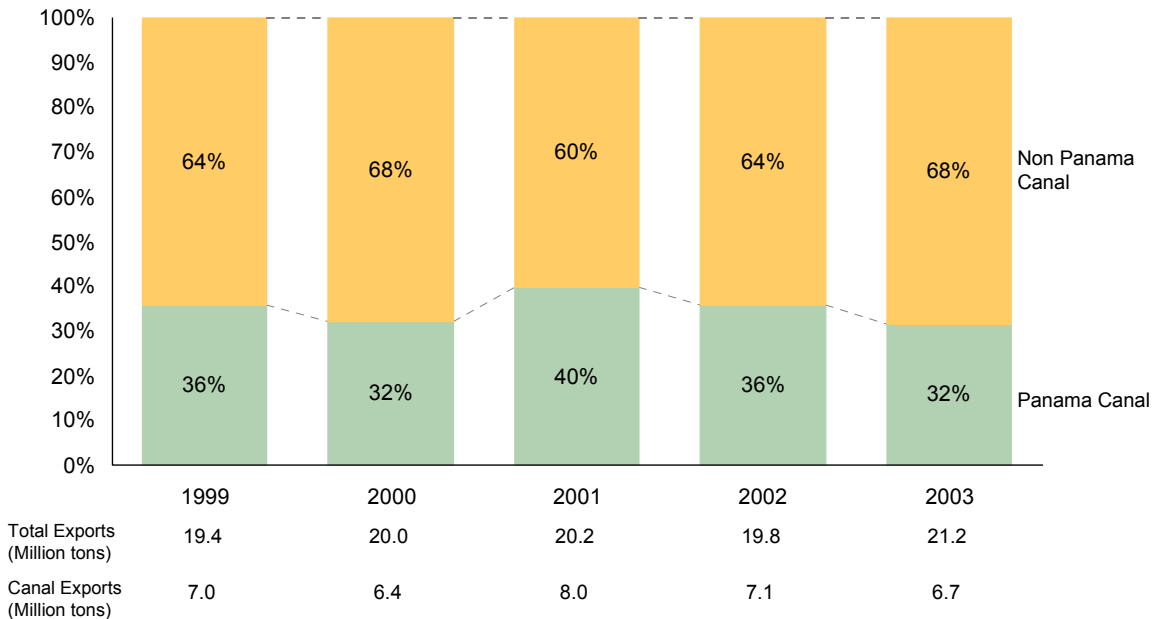| Canal Imports (Million tons) | 7.0 | 6.4 | 8.0 | 7.1 | 6.7 |
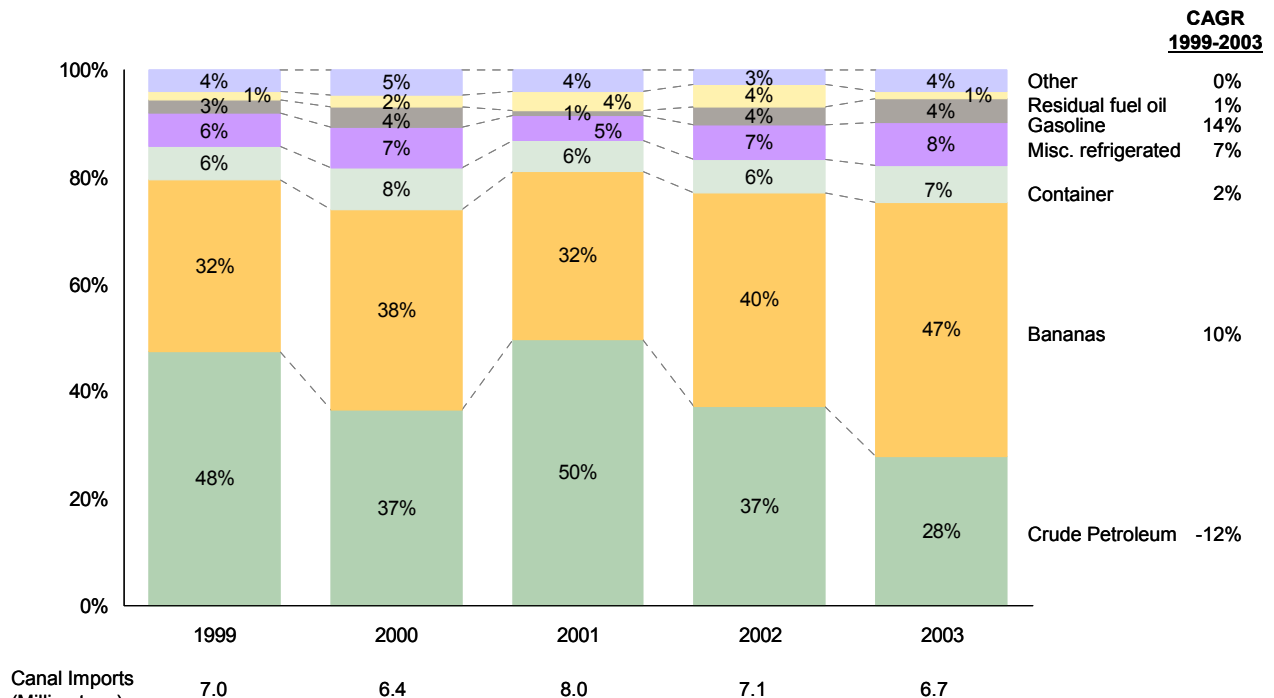
Source: ACP.

Between 1999 and 2003, on average, 35 percent of Ecuador's exports transited the Panama Canal (Exhibit 4-5). During this period, total exports increased by 2 percent per year, while Canal-relevant exports decreased by 1 percent per year, causing the share of exports transiting the Canal to drop from 36 percent to 32 percent of total Ecuadorian exports over the period.

In contrast, during this same period, a much larger percentage of Ecuador's imports (75 percent on average) transited the Panama Canal (Exhibit 4-6). Total imports increased by 14 percent per year, while Canal-relevant imports increased by 4 percent per year, causing the share of Ecuador's imports transiting the Canal to drop from 78 percent to 55 percent over this period.

Exhibit 4-7 shows that on average between 1999 and 2003, Ecuador's main exports transiting the Canal were crude oil (27 percent) and bulk bananas (45 percent). The principle import commodities during this period were containerized cargo (20 percent), including plastics, paper, and machinery; iron & steel (13 percent); gasoline and diesel (9 percent); liquefied gas (9 percent); and fertilizers (8 percent).

Exhibit 4-5
Total Ecuadorian Exports vs. Panama Canal Exports
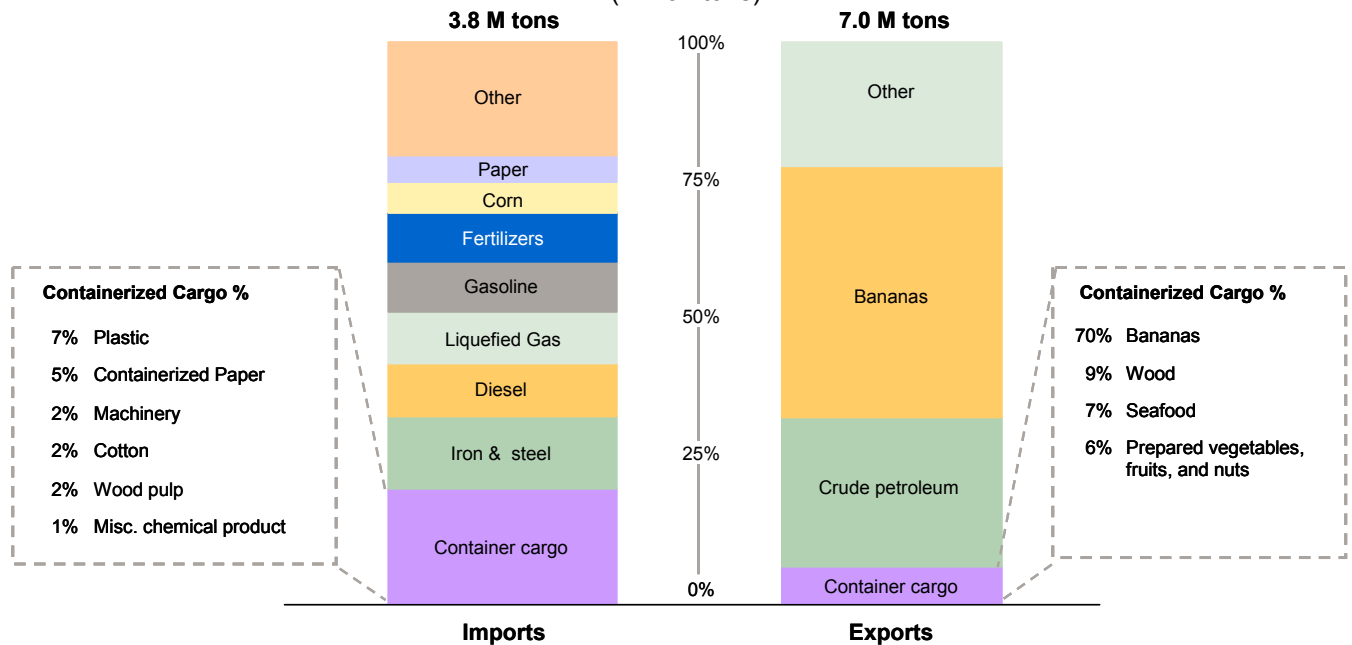(million tons)

	1999	2000	2001	2002	2003
Total Exports (Million tons)	19.4	20.0	20.2	19.8	21.2
Canal Exports (Million tons)	7.0	6.4	8.0	7.1	6.7

Source: Banco Central del Ecuador, ACP.

Exhibit 4-6
Total Ecuador Imports vs. Panama Canal Imports
(million tons)

	1999	2000	2001	2002	2003
Total Imports (Million tons)	4.0	4.1	4.9	6.1	6.7
Canal Imports (Million tons)	3.1	3.4	4.8	4.8	3.7
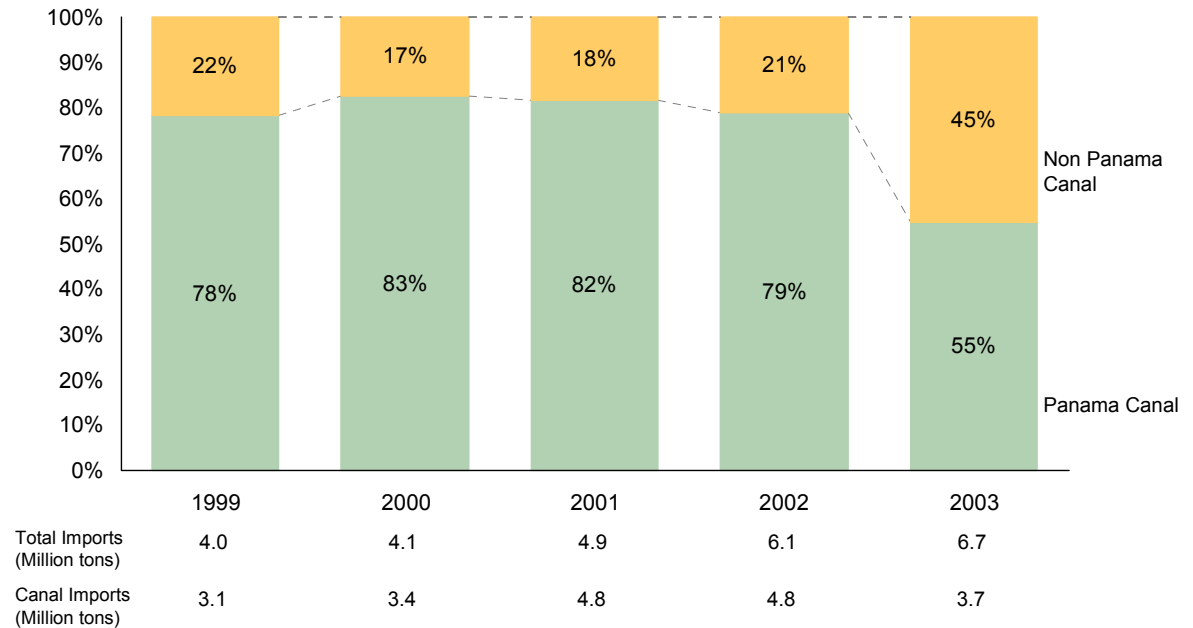
Source: Banco Central del Ecuador, ACP.

Exhibit 4-7
5-Year Average: Ecuador's Panama-Canal Relevant Trade
(million tons)

Imports — 3.8 M tons

Containerized Cargo %
- 7% Plastic
- 5% Containerized Paper
- 2% Machinery
- 2% Cotton
- 2% Wood pulp
- 1% Misc. chemical product

Import categories: Other, Paper, Corn, Fertilizers, Gasoline, Liquefied Gas, Diesel, Iron & steel, Container cargo

Exports — 7.0 M tons

Containerized Cargo %
- 70% Bananas
- 9% Wood
- 7% Seafood
- 6% Prepared vegetables, fruits, and nuts

Export categories: Other, Bananas, Crude petroleum, Container cargo

Source: Mercer analysis, ACP.
Note: Containerized commodities only include tons traded between Ecuador and the East Coast of the United States.

4.3 Canal-Relevant Ecuadorian Export Commodities

4.3.1 Crude Oil

Crude oil accounts for nearly all of Ecuador's exported petroleum products. Once extracted, crude oil is processed to distill natural gases, kerosene, gasoline, light oil, heavy oil, diesel, and solid residues. In 2003, Ecuador exported US$2.3 billion worth of crude oil (94.5 million barrels), which represented 39 percent of its total exports by value, making it the 19th largest exporter of this commodity in the world.[16] The US accounts for more than half of Ecuador's crude oil exports (Exhibit 4-8).

