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The Dynamics of U.S.-Asian-South American Waterborne Trade and the Panama Canal Expansion: Their Anticipated Impacts on Texas Ports and the State's Economy

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16. Abstract This report examines noteworthy aspects of US-Asian and US-Latin American trade, particularly the present and likely future roles of Texas ports and the Panama Canal. The purpose is to identify opportunities and challenges faced by the State of Texas and its ports in competing for international trade. The role of Texas ports within the larger US economy is examined, and developments in the Texas energy sector noted. The research team collected information from and conducted selected interviews with Texas port officials and individuals involved with various modes of transportation, such as ocean carriers, the Panama Canal Authority, shippers, consultants, international organizations, research institutes, and the like. The report addresses the Texas Department of Transportation's (TxDOT) role in maintaining functional, economically healthy ports and responding to the canal's expansion.		
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Foreword

The Lyndon B. Johnson School of Public Affairs has established interdisciplinary research on policy issues as the core of its educational program. A major part of this program is the nine-month policy research project, in the course of which one or more faculty members direct the research of ten to twenty graduate students of diverse backgrounds on a policy issue of concern to a government or nonprofit agency. This "client orientation" brings the students face to face with administrators, legislators, and other officials active in the policy process and demonstrates that research in a policy environment demands special talents. It also illuminates the occasional difficulties of relating research findings to the world of political realities.

This report is the product of a policy research project completed during the 2011–2012 academic year with funding from the Texas Department of Transportation (TxDOT Project 0-6690). The study upon which this report is based examines the growing role of Texas ports in the emerging US/South America/Asia trade triangle. The Panama Canal is located at the crossroads of theses trade lanes. And the expansion of the Panama Canal will offer the State of Texas new opportunities to take advantage of these developments.

Disclaimers

Authors' Disclaimer: The contents of this report reflect the views of the authors, who are responsible for the facts and the accuracy of the data presented herein. The contents do not necessarily reflect the official view or policies of the Federal Highway Administration or the Texas Department of Transportation (TxDOT). This report does not constitute a standard, specification, or regulation.

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None of the sponsoring units, including the Texas Department of Transportation and the Lyndon B. Johnson School of Public Affairs, endorse any of the views or findings expressed in this report. Any omissions or errors are the sole responsibility of the authors.

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Executive Summary

Introduction

This report examines salient aspects of US-Asian and US-Latin American trade, with particular attention paid to the present and likely future roles of Texas ports and the Panama Canal. The purpose is to identify, to the extent possible, both opportunities and challenges faced by the State of Texas and its ports in competing for international trade. In doing so, the research team has collected information from and conducted selected interviews with Texas port officials and individuals involved with ocean carriers, the Panama Canal Authority, shippers, consultants, international organizations, research institutes, and the like.

Contents

This report is composed of five chapters and an appendix.

Chapters 1 and 2 focus on Asian and Latin American trade lanes, respectively. They provide illustrations of waterborne trade routes and trade flows to and from Texas and an overview of both regional and country-specific imports/exports by commodity.

Chapter 3 describes the roles of Caribbean ports as hub-and-spoke conduits for container ships involved in both north-south and east-west trade. It begins with a discussion of the historical development of hub ports in the Caribbean as transshipment centers. Case studies of the ports of Colon, Kingston, and Caucedo are offered. The chapter concludes with a discussion of how these hub ports, in many cases, are evolving into logistics centers, as well as how they are responding to an expanded Panama Canal.

Chapter 4 addresses the Panama Canal. It consists of two parts. The first part describes the Canal's current operations. Information is offered on current tolls, number of vessel transits, traffic by market segment (container, tanker, break-bulk, etc.), and how the Canal works in practice. The second part describes the expanded Canal in terms of investments in physical facilities and possible economic impacts. Its expected opening is 2015.

Chapter 5 discusses the Texas port system in terms of key strengths and challenges to growth. The chapter also contains in-depth profiles of the ports of Beaumont, Brownsville, Corpus Christi, and Houston. Each profile summarizes cargo and passenger facilities, access to infrastructure, shipping operations, types of imported/exported commodities, and forecasts of future port activities.

Finally, the appendix contains country profiles of major trading partners: Brazil, Chile, Colombia, Peru, and Venezuela in Latin America; and China, India, Japan, South Korea, and the Association of Southeast Asian Nations (ASEAN) in Asia. The country profiles provide information on general macroeconomic trends, governmental structures and institutions, trends in trade, descriptions of transportation infrastructure, and looming challenges to growing trade.