Between 1999 and 2003, on average, Ecuador exported 2.8 million tons of crude oil through the Panama Canal per year. In 2003, 60 percent of Ecuador's crude oil transiting the Canal was landed on the East Coast of the US, equivalent to 16 percent of Ecuador's total crude oil exports to the United States.

Exhibit 4-8
Ecuador's Crude Oil Export Partners: 2003
(US$ millions)
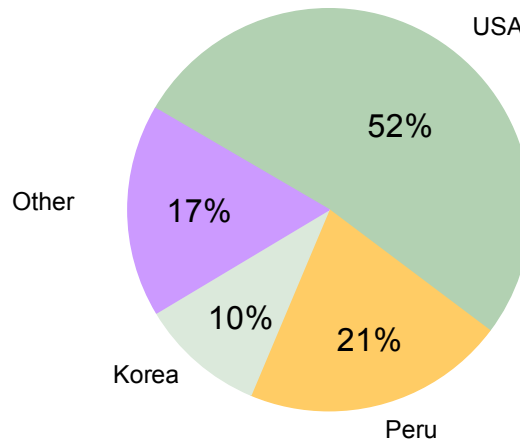
Source: UN Comtrade.

4.3.2 Bananas

Bananas, by volume, are the most internationally traded fruit in the world, and are the second most traded in terms of value, behind citrus fruits.[17] Bananas are principally consumed as fresh fruit, but are also processed and made into food products such as banana "chips," banana puree for baby food, flour and powder, juice, and even alcohol. Beyond the kitchen banana products are used in various applications, including as fiber, animal feed, and for medicinal uses.

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[16] UN Comtrade.
[17] UNCTAD.

In 2003, Ecuador exported US$1.1 billion worth of bananas (bulk and containerized), which represented 18 percent of its total exports by value, making it the largest exporter of this commodity in the world. Its main partners were Italy, which imported 25 percent of Ecuador's banana exports, the US with 22 percent, and the Russian Federation with 21 percent (Exhibit 4-9).

Between 1999 and 2003, on average, Ecuador exported 3.1 million tons of bananas (bulk reefer cargo) through the Panama Canal per year. (Note: Ecuador also exports 318,000 tons of containerized bananas per year.) The largest recipients of Ecuador's Canal-relevant banana exports were the Russian Federation, which received 21 percent, Germany (17 percent), Italy (16 percent), and Belgium (8 percent).

Exhibit 4-9
### Ecuador's Banana Export Partners: 2003
(US$ millions)
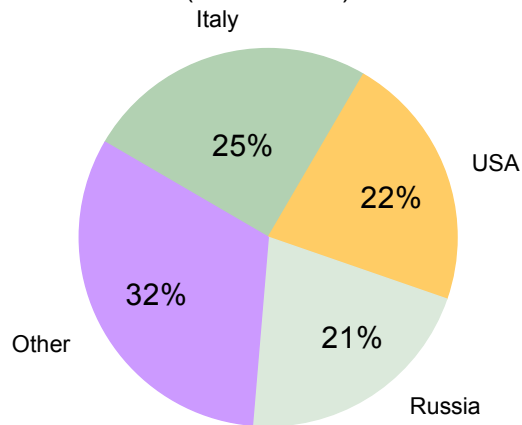
Source: UN Comtrade.

4.3.3 Containerized Export Commodities

On average between 1999 and 2003, Ecuador exported 6.9 million tons of goods through the Panama Canal, of which containerized cargo accounted for 7 percent. Ecuador's largest containerized commodity is bananas, which accounted for 70 percent of Canal-relevant exports (containerized bananas are included in the discussion in section 4.3.2 above). Additionally, Ecuador's other significant containerized exports include vegetable and fruit preparations, seafood, and wood (Exhibit 4-10).

Exhibit 4-10
Ecuador's Containerized Exports Through the Panama Canal: 2003
(million tons)
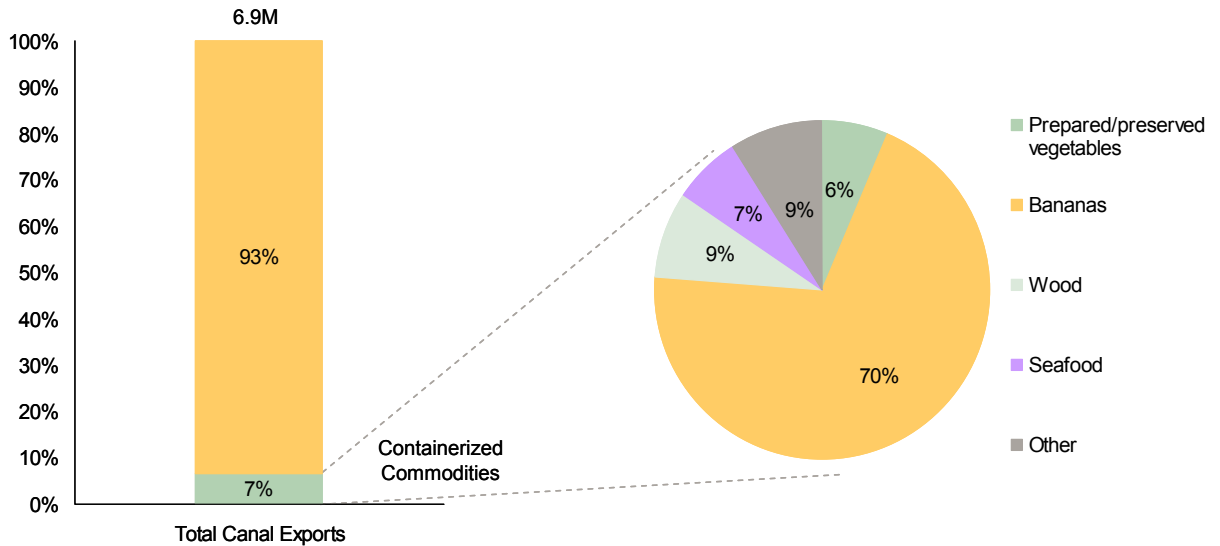
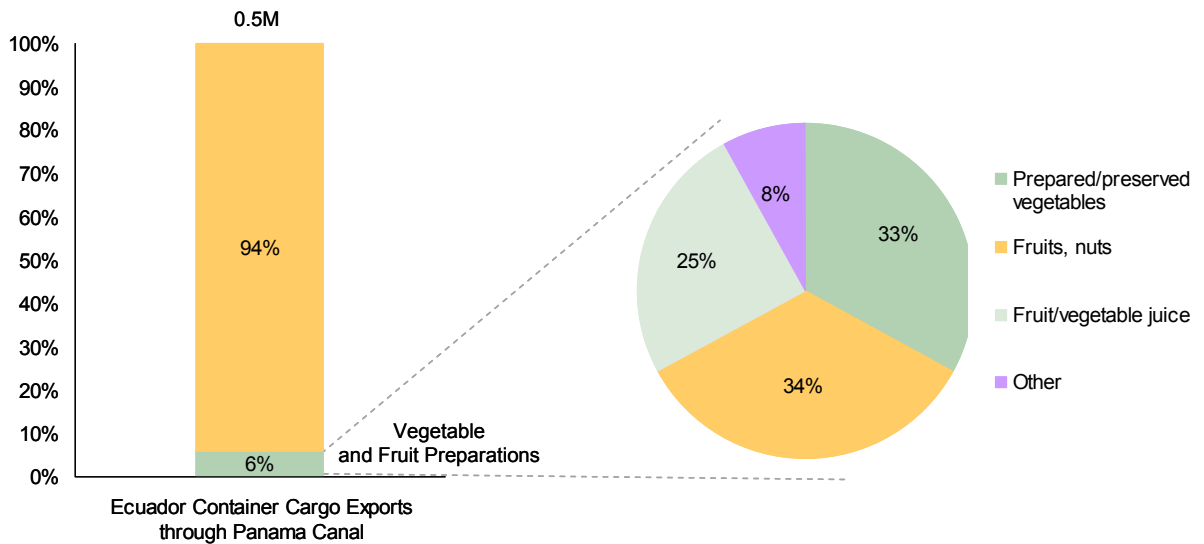Source: ACP, US Waterborne Commerce 2003 data, Mercer analysis.

Containerized Prepared Vegetables, Fruits, and Nuts

This category includes vegetable or fruit preparations such as jellies, jams, frozen fruit or vegetables, or packed juices. Within this commodity category, Ecuador mainly exports prepared and preserved vegetables, fruits, nuts, edible parts of plants and fruit/vegetable juices.

In 2003, Ecuador exported US$8 million worth of prepared or preserved vegetables, US$43 million of fruits, nuts, & edible parts of plants, and US$44 million of fruit/vegetable juices. In total, in 2003 Ecuador represented 0.5 percent of the world's exports of fruit and vegetable preparations.

On average between 1999 and 2003, vegetable preparations accounted for 6 percent of Ecuador's total tonnage exported in containers that transits the Canal (Exhibit 4-11).

Exhibit 4-11
Ecuador Containerized Vegetable Preparations Transiting the Canal: 2003
(million tons)

Source: ACP, US Waterborne Commerce 2003 data, Mercer analysis.

Containerized Wood & Articles of Wood

World lumber trade amounted to 56 million tons in 2003, with 4.6 million tons moving in international trade.[18] The lumber category includes lumber (boards and planks), plywood, and wood chips. Lumber is a vital element of all types of construction and furnishing.

For Canal-relevant Ecuadorian exports of containerized wood products, only plywood and wood articles were analyzed, given that these make up 88 percent of this trade. In 2003 Ecuador exported US$84 million in wood products total, of which plywood accounted for US$23 million, and wood articles for US$1.4 million (Exhibit 4-12).

Between 1999 and 2003, on average, Ecuador exported approximately 39,000 tons of wood and wood related products through the Panama Canal, accounting for 0.6 percent of its total Canal exports by weight. Of this, approximately 38 percent was plywood, and 50 percent was manufactured articles of wood.

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[18] Nathan Study.

Exhibit 4-12
Ecuador Containerized Wood Exports Transiting the Canal: 2003
(million tons)
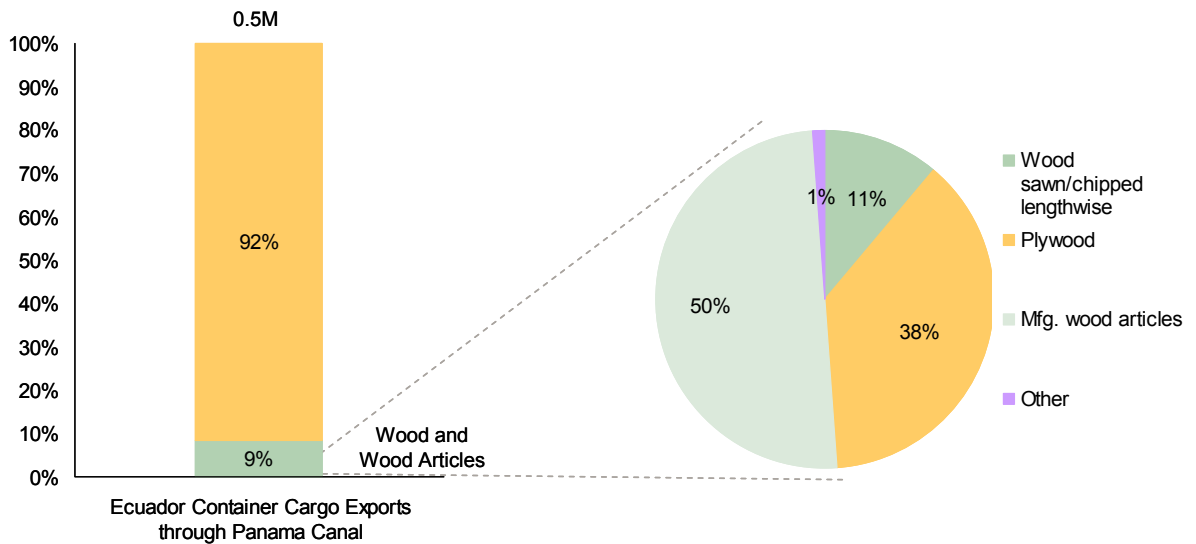
Source: ACP, US Waterborne Commerce 2003 data, Mercer analysis.

Seafood

In 2003, Ecuador exported US$372 million worth of seafood, representing 5.6 percent of its total exports. Ecuador's principal containerized commodities in this category include tuna, other fish and fish fillets, and shrimp (Exhibit 4-13). Of these, shrimp and other crustaceans are Ecuador's primary exports, accounting for 93 percent of containerized seafood.

On average between 1999 and 2003, Ecuador exported 30,000 tons of seafood through the Panama Canal, accounting for 6.5 percent of its Canal relevant containerized cargo exports, and 0.4 percent of Ecuador's total Canal exports.

Exhibit 4-13
Ecuador Containerized Seafood Exports Transiting the Canal: 2003
(million tons)
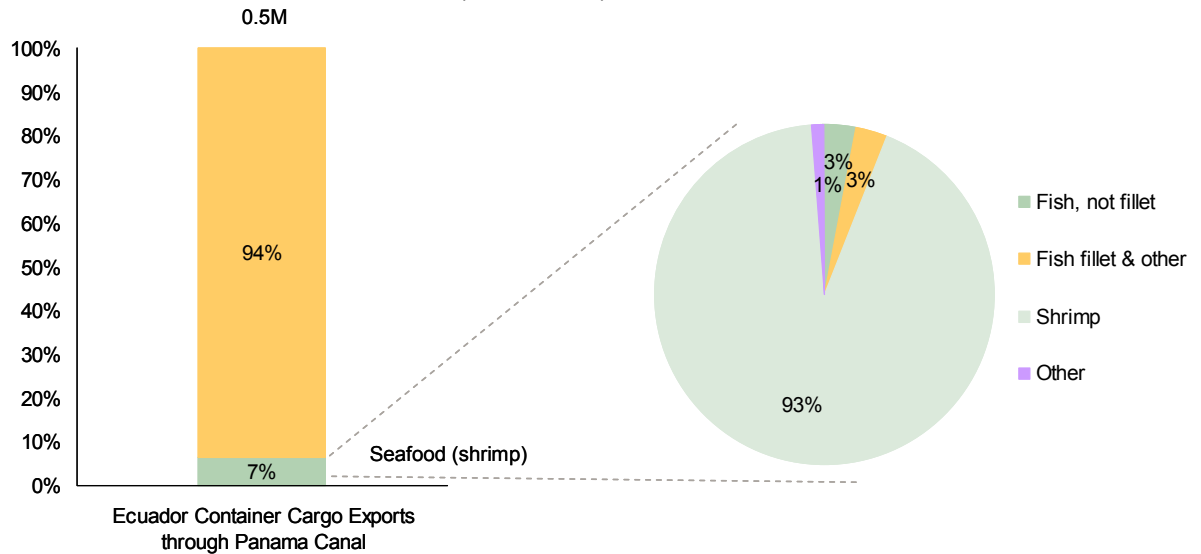
Source: ACP, US Waterborne Commerce 2003 data, Mercer analysis.

4.4 Canal-Relevant Ecuadorian Import Commodities

4.4.1 Petroleum Products

Ecuador's imports of petroleum products include diesel oil, gasoline and liquefied gas. In 2003, Ecuador imported US$158 million in petroleum products.[19]

On average between 1999 and 2003 Ecuador imported 339,000 tons of gasoline, accounting for 9 percent of its total Canal imports. The primary origins of Canal-relevant imports of this commodity include Venezuela (25 percent), the United States (30 percent), Spain (9 percent), and Colombia (6 percent).

During this same period, Canal-relevant imports of diesel oil averaged 360,000 tons per year, primarily originating from Venezuela (37 percent), the United States (31 percent), and the Netherlands West Indies (12 percent).

Canal-relevant liquefied gas imports between 1999 and 2003 averaged 350,000 tons per year. The primary exporters of this commodity to Ecuador include Venezuela, which accounted for 72 percent of Ecuador's Canal-relevant imports of this commodity, Nigeria (6 percent), and the United States (5 percent).

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[19] UN Comtrade.

4.4.2 Iron and Steel

Steel is derived from metallic iron that must first be extracted from iron ore. The main uses of iron and steel include automotive vehicles and parts, construction materials, cans, and containers. Iron and steel comprises about 95 percent of all the tonnage of metal produced annually in the world.

Worldwide exports of iron and steel have grown significantly in recent years. Between 2000 and 2001, world iron and steel exports declined by 2.2 percent. However, from 2001 to 2003, they increased by 14 percent per year. In 2003, Ecuador's total raw iron and steel imports were US$5.7 million, and its imports of articles of iron and steel were US$30 million.

Between 1999 and 2003, Ecuador's imports of iron and steel that transited the Canal totaled 486,000 tons, accounting for 13 percent of its total Canal relevant imports. The largest providers of iron and steel to Ecuador via the Canal included Venezuela (34 percent), Russia (22 percent), Ukraine (10 percent), and the United States (3 percent).

4.4.3 Corn

Corn is primarily used to feed livestock, but is also a major ingredient in food products for human consumption. It is used in many types of food and industrial products, including starches, sweeteners, corn oil, beverage and industrial alcohol, and fuel ethanol.

Corn products are also being used in place of petroleum in many industrial applications. Polylactide (PLA), a biodegradable polymer made from corn, is being used successfully in the manufacturing of a wide variety of everyday items, such as clothing, packaging, carpeting, recreational equipment, and food utensils. Because these products are biodegradable and made from a renewable resource, they offer environmental benefits.

In 2003, by value, Ecuador imported US$8.5 million worth of corn, accounting for approximately 0.1 percent of the Ecuador's total imports.

Between 1999 and 2003, on average, 212,000 tons of corn destined for Ecuador passed through the Panama Canal per year. During this period, the US supplied 100 percent of Ecuador's Canal-relevant corn imports.

4.4.4 Fertilizers

Fertilizers are key components of agricultural production, enhancing the ability of existing land and soil resources to increase food production. The more common fertilizers include nitrogen, phosphorus, potassium, calcium, sulfur, and magnesium.

In 2003, by value, Ecuador imported US$483 million worth of fertilizers, accounting for approximately 7.2 percent of Ecuador's total imports.

Between 1999 and 2003, on average, Ecuador imported 325,000 tons of fertilizers per year through the Panama Canal. During this period, Ecuador's top import partners for this commodity were Russia, which provided 37 percent of Ecuador's Canal-relevant fertilizer imports, the United States (19 percent), Latvia (11 percent), and the Ukraine (9 percent).

4.4.5 Paper and Paper Products

This commodity includes intermediate paper goods (products that have been partially developed and processed for consumer use) and consumer ready products. In 2003, Ecuador imported US$27 million of paper and paper products, accounting for 0.4 percent of its total imports.

Between 1999 and 2003, on average, Ecuador imported 183,000 tons of bulk paper and paper products through the Panama Canal per year. During this period, Ecuador's top import partners for this commodity were the United States, which provided 82 percent of Ecuador's Canal-relevant paper imports, and Canada, which provided 6 percent. A small portion of Ecuador's paper imports were containerized, and the Canal-relevant portion is discussed in section 4.4.6.

4.4.6 Containerized Import Commodities

Containerized commodities imported by Ecuador totaled 3.8 million tons in 2003. Of this, 20 percent transited the Canal. These imports include a diverse range of commodities, with the two largest categories of Canal-relevant imports by value made up of plastics and paper (Exhibit 4-14).

The containerized import commodities described in this section only include data for imports from the United States that passed through the Panama Canal.

Exhibit 4-14
Ecuador Containerized Imports Transiting the Canal: 2003
(million tons)
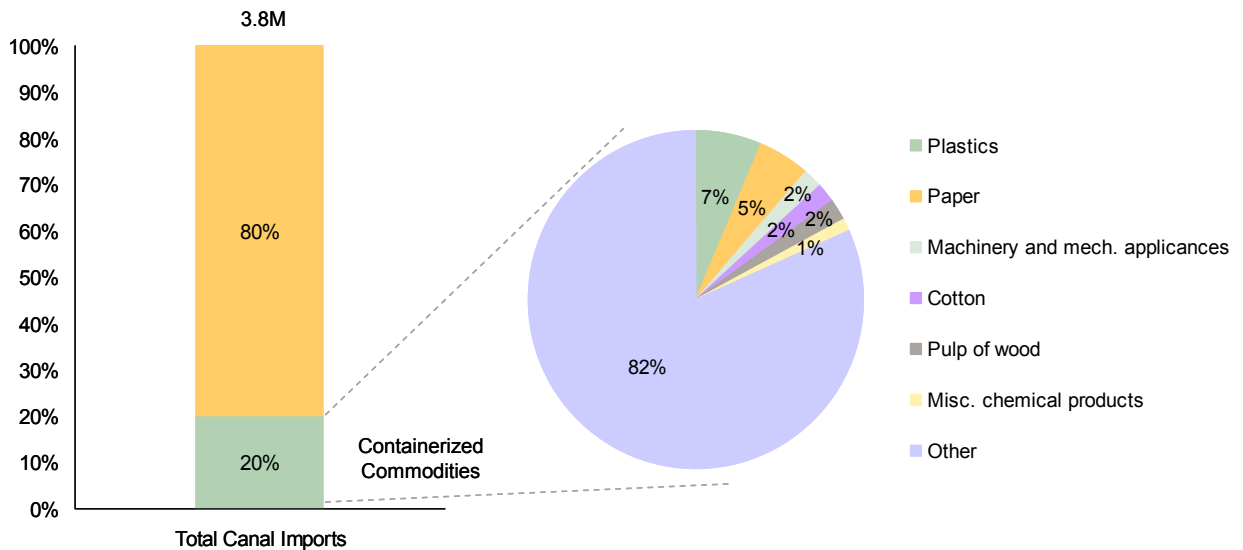
Source: ACP, US Waterborne Commerce 2003 data, Mercer analysis.
Note: The commodities shown in the pie chart only include containerized imports originating from the East Coast of the United States.

Plastics

In 2003, Ecuador imported US$28 million worth of plastics. The principal Canal-relevant containerized import commodities within this category include miscellaneous polyethylene, which represented 39 percent of the value of these commodity imports, cellulose (5 percent), and kitchen tableware (8 percent).

Between 1999 and 2003, on average, Ecuador imported 50,300 tons of plastics through the Panama Canal per year. This accounted for 7 percent of Ecuador's total Canal-relevant container imports and 1.3 percent of its total imports by weight.

Paper and Paperboard

As described in section 4.4.5, Ecuador imported $27 million worth of paper products in 2003. Between 1999 and 2003, on average, Ecuador imported 37,000 tons of containerized paper products via the Panama Canal per year. This accounted for 4.8 percent of Ecuador's total Canal-relevant container imports and 1.0 percent of its total imports by weight.

Machinery and Mechanical Appliances

This category is mainly composed of machinery, such as industrial machinery, but also includes items such as personal and large-scale computers, peripheral devices, data storage systems, networking equipment, point-of-sale (POS) devices, automated teller machines (ATMs), and other computer-based systems.

In 2003, Ecuador imported US$39 million worth of machinery and mechanical equipment. Ecuador's principal Canal-relevant containerized import commodities within this category include parts for pumps and vacuums, which represented 17 percent of the value of these commodity imports, personal weighing machines (4 percent), washing machines (11 percent), and machinery and parts for processing rubber (4 percent).

On average between 1999 and 2003, 16,000 tons of machinery and mechanical appliances imported by Ecuador transited the Panama Canal. This accounted for 2.1 percent of Ecuador's total Canal-relevant container imports and 0.4 percent of total imports by weight.

Cotton

In 2003, Ecuador imported US$17 million worth of cotton. The principal Canal-relevant containerized import commodities within this category include raw cotton, which represented 90 percent of the value of these commodity imports, and cotton yarn (4 percent).

Between 1999 and 2003, on average, Ecuador imported 14,600 tons of cotton through the Panama Canal per year. This accounted for 1.9 percent of Ecuador's total Canal-relevant container imports and 0.4 percent of its total imports by weight.

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Canal-Relevant Commodities Analysis

5.1 Methodology for Export Commodities Analysis

This section provides the results of an analysis of the Ecuadorian Canal-relevant commodities discussed in section 4. These commodities were analyzed with the objective of determining the potential impact of an increase in the Canal toll on landed cost, and therefore the relevance of a toll increase to Ecuador's trade and economy.
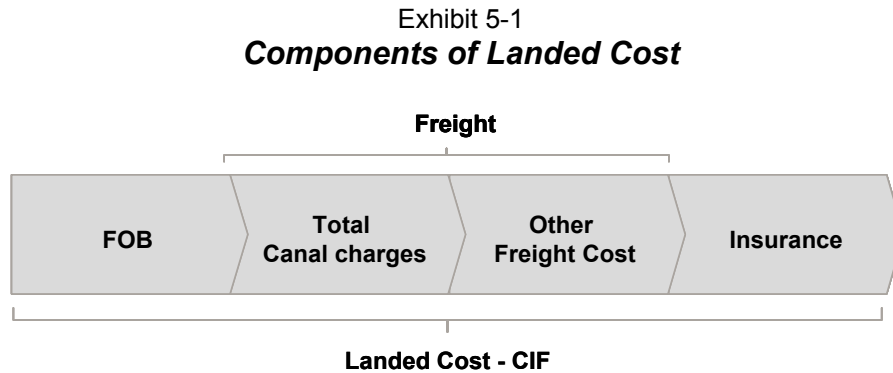
The methodology for analysis was threefold:

1. The relevance of Panama Canal tonnage transits for 1999-2003 to the overall trade in the commodity for Ecuador was determined. Where possible, commodities were matched to the ACP's description of each category and HS 4-digits or HS2-digits.

2. If the commodity tonnage transits through the Canal were above a certain threshold (percent of country trade) then the commodity was analyzed further to determine the relevance of a potential increase in Canal toll on landed cost.

3. A sensitivity analysis was then applied to determine a range of impact on landed cost given different toll increase scenarios.

In most cases, the first step involved two analyses to determine the significance of a particular commodity's Panama Canal transits with respect to Ecuador trade:

- Total value of the exports of a specific commodity compared to Ecuador's total exports

- Total value of the specific commodity transiting the Canal compared to the value of Ecuador's total exports of that commodity

ACP transit data was used to determine Panama Canal transits for each commodity.

If the commodity tonnage transits through the Canal were above a certain threshold (percent of country trade or exports through the Canal), the next step involved first determining what percentage of total landed cost is represented by the Panama Canal transit cost (toll plus other marine services). For the purposes of this analysis, landed cost was unbundled as shown in Exhibit 5-1.

Exhibit 5-1
Components of Landed Cost

Freight

| FOB | Total Canal charges | Other Freight Cost | Insurance |

Landed Cost - CIF

To determine total landed cost (CIF) for each exported commodity, the FOB, tonnage, and freight and insurance charges were obtained from several sources, depending on the type of commodity (bulk or containerized commodities). All costs are average values of all sea trade exports.