Highlights

Overview

All Texas deep-water ports stand to benefit from growing global trade. Anticipated growth in US-Latin American and US-Asian trade will more than compensate for any short-term (and even long-term) decline in US-European trade. Moreover, Texas ports have room to grow. Each port profiled in this report—Beaumont, Brownsville, Corpus Christi, and Houston—has identified specific opportunities for growth and is undertaking initiatives to develop, build, or otherwise implement a variety of improvements to capitalize on those opportunities.

The size of the Texas consumer market is the single-most important locational advantage for Texas ports in competing for global trade. The Dallas-Ft. Worth metropolitan area ranks fourth nationally in terms of population, while Houston ranks fifth. If the San Antonio and Austin metropolitan areas are included, nearly 15 million residents are easily served by Texas ports, compared to 12 million residents within the region between Philadelphia and Washington, D.C. and 8 million in the greater Miami area.

According to the US Congressional Research Service, two-way US-Latin American trade increased 82% over the past decade, compared with a 72% increase in US-Asian trade and 51% with Europe. Regional US free-trade agreements with Chile, Colombia, and Panama and a growing Latin American middle class are contributing to this growth in two-way trade. Imports from South America, Central America, and the Caribbean rose 6.7% in 2011 and were projected to grow 6.7% again in 2012 and 10.4% in 2013. US exports to Latin America increased 3.4% in in 2011, and were projected to grow a modest 0.8% in 2012 and 3.0% in 2013.

Latin American exports still consist of mostly of raw materials and commodities. But information technology, electronics, medical supplies, automobile parts, and apparel firms are increasingly penetrating the US market. In this regard, the *Journal of Commerce*[1] reports that Central America, South America, and most notably Mexico are rapidly becoming preferred locations for many manufacturers who desire to produce closer to the US market by shifting their current operations from Asia (otherwise known as *near sourcing*). These manufacturing relocations can be explained by the region's increasingly competitive labor rates and transportation costs, skilled work force, and ability to serve both Spanish- and English-speaking consumers. The ports of Beaumont, Brownsville, Corpus Christi, and Houston should all benefit from these trends in varying degrees, especially in those cases where manufacturers shift their operations from Asia to Latin America.

The expanded Panama Canal primarily will affect trade between the US and Asia, which has increased dramatically over the past two decades, largely due to China's economic rise. From 1990 to 2011, trade between the US and China increased from $15 billion to $291 billion, positioning China as the second-largest US trading partner and accounting for more than 30% of US-Asian trade. Additionally, trade between the US and other Southeast Asian countries has more than tripled over the last 20 years, increasing from $45.9 billion in 1990 to $176 billion in 2010. Japan and South Korea also are major US trading partners.

The new set of locks will enable the transit of significantly larger containerized and non-containerized ships, thereby enhancing the opportunity for East Coast and Gulf Coast ports to increase their market share of US-Asian trade. In particular, the ports of Houston and Corpus Christi will be afforded opportunities to benefit from the 2015 opening of the expanded Panama Canal.

Promises and Challenges of the Texas Energy Sector

In the longer term, the proximity of Texas ports to the state's energy-producing areas will become another exceedingly important source of stimulus to the state's economy in general and to port import/export activities in particular. Texas currently accounts for one-fifth of the world's drilling rigs operating in five major areas of oil and natural gas production. The Barnett shale formation in North Texas was the first field where horizontal drilling and hydraulic fracturing (fracking) were applied to extract oil and gas from dense shale rock. This activity was quickly followed by increasingly accelerated drilling and production in the Eagle Ford shale formation in South Texas, the Haynesville/Bossier shale formation in East Texas, and the Granite Wash formation (consisting of tight sandstone) in the Texas Panhandle. Finally, the Permian Basin in West Texas, consisting of multiple geological fields, has re-emerged as a focus for concentrated drilling, with particular attention paid to the Cline shale formation.

It is no exaggeration to say that the state has quickly become awash in oil and natural gas in the brief time span of about 6 years. In fact, the time span was so brief that none of the dozens of Panama Canal Authority-funded consultant studies (undertaken to examine future trends in vessels operations, trade flows, regional markets, and alternative waterborne trade routes) foresaw the growth of the Texas energy sector or its potential impact on the Panama Canal.