- Bulk commodities:

  – Mercer used the UN Comtrade database to estimate FOB, insurance, freight and CIF based on 2003 data.

  – ACP transit data was used to determine Panama Canal transits for each commodity. The average total Canal charges per ton for each commodity were calculated using ACP data from ships laden with that commodity.

  – A total CIF per ton was calculated, and compared to the total Canal charges (toll plus other marine services) per ton for that commodity to determine the percentage share accounted for by the Canal cost out of the total landed cost, i.e.:

    Total Canal Charges / (FOB+Canal Charges+Freight+Insurance) = Total Canal Charges as % of CIF

- Containerized commodities:

  – Mercer used a benchmark value obtained from use of the US Waterborne Commerce 2003 database for US imports from Ecuador to estimate the FOB, freight and insurance, and CIF values.

– The commodities to be analyzed were obtained using 2003 US Waterborne Commerce data. Those commodities accounting for around 70 percent of containerized cargo to an HS2 level were selected.

– With the objectives of expressing containerized cargo FOB price, freight, insurance, and other costs per TEU, Mercer converted tons to TEUs for each commodity, using a ration supplied by JOC-PIERS.

– Total Canal charges (Canal toll and cost of other marine services) were obtained directly from ACP.

– A total CIF per TEU was calculated, and compared to the total Canal charges per TEU for that commodity to determine the percentage share accounted for by the Canal cost out of the total landed cost, i.e.:

> *Total Canal Charges / (FOB+Canal Charges+Freight+Insurance) = Total Canal Charges as % of CIF*

More specifically for bananas, the FOB, total Canal charges and other freight costs were calculated per box, which is the common measure for bananas. The ratio of boxes per ton was obtained from Sopisco and the ratio of boxes per TEU was obtained from ACP.

When a commodity is analyzed as bulk and this commodity is also exported in containers, the analysis for the containerized portion is carried out separately but included in the same section with the analysis of the bulk portion of that commodity.

A sensitivity analysis was then applied to determine a range of impacts on landed cost given different toll increase scenarios (50,100,150,200 percent).

This methodology may have been slightly modified depending on the particular commodity analyzed (and if so, that information is noted below).
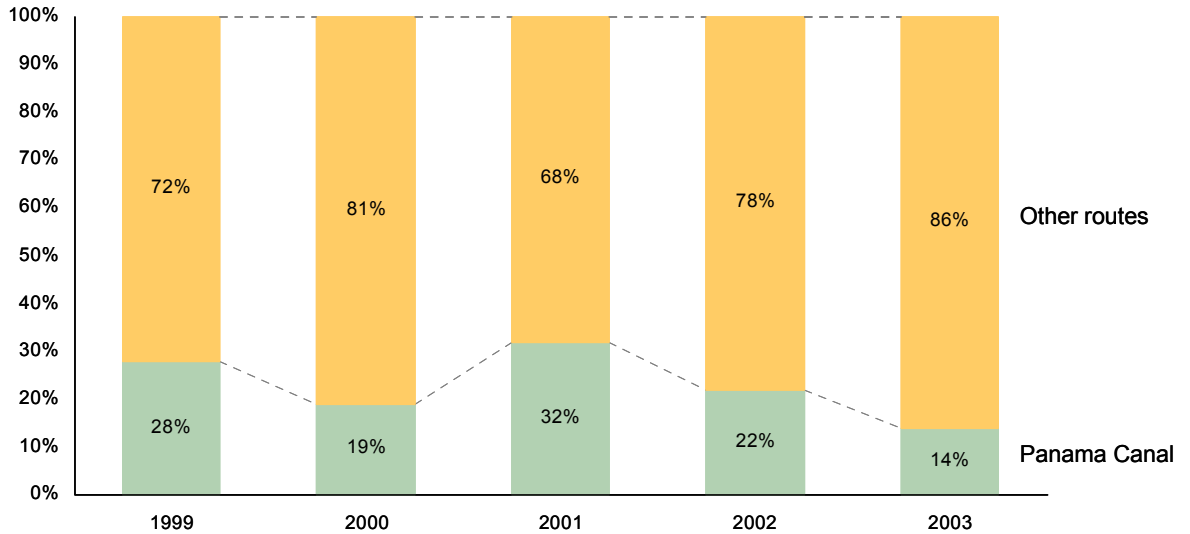
5.2 Crude Oil

5.2.1 Overview

Crude oil exports from Ecuador have grown by an average of 2 percent per year over the last five years. However, based on ACP data, Ecuador's crude oil exports transiting the Canal decreased over this period by around 13 percent annually. Therefore, in 2003, crude oil transiting the Canal only represented 14 percent of Ecuador's total crude oil exports in cargo tons (Exhibit 5-2).

Ecuadorian crude oil exports in 2003 represented 39 percent of total Ecuadorian exports (Exhibit 5-3). Of this, 14 percent by value transited the Panama Canal, equivalent to 5.5 percent of total Ecuadorian exports.

Exhibit 5-2
Ecuadorian Crude Oil Exports: 1999-2003
(percentage based on weight)

Source: Mercer analysis, UN COMTRADE, ACP database.

Exhibit 5-3
Canal Transit Share of Ecuador's Crude Oil Exports: 2003
(US$ billions, current prices)
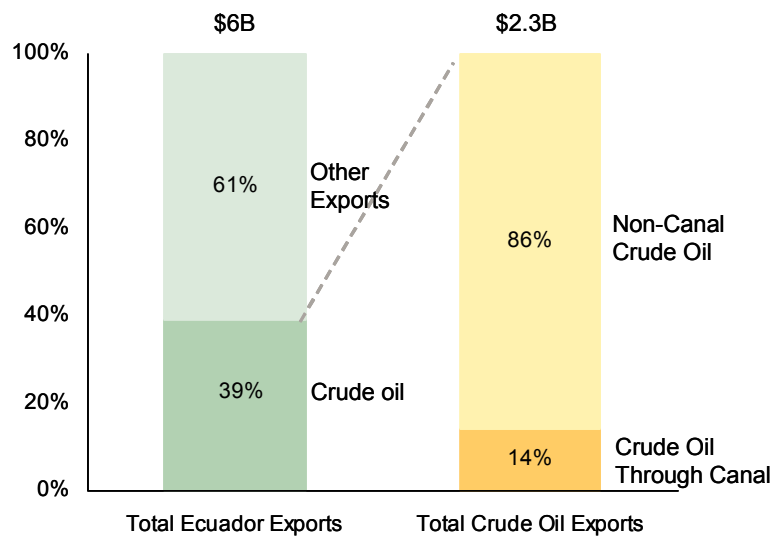
Source: UN COMTRADE, ACP database.

5.2.2 Panama Canal Cost Share of Landed Cost

Exhibit 5-4 shows the cost components of the calculated CIF for Ecuador's crude oil exports. Using the methodology described in section 5.1, the analysis found that total Canal charges represent 1.1 percent of the total landed cost for Ecuador's crude oil exports.

Exhibit 5-4
Canal Cost Share of Landed Cost of Ecuador's Crude Oil Exports: 2003
(2003 values in US$/ton)

	FOB	Charges (Freight & Insurance)	Canal Cost (Toll + OMS)	Total CIF	Canal Cost as % of CIF
Crude oil	$185	$12	$2.10	$199	1.10%

Source: UN COMTRADE, US Waterborne Commerce 2003 database, ACP database.

Based on this analysis, it can be expected that an increase in the toll for ships transporting crude oil through the Canal would not have a significant impact on the commodity's total landed cost.

Additionally, a sensitivity analysis determined that the maximum Canal toll increase would raise its CIF by 1.8 percent (Exhibit 5-5).

Exhibit 5-5
Crude Oil Sensitivity Analysis: CIF Increase vs. Toll Increase

Toll Increase	50%	100%	150%	200%
CIF Increase	0.40%	0.90%	1.30%	1.80%

Source: UN COMTRADE, US Waterborne Commerce 2003 database, ACP database.

5.2.3 Analysis of Commodity Relevance

Ecuador's crude oil exports transiting the Canal represent 5.5 percent of Ecuador's total exports, and are therefore moderately significant to Ecuador's total exports and to its economy.

Ecuador exports around 86 percent of its crude oil to countries located in Asia and on the Pacific side of North America and Latin America, and these are expected to be growth trades for Ecuador going forward.

To export crude oil to the East Coast US (which accounts for 60 percent of Ecuador's crude oil exports through the Canal,) Ecuador has several transportation alternatives: shipping through the Panama Canal, shipping through the Magellan Straight, or

transporting crude oil through the Trans-Panama Pipeline. The Trans-Panama Pipeline (PTP) was completed in 1979 and operated for approximately 16 years to transport surplus Alaskan North Slope crude oil to US refiners in the Atlantic Basin. The PTP runs from the port of Charco Azul on the Pacific Coast (near Puerto Armuelles, southwest of David) to the port of Chiriqui Grande, Bocas del Toro on the Caribbean. In 2003, the pipeline was re-opened, allowing Ecuador to export crude oil to US Gulf refiners.

According to analyses developed in the ACP's 2004 Panama Canal Demand Forecast, the cost to move crude via the PTP is estimated to be slightly lower than shipping through the Canal at present toll levels. Therefore, the increase in the Canal toll would not affect Ecuador's crude oil exports overall, but would likely change the transportation mode from waterborne to pipeline. Therefore, the impact of a Canal toll increase would not have a significant effect on Ecuador's trade or economy.

5.3 Bananas

5.3.1 Overview

Historically, Ecuador's banana exports have grown by an average of 4 percent annually over the last five years, while its exports of bananas transiting the Canal have increased by around 8 percent annually. In 2003, Ecuador's Canal-relevant banana exports represented 73 percent of Ecuador's total banana exports in metric cargo tons (Exhibit 5-6).

Banana exports represent 18 percent of the value of Ecuador's total exports (Exhibit 5-7).Of this, 72 percent of banana exports in value terms pass through the Panama Canal. Ecuador's banana exports transiting the Canal thus represent 13 percent of Ecuador's total exports in value terms.

Additionally, in 2003, exports of banana by reefer transport represented 91 percent of Ecuador's total banana exports transiting the Canal, of which 90 percent were destined for Europe.

Exhibit 5-6
Ecuador's Banana Exports: 1999-2003
(percentage based on weight)
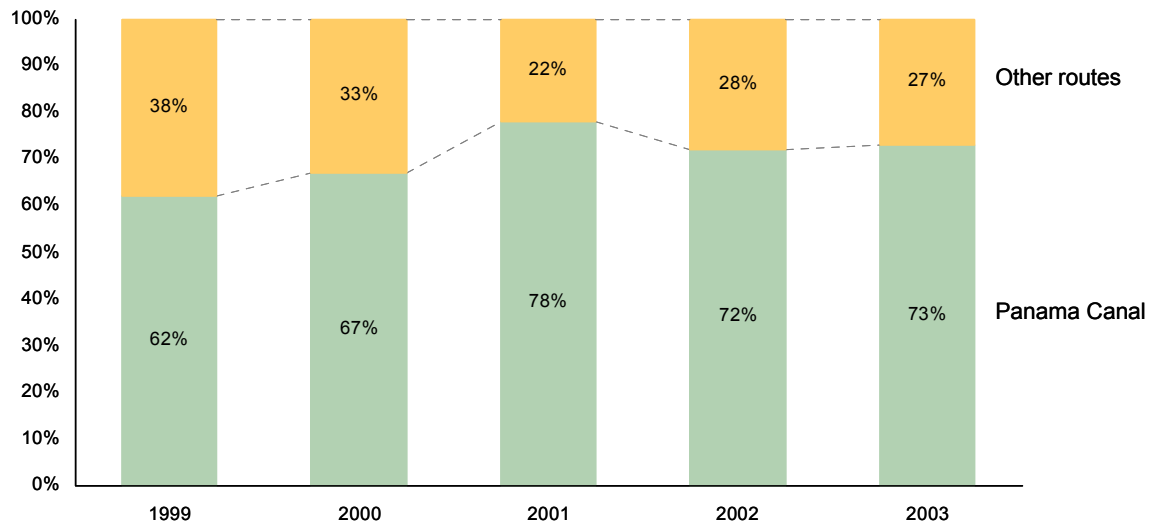
Source: Mercer analysis, UN COMTRADE, ACP database.

Exhibit 5-7
Canal Transit Share of Ecuador's Total Banana Exports: 2003
(US$ billions, current prices)
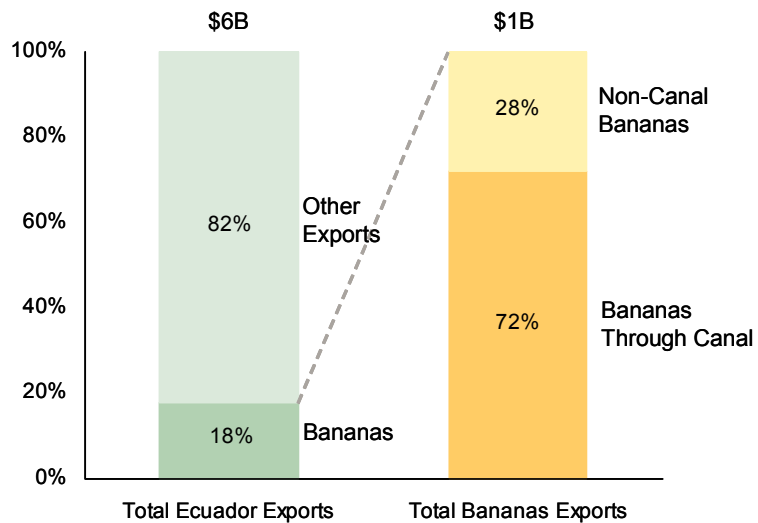
Source: UN COMTRADE, ACP database.