The *Financial Times*[2] reported on December 15, 2012 that this nationwide shale oil-and-gas boom has led a variety of US and foreign manufacturers to announce more than $90 billion in future investments in the US to take advantage of cheap and growing natural gas supplies. These manufacturers include petrochemical, automobile, fertilizer, steel, health care, and agricultural firms. The *American Shipper*[3] journal also reported at about the same time that US-based chemical companies were contributing to strong exports of petrochemical derivatives and plastics. One consequence of this prosperity is that Dow Chemical, BASF, Total Petrochemical, Occidental Chemical, Shell, and Mexichem have all announced plans to build new facilities; and other companies such as Ineos, Formosa Plastics, Westlake Chemical Corporation, and Nova Chemicals Corporation intend to expand their capacity at existing locations. What is telling is that most of the plants will be located near the Gulf of Mexico. That said, neither the timing nor the scale of anticipated benefits are known with any degree of certainty: both new and expanded existing plants will take years to complete and their construction costs will run into billions of dollars.

Even more uncertain is the timing and scale of future liquefied natural gas (LNG) exports to foreign markets. Several companies, such as Sempra Energy, Freeport LNG Development, and Cheniere Energy, have expressed interest in constructing LNG export terminals to expand natural gas exports. Gas exports do not require federal government approval if they go to one of the 17 countries that have a free-trade agreement with the US. But exports to other countries (e.g., Japan, India, and all of Europe) require approval from the US Department of Energy (DOE). Currently, only Cheniere Energy's Sabine Pass terminal has been granted approval to export gas, and is expected to launch is 2015. Fifteen other applications are awaiting DOE approval. Most of the applications involve LNG export terminals that would be clustered around the Gulf Coast. Texas-based applications, for example, entail export terminals at Freeport, Corpus Christi, and Lavaca Bay.

One reason for the delay in granting export permits is that the DOE wants to be assured that increased LNG exports would be in the national interest, as required by law. Hence, the agency has been awaiting the results of a just-released report on the subject, conducted by NERA Economic Consulting, which concluded that "Shipping some of the newly abundant U.S. natural

gas would benefit the nation's economy more than keeping it all at home."[4] The DOE has yet to officially announce a timeline for rendering decisions on the applications. And even when permits are granted, there is no assurance how many and how quickly the export terminals will be built and become operational. By most estimates, it will take more than $10 billion to bring each terminal online. This represents a capital commitment that most firms cannot easily undertake.

A final energy-related issue concerns oil imports vs. exports. Governed by the Export Administration Act of 1979, US crude-oil exports are heavily restricted. Refined products such as gasoline can be shipped overseas more easily. Indeed, US refiners have been selling increased amounts in foreign markets as domestic demand has sagged.

The Gulf Coast region is home to approximately one-half of the nation's refinery capacity. This refinery capacity is currently set up for a world in which the US has traditionally imported large volumes of heavy, high-sulfur crude oil from the likes of Venezuela and Saudi Arabia. Yet, much of the newly extracted oil in the state consists of so-called "sweet" crude (light and low-sulfur). It will take substantial investments on the part of Gulf Coast refiners to make the necessary adjustments to enable them to process "sweet" crude. And we can expect exploration and production companies to push for a relaxation of export restrictions on crude oil in the same way they are for natural gas.

Dynamics of Maritime Trade and the Role of the Panama Canal

Only two irrefutable facts are known at this time. The first is that the new locks—sometimes called the third set of locks—will offer global shippers new choices based on routes, cost, and service. That much is certain. The second is that the impact of the new locks on particular ports and trading partners will vary over time and their use by larger (post-Panamax) vessels will be linked to specific trade lanes, commodities, trends in geographic labor and transportation costs, future free-trade agreements, and advancements in maritime-related technology, among other factors.

Beyond these two facts, there is no agreement among experts about the likely pace or scale of future port activity due to the Panama Canal expansion. Disagreements even exist among officials within the same organizations and ports. Why?

- To the extent that increasingly larger (post-Panamax) containerized and non-containerized vessels will sail directly to and from US ports, there will be fewer ports of call and services may be further consolidated through vessel sharing agreements among steamship lines. To maximize revenue and maintain schedule integrity, ships must spend as little time as possible in port. With few exceptions, the likely winning ports are open to speculation.

- To keep their larger vessels at sea for as long as possible, steamship lines may well increasingly use terminals in transshipment ports (such as Freeport, Bahamas; Kingston, Jamaica; Caucedo, Dominican Republic; and Colon, Panama) to transfer containers to smaller feeder ships that carry shipments throughout the Caribbean, South and Central America, and the US Gulf and East Coasts. The growth in near-sourced manufacturing will further boost these feeder services. Moreover, logistics centers are being planned around Caribbean transshipment hubs. These logistics centers offer steamship lines the possibility of filling their vessels with Caribbean goods bound for Asia on their backhauls.

- Western railroads will act to protect their market share in the face of future Panama Canal competition. Over the past 5 years, the Burlington Northern Santa Fe and Union Pacific rail lines have invested $12 billion in both facilities and mainlines to serve Southern California alone. This sum is more than double the $5.2-billion cost of expanding the Panama Canal. US West Coast ports and railroads have the advantage of being able to engage in differential pricing by market segment and could lower prices for services with slower transit times if they feel pressure from all-water services through the Panama Canal. Railroads also have the ability to price shipments on a door-to-door basis.
- Another major consideration is the extent to which future manufacturing will migrate from China to Southeast Asia and the Indian subcontinent, including Bangladesh and Pakistan. The closer that US trading partners are located to the west and south of Singapore, the more the Suez Canal becomes the preferred route to the US East Coast. As previously mentioned, two-way trade between the US and Southeast Asian countries has tripled over the last 20 years.
- Finally, the lack of adequate port and surface transport infrastructure in foreign countries may well pose a significant obstacle to future trade. With the exception of Chile and Panama, growth in trade has far outpaced infrastructure development throughout Latin America. This is particularly true for Brazil, which only recently began taking steps to rectify problems. With the exception of Singapore and Malaysia, the same applies to the remainder of Southeast Asia and the Indian subcontinent.

Texas Port Challenges

Ports face three distinct challenges, each linked to different issues and funding sources. These challenges comprise seaside access (principally channels), port and terminal operations (capacity), and landside connections with surface modes of transport. Each can place limits on Texas port capacity and competition.

- Both East Coast and Gulf Coast ports have devoted considerable attention in their investment strategies to enhance port access that will enable them to service post-Panamax vessels after the 2015 opening of the new Panama Canal locks. An operating depth of 50 feet is generally considered the standard for those (like Florida's ports) promoting their respective locations, even though such a depth is unlikely (and possibly unnecessary) for most Gulf Coast locations, based on simple cost-benefit analysis estimates. The reach of a deeper, wider 50-foot-deep channel would exceed 11 miles in some cases, requiring unsustainable levels of dredging and disposal. New terminals located nearer deeper water may help, but the most immediate need is to offer an access system that provides a consistent depth. In Houston, for example, this means linking the main 45-foot-deep channel with the 40-foot-deep Barbours Cut and Bayport terminal channels. Shallow-draft ports would benefit from dredging the Gulf Intracoastal Waterway to the authorized 12-foot depth and 125-foot width, since barge operators are currently traversing an operating depth of 9.5 feet, which adversely impacts barge productivity. Providing the necessary finances to fund or match federal contributions for conducting channel dredging on this scale is virtually impossible for most Texas deep-water

ports; these funds are unlikely to be provided solely by the federal government given present and forecasted budget shortfalls.

- Texas ports handle a wide variety of both imported and exported commodities. Container traffic is concentrated at Houston and Freeport. These terminals have sufficient capacity, when expressed in terms of current and approved construction, to handle double the current twenty-foot-equivalent (TEU) container volumes. In general, ports handle their operations effectively and rely upon a variety of financial mechanisms to support strategic planning on their own properties. They have been successful in transmitting their concerns to TxDOT and other agencies. A recent Texas waterborne trade study identified port project needs and all highway projects that would benefit port operations to TxDOT District planners for consideration.
- Landside issues include terminal rail and highway chokepoints. Highway bottlenecks are being addressed in a systematic fashion, reflecting the wide variety of competing projects and limited budgets. Bayport terminal dray trucks, for example, will benefit from a recently completed freeway ramp. The Texas economy is dominated by the Dallas/Ft. Worth-Houston-San Antonio triangle. Both import and export customers who rely on Texas deep-water ports in that region will use trucks for most of their landside movements. Rail intermodal container traffic will gain importance if Texas ports become true load centers. Yet only Houston, with woefully inadequate rail access, possesses the attributes to become a true load center. Access to the port has to be examined in the broader context of the Houston rail and terminal network. A much-needed improvement would be the construction of an urban terminal yard receiving both domestic and international traffic.
- As of 2012, deep-water port needs are ranked as follows: channels, landside rail connectivity, and port operations.