5.3.2 Panama Canal Cost Share of Landed Cost

Exhibits 5-8 and 5-9 show the cost components of the calculated CIF for Ecuador's banana exports. Using the methodology described in section 5.1, the analysis found that

total Canal charges represent 1.6 percent of the total landed cost for reefer transport of bananas and 1.3 percent of the CIF for containerized transport of bananas.

Exhibit 5-8
Canal Cost Share of Landed Cost: Banana Reefer Cargo Exports
(2003 values in US$/box)

	FOB	Charges (Freight & Insurance)	Canal Cost (Toll + OMS)	Total CIF	Canal Cost as % of CIF
Reefer Bananas	$4.39	$3.51	$0.13	$8.03	1.60%

Source: UN COMTRADE, Sopisco, ACP database.

Exhibit 5-9
Canal Cost Share of Landed Cost: Banana Containerized Cargo Exports
(2003 values in US$/box)

	FOB	Charges (Freight & Insurance)	Canal Cost (Toll + OMS)	Total CIF	Canal Cost as % of CIF
Containerized Bananas	$5.29	$0.97	$0.08	$6.34	1.30%

Source: US Waterborne Commerce 2003 database, ACP database.

Based on this analysis, it can be expected that an increase in the toll for ships transporting bananas through the Canal would have a minimal impact on the commodity's total landed cost.

Additionally, a sensitivity analysis determined that the maximum Canal toll analyzed of 200 percent would raise CIF for reefer cargo bananas by 2.6 percent (Exhibit 5-10) and for containerized bananas by 1.9 percent (Exhibit 5-11).

Exhibit 5-10
Bananas Reefer Cargo Sensitivity Analysis:
CIF Increase vs. Toll Increase

Toll Increase	50%	100%	150%	200%
CIF Increase	0.70%	1.30%	2.00%	2.60%

Source: UN COMTRADE, Sopisco, ACP database.

Exhibit 5-11
Banana Containerized Cargo Sensitivity Analysis:
CIF Increase vs. Toll Increase

Toll Increase	50%	100%	150%	200%
CIF Increase	0.5%	0.9%	1.4%	1.9%

Source: US Waterborne Commerce 2003 database, ACP database.

Canal Cost Relative to Ocean Rate for Bananas

Canal charges are just one component of the ocean rate for movement of bananas. The ocean rate for Ecuador's reefer cargo banana exports represents 12 percent of landed cost.[20] The ocean rate is composed of the time charter, fuel cost, Canal charges, and port cost. For Ecuador's reefer cargo banana exports, total Canal charges represent around 13 percent of its ocean rate.

Exhibit 5-12 shows that the time charter increased by 197 percent in total between 2001 and 2005 year to date, which, holding all other variables constant, would have increased the ocean rate by 65 percent. Several analyses determined that the Canal toll impact on the ocean rate would be approximately 27 percent for a 200 percent toll increase, which is minimal compared to the impact of the time charter historic increase on ocean freight (of 197 percent).

Assuming that every other variable is held constant, the impact of the 197 percent increase of the time charter has been to raise the CIF price by 7 percent since 2001, in comparison with the estimated impact of 2.6 percent on the CIF for a 200 percent increase in the Canal toll.

Additionally, despite the significant increase in the banana export ocean rate, Ecuador's exports to Europe still increased by 61 percent between 2001 and 2003 (Exhibit 5-13).

Furthermore, the ocean rate paid for Ecuador's bananas increased by 12 percent between 2001 and 2003,[21] based on end of December data for each year. Nevertheless, it is important to understand the nature of the time charter market means that there is considerable fluctuation in its daily rates (Exhibit 5-14). Despite these high fluctuations, Ecuador's banana exports increased significantly overall, at a compound annual growth rate of 27 percent from 2001 to 2003.

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[20] Mercer analysis, Clarkson, Reefer Trends, Lauritzen Cool, Global Insight.
[21] Mercer analysis, Clarkson, Reefer Trends, Lauritzen Cool, Global Insight.
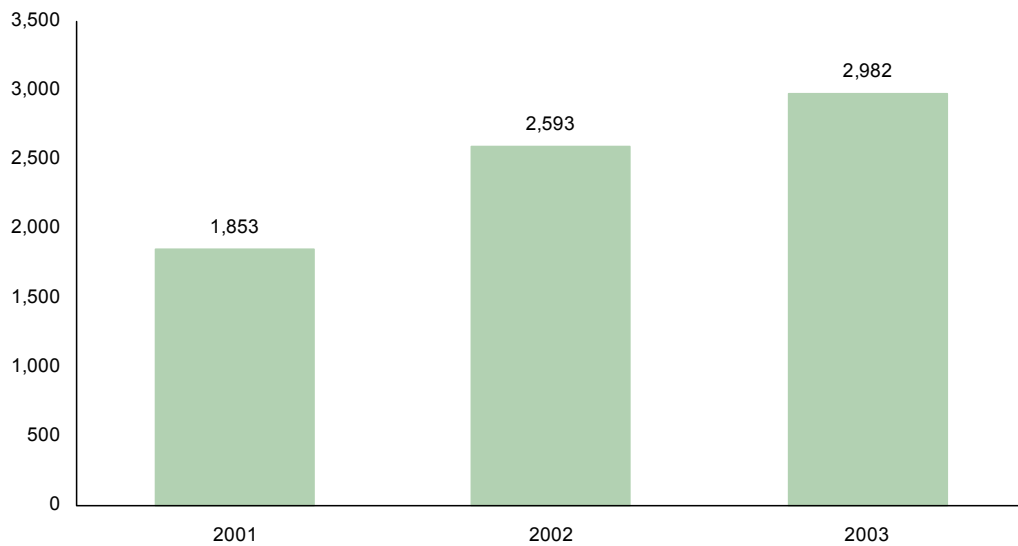
Exhibit 5-12
Banana Ocean Freight Cost: Ecuador to Europe: 2001-2005 year to date
(US$ thousands, current prices)
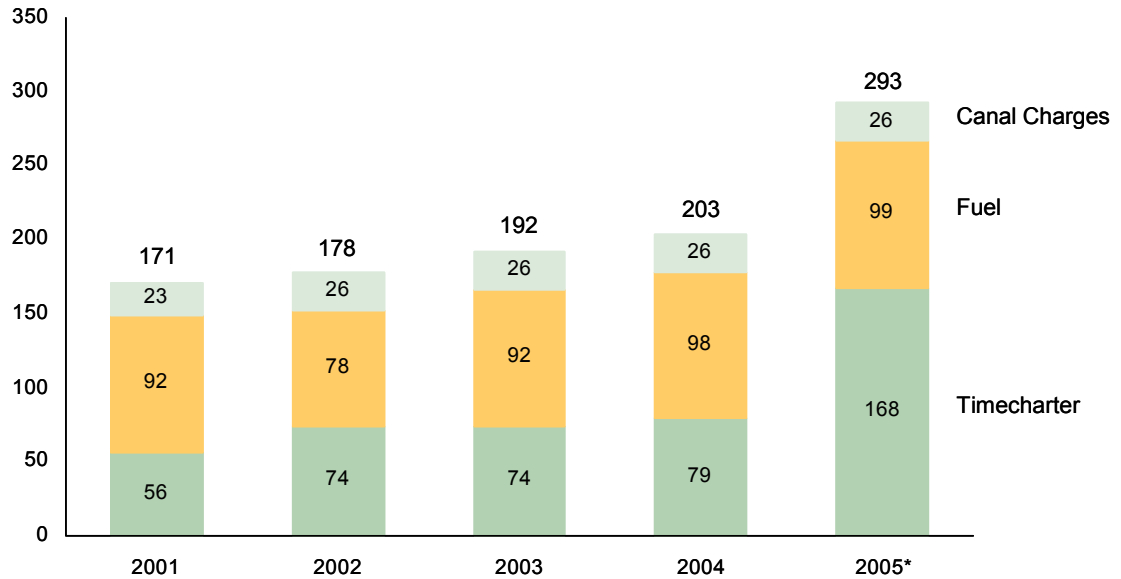
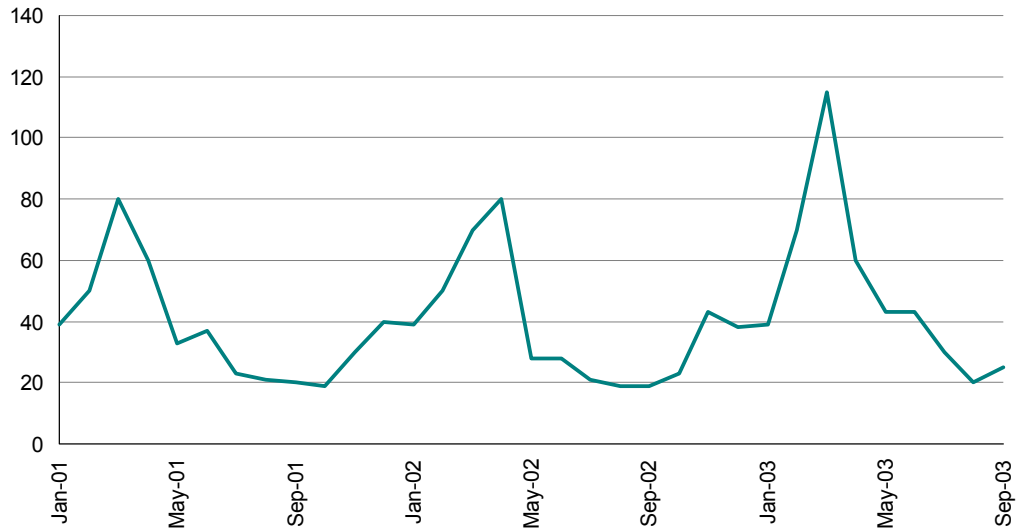Source: Mercer analysis, Clarkson, Reefer Trends, Lauritzen Cool, Global Insight.

Exhibit 5-13
Ecuador's Banana Exports to Europe: 2001-2003
(thousand of metric tons)

Source: UN COMTRADE.

Exhibit 5-14
*** Reefer Time Charter Prices: 2001-2003***

Source: Clarkson.

Canal Cost Relative to Pending EU Tariff Increase

The European Union accounts for 65 percent of Europe's total banana imports from Ecuador. Recently, the European Commission notified the WTO of its intentions to raise the duty cost under the EU's import regime for bananas from most favored nation (MFN) suppliers, which are composed mostly of Latin America countries. The European Commission will replace the current quota & tariff system by a tariff regime only, which will eliminate import quantity restrictions for Latin America countries. However, the new tariff proposed is €230 per ton (US$ 303), up from the current tariff of €75 per ton (US$ 99) starting January 2006. This represents an increase of 206 percent. Assuming that there are no additional costs, such as inland transportation, warehousing, etc. within the importing country, the wholesale price for bananas will increase from US$ 9.91 to US$13.79 per box, which is equivalent of an increase of 39 percent in the wholesale price.[22] This impact on the wholesale price of the tariff change will be much higher than the impact of even a 200 percent toll increase, which would cause the current wholesale price to rise by only 2.2 percent.

5.3.3 Analysis of Commodity Relevance

Ecuador's banana exports transiting the Canal represent 13 percent of Ecuador's total exports in value terms, and are therefore moderately significant to Ecuador's total exports and to its economy.

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[22] Wholesale price = CIF price + EU tariff.

A maximum Canal toll increase of 200 percent would have an impact of only 2.6 percent on the banana CIF price. As illustrated by the analyses described above, a number of other factors impact the cost of bananas far more than the Canal toll. For example, the increase in reefer time charter rates of 197 percent since 2001 has had an impact of 7 percent on the CIF price (holding all other variables constant), and yet banana exports have continued to increase by double-digit rates. Additionally, pending increases in the tariff for bananas imported into Europe will be far larger as a percentage of the wholesale price for bananas. Therefore, the impact of a Canal toll increase is not expected to have a significant effect on Ecuador's trade and economy.

5.4 Wood & Articles

5.4.1 Overview

Ecuador's total wood exports have been decreasing by an average of 3 percent annually over the last five years, while wood exports transiting the Canal have been increasing by around 6 percent per year. As a result, the Canal's share of Ecuador's wood exports by metric cargo tons increased to 19 percent in 2003 (Exhibit 5-15).

Wood & wood articles are exported as containerized cargo, and represent 1 percent of the value of Ecuador's total exports (Exhibit 5-16). In 2003, about 46 percent of Ecuador's wood exports in value terms passed through the Canal, representing therefore .05 percent of Ecuador's total exports.

Exhibit 5-15
Ecuador's Wood Exports: 1999-2003
(percentage based on weight)
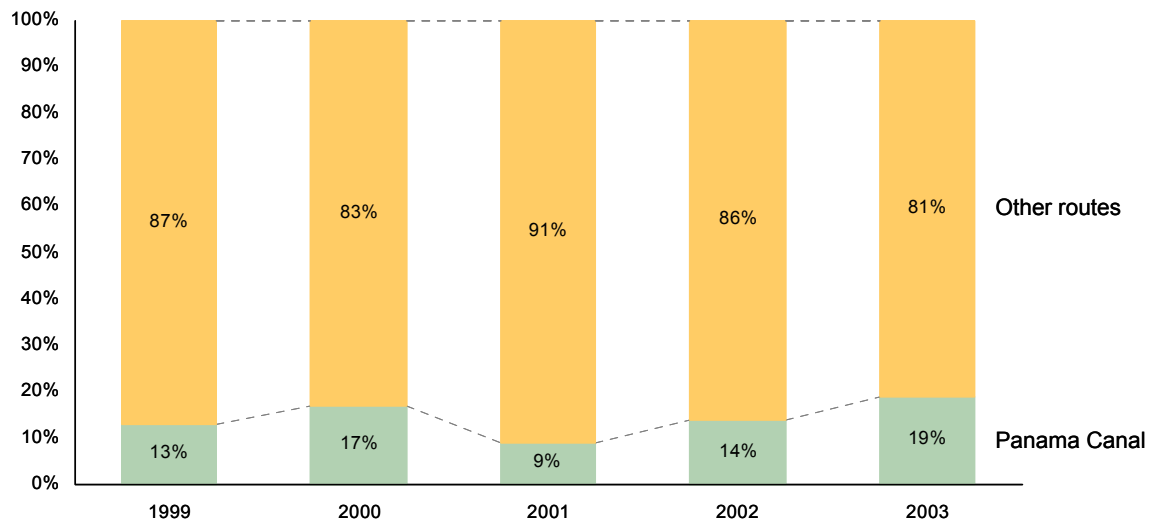
Source: Mercer analysis, US Waterborne Commerce 2003, 2001 & 2000 and ACP databases,

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Exhibit 5-16
Canal Transit Share of Ecuador's Total Wood Exports: 2003
(US$ billions, current prices)

Source: US Waterborne Commerce 2003 and ACP databases.

5.4.2 Panama Canal Cost Share of Landed Cost

Exhibit 5-17 shows the cost components of the calculated CIF for Ecuadorian exports of wood & wood articles. Using the methodology described in section 5.1, the analysis found that total Canal charges represents 0.5 percent of the total landed cost for Ecuadorian export of wood & wood articles.

Exhibit 5-17
Canal Cost Share of Landed Cost of Ecuador's Wood Exports: 2003
(2003 values in US$/TEU)

	FOB	Charges (Freight & Insurance)	Canal Cost (Toll + OMS)	Total CIF	Canal Cost as % of CIF
Wood	$7,100	$393	$40.61	$7,534	0.50%

Source: US Waterborne Commerce 2003 and ACP databases.

Based on this analysis, it can be expected that an increase in the toll for ships transporting wood & wood articles through the Canal would not have a significant impact on the commodity's total landed cost.

A sensitivity analysis further showed that wood would not be affected by Panama Canal toll changes. A maximum Canal toll increase of 200 percent would increase the CIF for

wood by only 0.8 percent, as wood is a relatively high value commodity at US$7,100 per TEU in 2003 (Exhibit 5-18).

Exhibit 5-18
Wood Sensitivity Analysis: CIF Increase vs. Toll Increase

Toll Increase	50%	100%	150%	200%
CIF Increase	0.2%	0.4%	0.6%	0.8%

Source: US Waterborne Commerce 2003 database, ACP database.

5.4.3 Analysis of Commodity Relevance

Wood exports transiting the Canal make up a very small portion of Ecuador's total exports – only 0.5 percent. A maximum impact of 0.8 percent on the CIF price of these wood exports therefore would not significantly affect Ecuador's trade or economy.
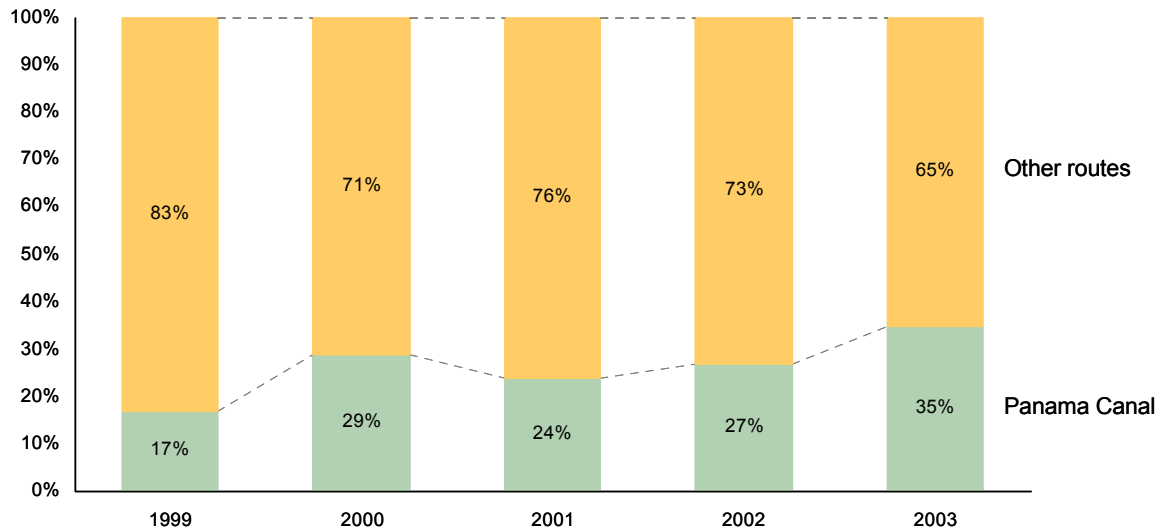
5.5 Seafood

5.5.1 Overview

Ecuador's seafood total exports have been decreasing by an average of 11 percent annually over the last five years, while exports of seafood transiting the Canal have increased during the same period by around 6 percent annually. As a result, the Canal share of Ecuador's seafood exports increased to 35 percent in 2003 (Exhibit 5-19).

Seafood is a commodity exported as containerized cargo, representing 6 percent of Ecuador's total exports by value (Exhibit 5-20). In 2003, about 45 percent of the value of Ecuador's seafood exports passed through the Canal, thereby representing 2.7 percent of total exports.

Exhibit 5-19
Ecuador's Seafood Exports: 1999-2003
(percentage based on weight)

Source: Mercer analysis, UN COMTRADE, ACP database.

Exhibit 5-20
Canal Transit Share of Ecuador's Seafood Total Exports: 2003
(US$ billions, current prices)
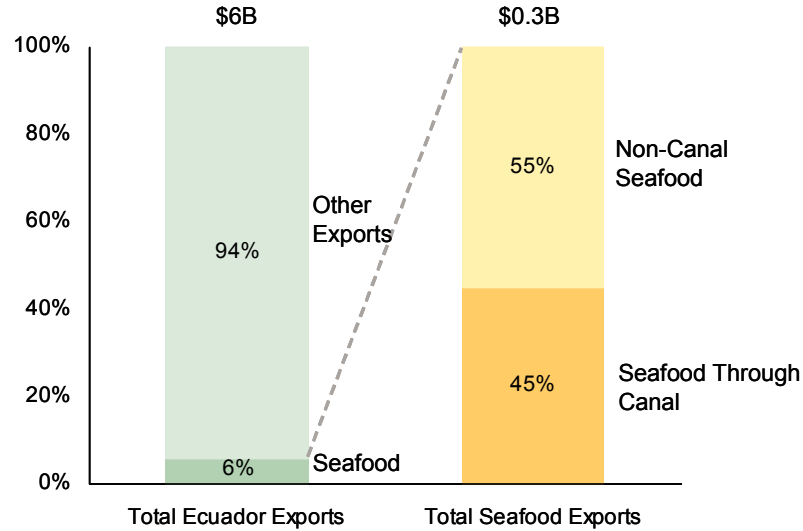
Source: US Waterborne Commerce 2003 and ACP databases.

5.5.2 Panama Canal Cost Share of Landed Cost

Exhibit 5-21 shows the cost components of the calculated CIF for Ecuador's exports of seafood. Using the methodology described in section 5.1, the analysis found that total

Canal charges represent only 0.06 percent of the total landed cost for Ecuador's exports of this commodity.

Exhibit 5-21
Canal Cost Share of Landed Cost of Seafood Exports: 2003
(2003 values in $US/TEU)

	FOB	Charges (Freight & Insurance)	Canal Cost (Toll + OMS)	Total CIF	Canal Cost as % of CIF
Seafood	$62,182	$2,510	$40.61	$64,732	0.06%

Source: US Waterborne Commerce 2003 and ACP databases.

Based on this analysis, it can be expected that an increase in the toll for ships transporting seafood through the Canal would have an insignificant impact on the commodity's total landed cost.

A sensitivity analysis further showed that seafood exports would not be affected by Panama Canal toll changes. Seafood is a high-value commodity at US$64,732 per TEU in 2003. Therefore, an increase in the Canal toll of even 200 percent would only increase the commodity's CIF by 0.09 percent (Exhibit 5-22).

Exhibit 5-22
Seafood Sensitivity Analysis: CIF Increase vs. Toll Increase

Toll Increase	50%	100%	150%	200%
CIF Increase	0.02%	0.05%	0.07%	0.09%

Mercer analysis.

5.5.3 Analysis of Commodity Relevance

Seafood exports transiting the Canal represent only 2.7 percent of Ecuador's total exports. Furthermore, increasing the Canal toll by even 200 percent would have an extremely small impact on the landed cost for this high-value commodity, of only 0.09 percent. An increase in the Canal toll is therefore not expected to significantly affect Ecuador's trade or economy.

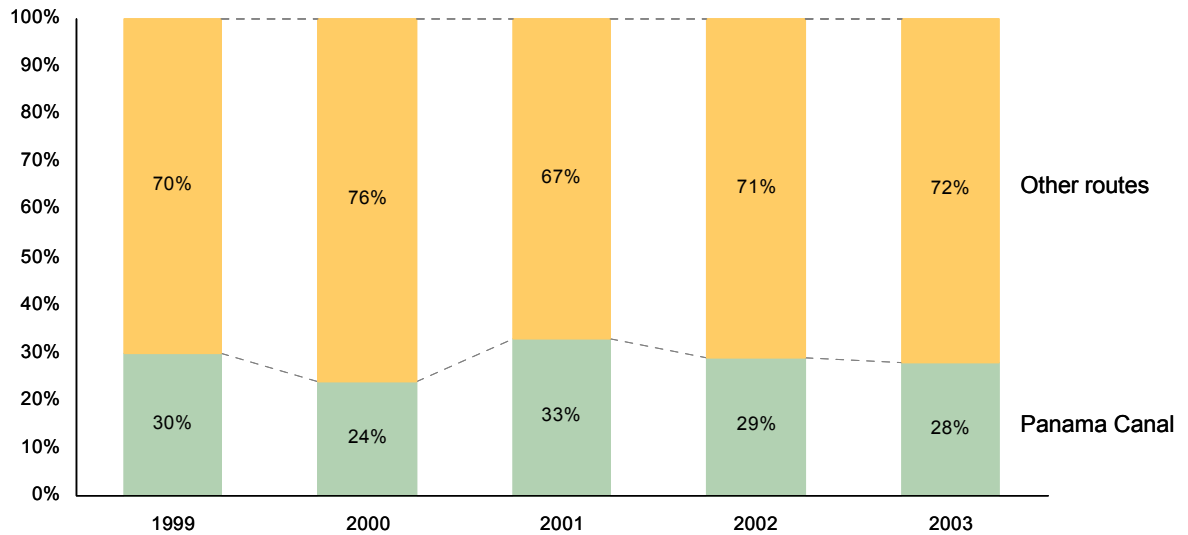## 5.6 Prepared Vegetables, Fruits, & Nuts

5.6.1 Overview

Ecuador's total prepared vegetables, fruits, & nuts exports have been increasing by an average of 7 percent annually over the last five years, while its exports of this commodity group transiting the Canal grew by only 5 percent per year on average over the same

period. Thus the Canal share of Ecuador's prepared vegetables, fruits, & nuts exports in metric cargo tons decreased to 28 percent in 2003 (Exhibit 5-23).

Prepared vegetables, fruits, & nuts are exported as containerized cargo, and represent 2 percent Ecuador's total export value (Exhibit 5-24). In 2003, about 20 percent of the value of Ecuador's prepared vegetables, fruits, & nuts exports passed through the Canal, thereby representing 0.4 percent of Ecuador's total exports.

Exhibit 5-23
Ecuador's Prepared Vegetables, Fruits, & Nuts Exports: 1999-2003
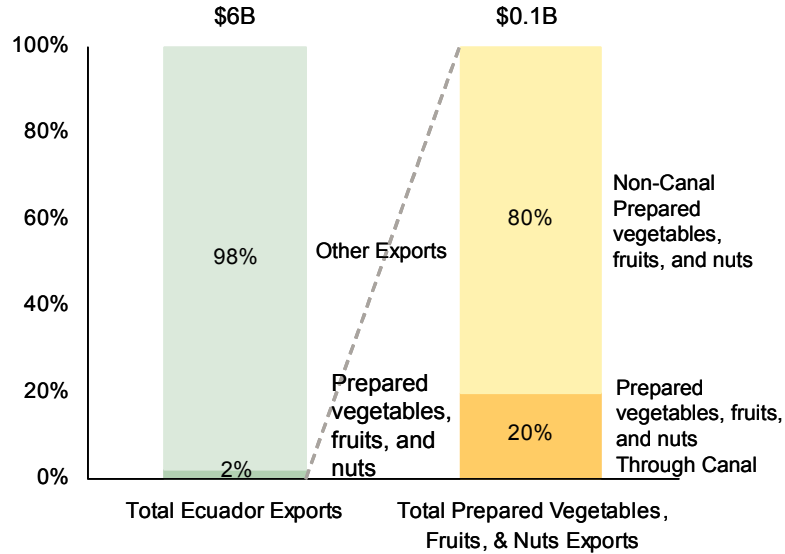(percentage based on weight)

Source: Mercer analysis, UN COMTRADE, ACP database.

Exhibit 5-24
Canal Transit Share of Ecuador's Total Prepared Vegetables, Fruits, & Nuts Exports: 2003
(US$ billions, current prices)

Source: US Waterborne Commerce 2003 and ACP databases.

5.6.2 Panama Canal Cost Share of Landed Cost

Exhibit 5-25 shows the cost components of the calculated CIF for Ecuador's exports of prepared vegetables, fruits, & nuts. Using the methodology described in section 5.1, the analysis found that total Canal charges represent only 0.4 percent of the total landed cost for Ecuador's exports of this commodity.

Exhibit 5-25
Landed Cost of Ecuador's Prepared Vegetables, Fruits, & Nuts Exports
(2003 values in US$/TEU)

	FOB	Charges (Freight & Insurance)	Canal Cost (Toll + OMS)	Total CIF	Canal Cost as % of CIF
Prepared Vegetables, Fruits, & Nuts	$8,073	$1,037	$40.61	$9,151	0.40%

Source: US Waterborne Commerce 2003 and ACP databases.

Based on this analysis, it can be expected that an increase in the toll for ships transporting prepared vegetables, fruits, and nuts through the Canal would not have a significant impact on the commodity's total landed cost.

A sensitivity analysis further showed that prepared vegetables, fruits, & nuts exports would not be affected by Panama Canal toll changes. Prepared vegetables, fruits, and nuts are relatively high value commodities at US$9,151 per TEU in 2003. Therefore, even a 200 percent increase in the Canal toll would increase the CIF per TEU by only 0.7 percent (Exhibit 5-26).

Exhibit 5-26
Prepared Vegetables, Fruits, & Nuts Sensitivity Analysis: CIF Increase vs. Toll Increase

Toll Increase	50%	100%	150%	200%
CIF Increase	0.2%	0.3%	0.5%	0.7%

Source: US Waterborne Commerce and ACP data.

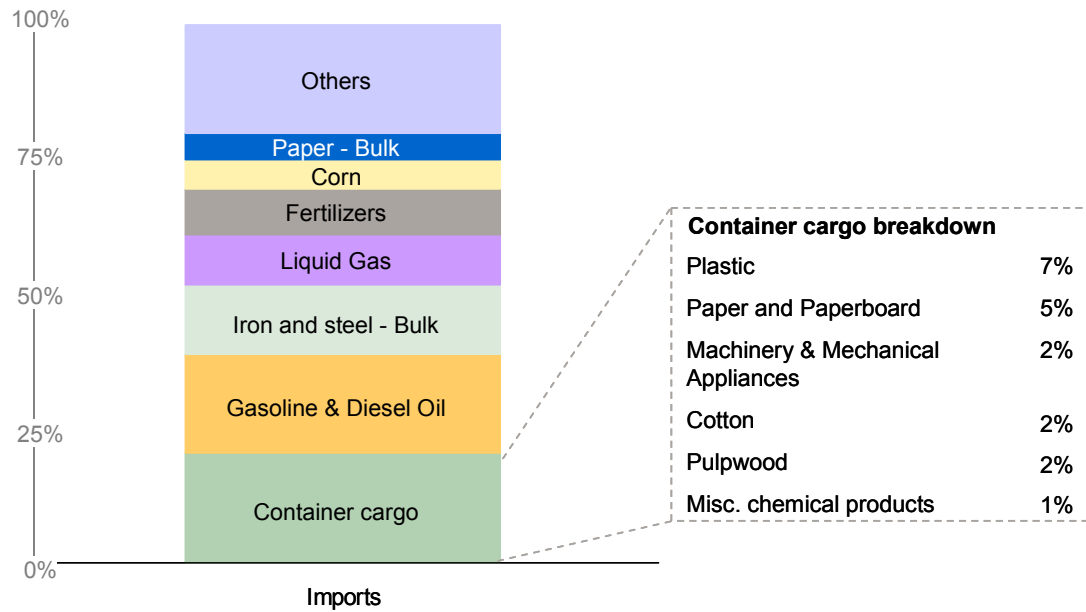## 5.6.3 Analysis of Commodity Relevance

Prepared vegetables, fruits, and nuts represent only a minimal 0.4 percent of Ecuador's total exports. A maximum impact on the CIF price of prepared vegetables, fruits, & nuts of 0.7 percent would not have a significant impact on Ecuador's trade or economy.

5.7 Analysis of Total Relevant Ecuadorian Imports

To ensure a thorough analysis of the effects of an increase in Panama Canal tolls, Ecuadorian commodity imports were analyzed in addition to exports. For the purposes of this analysis, only the most significant commodities, representing approximately 63 percent of Ecuadorian import tons passing through the Panama Canal, were analyzed.

Exhibit 5-27 shows a breakdown of commodities imported into Ecuador. The largest imports for Ecuador transiting the Canal include energy sources such as gasoline & diesel oil and liquid gas, iron & steel, fertilizers, and containerized cargo (mainly composed of plastics, paper & paperboard, and machinery & mechanical appliances).

Exhibit 5-27
1999-2003 Average Canal-Relevant Ecuadorian Total Imports
(percentage of tons)

Container cargo breakdown	
Plastic	7%
Paper and Paperboard	5%
Machinery & Mechanical Appliances	2%
Cotton	2%
Pulpwood	2%
Misc. chemical products	1%

Source: Mercer analysis, U.S. Waterborne database 2003, ACP database.

An increase in Canal tolls will increase the final landed price for imported commodities. There are various methods by which the impact of such increases on the Ecuadorian economy can be evaluated:

▪ One approach would be to examine the effect of the Panama Canal toll increases on the final consumer price for all of the relevant commodities imported. This method would evaluate the impact of a Canal toll increase relative to import tariffs, inland transportation costs, distribution and retailer mark-ups, and final state and federal taxes, and would take into account the total impact on Ecuador's CPI (Consumer Price Index) and consequently on inflation.

▪ A more technical approach would be to evaluate the impact of a Canal toll increase on Ecuador's inflation and GDP by performing an analysis to capture the relationship between major Ecuadorian macroeconomic variables.

▪ A third option would be to focus on the final landed cost of each commodity. An increase in the cost of imports from a Canal toll increase will reduce the current account (exports minus imports), which is part of national income, and as a result reduce the output (GDP) of the Ecuadorian economy, assuming that everything else is constant. Therefore, a Panama Canal toll increase would be equivalent to a transfer of income from Ecuador to Panama through a shift in the terms of trade.

After considering the above approaches within the context of the scope and goals of the present study, the ACP decided to pursue the third option, a general analysis of the impact of toll increases on the final landed cost of significant import commodities. The magnitude of the direct effect (e.g., inflation) of a given toll increase depends mainly on:

- The share of Ecuadorian national income represented by the imports that are passing through the Panama Canal

- The Ecuadorian economy's degree of dependence on these imports

- The ability of end-users to reduce their consumption and/or substitute alternative products or sources

Exhibit 5-28 shows the relative significance of international imports trade to Ecuador's economy. From 1999 to 2003, Ecuador's GDP grew by an average 13 percent per year, half as fast as merchandise imports.

Exhibit 5-28
Total Ecuador GDP and Merchandise Imports (CIF): 1999-2003
(US$ billions, current prices)
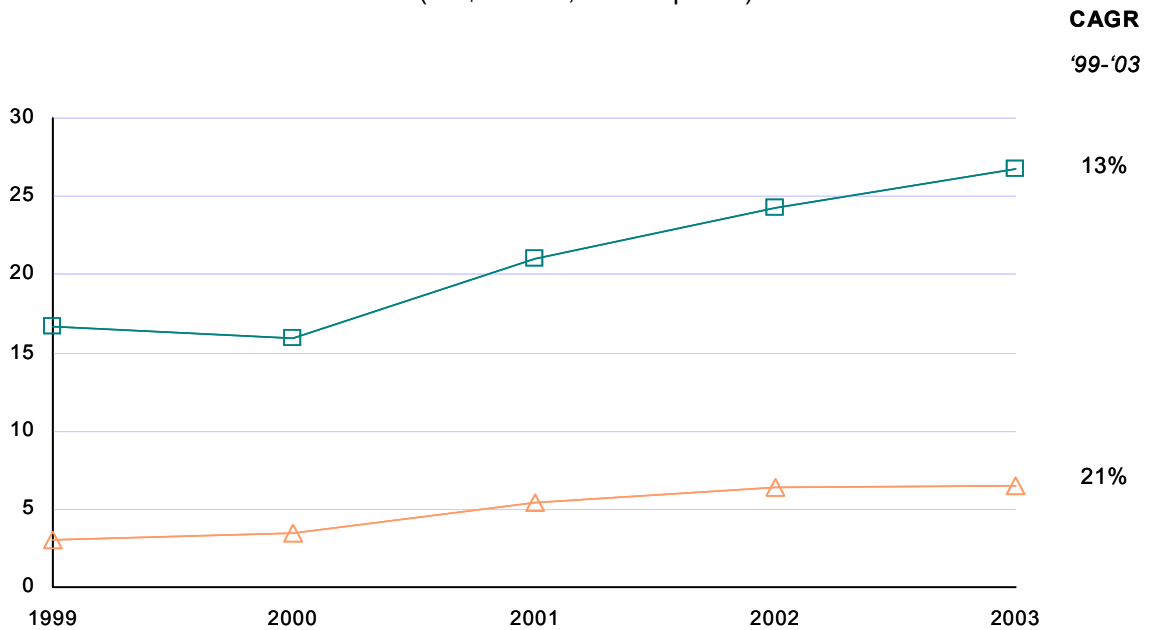
Source: International Monetary Fund World Economic Outlook Database (September 2004), UN COMTRADE.

As mentioned above, approximately 63 percent of the commodities which are imported to Ecuador, and transit the Canal, were analyzed in order to determine the share of their CIF value relative to total imports and GDP. Exhibit 5-29 illustrates the relevant values used for this analysis.

Exhibit 5-29
Canal-Relevant Ecuadorian Imports Analyzed

| Commodity	Canal Share	Canal Transit Tons 2003	Average CIF/Ton		CIF Value of Canal Transit Tons	
Gasoline & Diesel oil	18%	699,285	$	347	$	238,505,732
Iron & steel	13%	485,788	$	470	$	228,487,979
Liquefied gas	9%	344,318	$	382	$	131,624,431
Fertilizers, misc.	9%	319,992	$	188	$	60,241,412
Corn	6%	209,074	$	139	$	28,971,529
Paper and paper products	5%	180,060	$	497	$	89,482,399
Container cargo	4%	141,297	$	2,037	$	287,815,158
Other	37%	1,776,960				
Total CIF Value of Panama Canal Transit Tons					**$**	**1,065,128,642**

Source: Mercer analysis, UN COMTRADE, US Waterborne Commerce 2003.

In 2003, Ecuador's imports transiting the Panama Canal accounted for 16 percent of its total merchandise imports (valued in CIF terms). Additionally, Ecuador's imports transiting the Panama Canal represented 4 percent of Ecuador's GDP in 2003. Thus Ecuador has a low dependence on Panama Canal imports, and these imports represent a very small portion of Ecuador's GDP (Exhibit 5-30).

Exhibit 5-30
Ecuador's GDP and Canal-Relevant Merchandise Imports: 2003
(US$ billions, current prices)
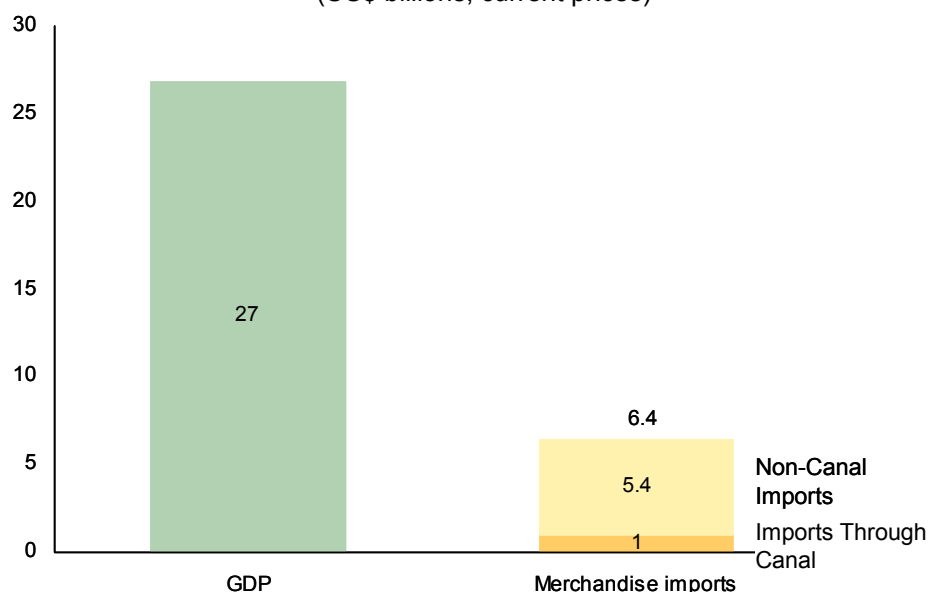
Source: International Monetary Fund World Economic Outlook Database (September 2004), UN COMTRADE, ACP database.

In 2003, Ecuador's current account deficit was US$461 million, or 1.7 percent of GDP. An increase in import prices, due to an increase in the Canal toll, will increase the deficit and reduce the national income. However, even if the Canal tolls were increased by 200 percent for all commodities that Ecuador imports through the Canal, the cost of total goods imports would grow by only 0.18 percent, the current account deficit would increase to 1.8 percent of GDP, and national income would drop by an almost imperceptible 0.04 percent. An increase in Canal tolls for imports is therefore unlikely to materially affect Ecuador's economy.

6

Assessment of the Impact of Panama Canal Transit Cost Changes

The analysis in section five determined that an increase in Panama Canal transit costs would not have a significant impact on the final landed cost of Ecuador's Canal-relevant export and import commodities. Therefore, there would be no significant impact on the Ecuadorian economy as a whole.

6.1 Impact of Transit Cost Changes for Exports

For exports, each significant Canal-relevant commodity (five commodities) was analyzed independently to determine the impact of an increase in the Panama Canal transit cost for ships carrying that commodity. The following factors were considered in order to determine how much the commodity and related industry would be affected, and how significant this impact would be on the Ecuadorian economy:

- The portion of the exported commodity that transits the Canal

- The relative importance of the commodity to total Ecuador exports

- The Canal transit cost impact on the final landed cost of the commodity (CIF)

### 6.1.1 Exported Commodities That Transit the Canal

Of the five commodities analyzed in this report, the portion of total exports that transit the Canal is different for each commodity. The most important in terms of high Canal share is bananas, of which 72 percent of total exports transit the Canal. In the case of three other

commodities, only 20-50 percent of exports transit the Panama Canal (wood & wood articles, fish & crustaceans and vegetable & fruit preparations). For crude oil, only 14 percent of exports transit the Canal.

While a significant portion of key commodity exports transit the Canal, only crude oil and bananas represent a significant portion of Ecuador's total exports (5.5 and 13 percent of Ecuador's total merchandise exports, respectively).

Exhibit 6-1 shows that the total value of export commodities analyzed in this report, representing approximately 67 percent in value of total Ecuador merchandise exports in 2003; approximately 34 percent of this value transited the Panama Canal. Overall, in 2003, the value of export commodities analyzed in this report represented 23 percent of total Ecuador merchandise exports.[23]

Exhibit 6-1
Panama Canal Transit Share of Analyzed Ecuadorian Exports
(US$ billions, current prices)
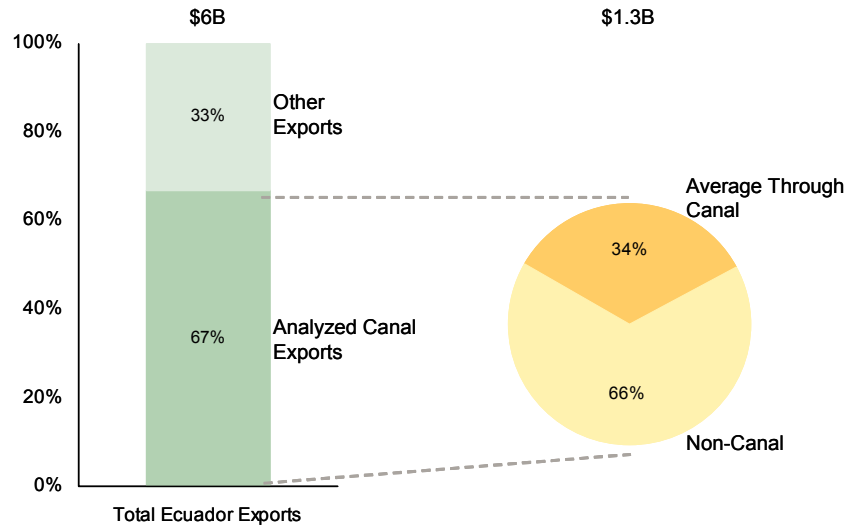
Source: International Monetary Fund World Economic Outlook Database (September 2004), UN COMTRADE, ACP database.

6.1.2 Commodity Importance Relative to Ecuador's Exports

The exports commodities analyzed were not only Canal-relevant but also relevant to Ecuador's exports mix, that is, some of the analyzed commodities represent an important portion of total Ecuadorian exports. In 2003, crude oil exports accounted for 39 percent of total Ecuadorian exports, and bananas accounted for 18 percent. The other analyzed commodities represent less than 6 percent of total exports each.

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[23] All containerized cargo includes containerized commodities that were not examined individually in this report. The value of containerized commodities was calculated using a weighted average of the FOB price of analyzed container commodities and the remaining tonnage of containerized cargo that was not analyzed.

6.1.3 Canal Transit Cost Impact on Final Landed Cost

The second phase of the analysis focused on determining the relevance of the Canal cost (Canal toll plus other marine services) to the total CIF of each commodity, and developing a sensitivity analysis for each commodity for a range of Canal toll increases, up to 200 percent (Exhibit 6-2). In general, the higher the value of a commodity's CIF, the lower the portion of the Canal cost for each commodity's CIF. This signifies that for higher-value commodities, the impact of a Canal toll increase will be lower. With the exception of bananas, the analysis determined that even a Canal toll increase of 200 percent would have an impact on the landed cost of each commodity of less than 2 percent.

However, given the importance of crude oil and bananas to the Ecuadorian economy, further analysis was carried out to understand the potential effects of an increase in Canal tolls on the demand for these commodities.

Crude Oil

Ecuador is an important Latin American producer of crude oil. The Panama Canal is a major conduit for crude oil exports to the East Coast US, which received about 60 percent of Ecuador's Canal-relevant crude oil exports in 2003. As mentioned above, crude oil exports represent 39 percent of Ecuador's total exports, and 14 percent of Ecuador's crude oil exports transit the Panama Canal. Crude oil is a medium value commodity and thus the Canal transit cost at 1.1 percent represents only a small portion of the total CIF cost. As a result, a 200 percent increase in Canal tolls would impact the CIF of crude oil by 1.8 percent.

Ecuador has three different alternatives to provide crude oil to the East Coast US: shipping through the Panama Canal, shipping through the straight of Magellan, or transporting crude oil through the Trans-Panama Pipeline. According to analyses developed in the ACP's 2004 Panama Canal Demand Forecast, the cost to move crude via the PTP is estimated to be slightly lower than present Canal toll levels. Therefore, the increase in the Canal toll would not affect Ecuador's crude oil exports but would potentially change the transportation mode from waterborne to pipeline.

Bananas

Ecuador is the world's largest exporter of bananas, and the Canal is a major conduit for exports of Ecuador's bananas to Europe. Given current market dynamics and customer preferences, bananas are transported as bulk in reefer vessels or in refrigerated containers. The Canal cost is 1.6 percent of the CIF for bulk bananas and 1.3 percent of the CIF for containerized bananas. If Canal tolls were increased by 200 percent, the bulk banana CIF would increase by 2.6 percent and containerized banana CIF by 1.9 percent.

Bulk bananas represent 91 percent of Ecuador's total banana exports transiting the Canal, and 90 percent of these were destined for Europe in 2003. An analysis of ocean freight rates determined that time charter costs had increased by 197 percent in total from 2001 to 2005 year to date. Assuming every other variable is held constant, the impact of a 197 percent increase in the time charter rate would raise the CIF price by 7 percent, which is twice the estimated 2.6 percent impact of a 200 increase in the Canal toll. And despite the significant increase in ocean freight rates for bananas, exports to Europe still increased by 61 percent between 2001 and 2003. Therefore, Canal toll increase would not materially affect the Ecuadorian banana trade.

Exhibit 6-2
Summary of Canal-Relevant Exports Analysis by Commodity
(US$ millions, current prices)

Commodity	1. FOB Value of Canal Exports	2. Canal Share of Total Exports	3. Total Export Value	4. Commodity Exports Share of Ecuador Exports	5. Canal Transit Cost Share of CIF	6. 200% Toll Increase Impact on CIF
Crude Oil	$ 338	14%	$ 2,372	39%	1.1%	1.8%
Banana - Reefer Bulk	$ 718	65%	$ 1,099	18%	1.6%	2.6%
Containerized cargo						
Bananas	$ 77	7%	$ 1,099	18%	1.3%	1.9%
Wood & Wood Articles	$ 39	46%	$ 85	1%	0.4%	0.8%
Fish & Crustaceans	$ 166	45%	$ 372	6%	0.0%	0.1%
Vegetable & Fruit Prep.	$ 21	20%	$ 102	2%	0.3%	0.7%

Source: International Monetary Fund World Economic Outlook Database (September 2004), UN COMTRADE, ACP database.
Description of columns:

7   The merchandise FOB value of the Canal-relevant portion of exports for each commodity

8   The percent of the total FOB export value for each commodity that transited the Canal

9   The total FOB value of all Ecuador exports of each commodity, regardless of transportation mode or route

10   The percent of total Ecuador exports FOB value in dollar accounted for by each commodity

11   The percent of the final landed cost (CIF) of each commodity accounted for by the total Canal transit costs (toll, other marine services) of that commodity

12   The percent change in the CIF as a result of a 200 percent increase in the Panama Canal toll for ships carrying this commodity

6.2 Impact of Transit Cost Changes for Imports

With respect to imports, a different approach was used in order to determine the impact of Canal toll increases on Ecuador's economy. The analysis focused on the final landed cost of each commodity, and on the impact of the aggregated value of Canal-relevant imports to total Ecuador imports and GDP.

In 2003, 16 percent of Ecuador's total US$6.5 billion in import value transited the Panama Canal (Exhibit 6-3). An analysis of Ecuador's Canal-relevant import

commodities determined that the effect of a Canal toll increase on the total cost of Ecuador's imports and on GDP would be negligible. If the toll were to increase by 200 percent, the cost of total Ecuadorian imports would increase by only 0.18 percent, with a minimal impact on GDP of -0.04 percent.
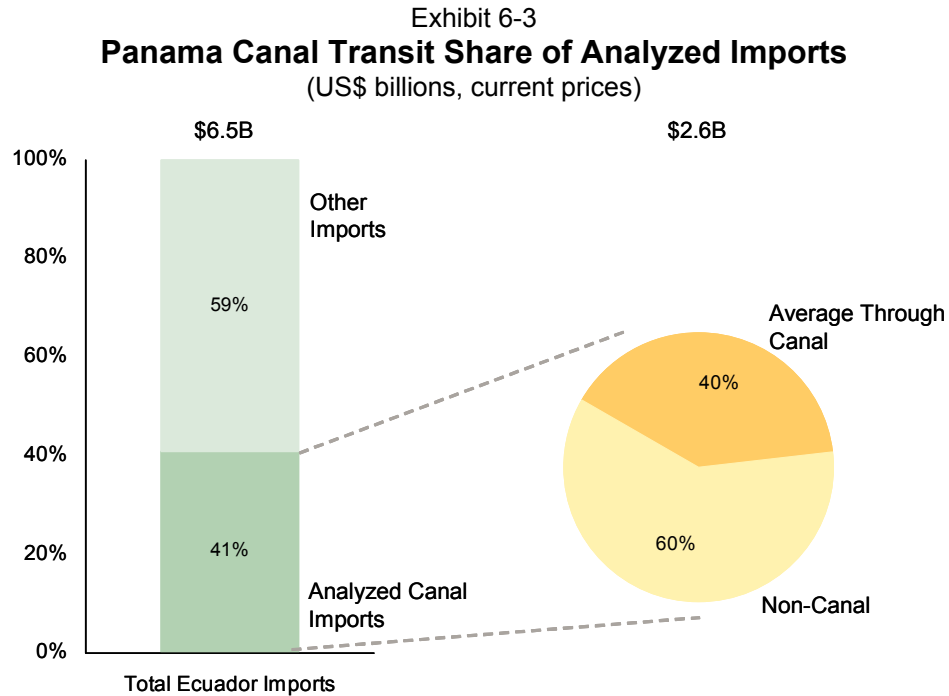
Exhibit 6-3
Panama Canal Transit Share of Analyzed Imports
(US$ billions, current prices)

Source: International Monetary Fund World Economic Outlook Database (September 2004), UN COMTRADE, ACP database.

Considering the very small increase in import cost represented by an increase in Canal transit costs, and the fact that the Canal toll is only one of many costs involved in bringing a commodity from its origin to the end user, the Canal transit cost increase would not be a significant contributor to inflation.

6.3 Conclusions

Based on the analyses developed in this report, the Panama Canal transit cost for ships carrying goods exported from Ecuador represents a very small component of the total landed cost, and therefore even a large increase in this cost would not have a significant impact on the economy of Ecuador nor on Ecuador's principal industries that provide Canal-relevant export commodities. Two of the five analyzed Canal-relevant commodities transit less than 20 percent of their value through the Canal, and for the three commodities of which a significant portion does transit the Canal, two accounted for less than 3 percent of Ecuador's total exports. The third commodity, bananas, was subject to further analyses which determined that a toll increase would not materially affect the

Ecuadorian bananas trade due the fact that recent large increases in ocean freight for bananas hasn't affected Ecuador's current banana trade.

Equally, for imports, Canal transit costs represent a very small portion of landed cost; additionally, the most significant Canal-relevant imports analyzed in this report account for 16 percent of total Ecuador's imports. Even a large Canal toll increase would have virtually no effect on the cost of total Ecuador's imports nor on Ecuador's GDP.

The most important question at present with regard to the Canal – and of relevance to Ecuador economy – is not the potential impact of transit cost changes, but whether the Canal will have sufficient capacity available to meet future demand, while providing an adequate level service. The implications for critical supply chains that serve Ecuador economy of a deterioration in service – due to increased wait times or decreased reliability, for example – in the event that Canal capacity fails to meet demand, are of vital concern. The Canal will be able to meet future capacity needs only if it can generate the necessary funds from tolls to cover capital expenses; this requirement, in terms of its potential impact on Ecuador trade and the economy, far outweighs the essentially negligible impact of the transit cost increases examined in this study.

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