Texas Department of Transportation's Role

- TxDOT's 2012 strategic plan specifically includes a provision to "prioritize new projects that will increase state GDP and enhance access to goods and services throughout the state" as well as directly contribute to promoting the state's economic competitiveness. As part of this strategy, TxDOT already has implemented several initiatives that will strengthen marine gateways and multimodal transport routes using Texas ports. These routes and ports include both those serving the current Panama Canal users and the likely beneficiaries of the enlarged set of locks, once opened for operations in 2015. The most significant change is the creation of a Marine Division, based in Houston, responsible for representing for deep- and shallow-draft port interests in statewide planning activities. This division will enable TxDOT to monitor maritime developments of all types, including channels, port operations, and new commodity flows (e.g., Texas-based oil-and-natural gas production and distribution) and to identify improvement to landside rail and highway connectivity.
- The second important change in TxDOT planning is the creation of the position of a dedicated freight planning coordinator, responsible for ensuring that freight plays a major role in transportation planning. Four additional initiatives are now in place:

1. The creation of a Freight Advisory Committee (FAC), comprising members representing major transport modes, industrial sectors, and logistics companies. The FAC will meet regularly and provide advice and support to TxDOT planning activities.
2. The development of a Freight Plan managed by the new freight coordinator, with help from the FAC, which will be regularly updated and will provide support for other planning initiatives.
3. TxDOT has recently awarded a contract to update the statewide transportation plan, which will incorporate freight data—including that pertaining to ports and waterways—derived from the Freight Plan.
4. In addition, another contract has been awarded for a statewide corridor study to evaluate the use and performance of key Texas corridors, including those critical for freight movements through Texas ports and NAFTA gateways along the Texas-Mexico border.

- The timing of these activities coincides with the most-recently enacted federal transportation funding authorization bill in 2012, the Moving Ahead for Progress in the 21st Century Act (or MAP-21). MAP-21 offers a streamlined and performance-based surface transportation program that specifically incorporates freight and other modes, notwithstanding its administration by the Federal Highway Administration (FHWA). In other words, TxDOT is positioned to benefit by acquiring a comprehensive understanding of freight flows, at a time when freight has gained regional and national significance.

Despite all these positive steps to promote the state's economy and transportation system, TxDOT should defer large Panama Canal-related investments until more clarity emerges in international maritime markets.

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[1] Journal of Commerce, "Near Sourcing's Latin Leap," October 12, 2012, pp. 37–38.
[2] Financial Times, "Shale Gas Brings $90 bn Boost," December 15, 2012, p.1.
[3] American Shipper, "Hot Commodity: US Chemical and Plastic Exports Should Expect Boost from Shale Gas," December 2012, p. 21.
[4] Wall Street Journal, "US-Gas Exports Clear Hurdle," December 5, 2012, p. A-1.

Chapter 1. Asian Trade Lanes

1.1 Overview

Trade between the US and Asia has grown rapidly since the 1990s. Much of this growth can be attributed to China's economic rise. Between 1989 and 2005, the total value of trade between the US and Asia grew by $535 billion, increasing from $306 billion in 1989 to $841 billion in 2005.[1] Between 1990 and 2011, US-China trade expanded from $15 billion to $291 billion, positioning China as the second-largest US trading partner, accounting for over 30% of total trade in the US.[2]

While trade with China is the largest segment of overall US-Asian trade, trade with Southeast Asian countries also increased rapidly since the 1990s. Data from the US Census Bureau demonstrates that trade with Southeast Asia tripled over the last 20 years from $45.9 billion in 1990 to $176 billion in 2010.[3]

US exports to Southeast Asia increased from $18.8 billion in 1990 to $67.9 billion in 2010, while US imports from Southeast Asia increased even more rapidly.[4] A closer look at specific countries reveals dynamic interregional differences (see Figure 1.1). Singapore emerged as the largest US trading partner in the region. US exports to Singapore grew from $8.02 billion in 1990 to $29.1 billion in 2010; however, exports to Malaysia and Vietnam also saw tremendous growth, expanding fourfold in the last 20 years. Imports from Malaysia multiplied nearly five times over the last 20 years to $25.9 billion in 2010, surpassing Singapore and Thailand as the region's largest importers to the US. Also remarkable is Vietnam's 80-fold increase of imports from $199 million in 1995 to $14.9 billion in 2010.[5]

1.2 Commodities

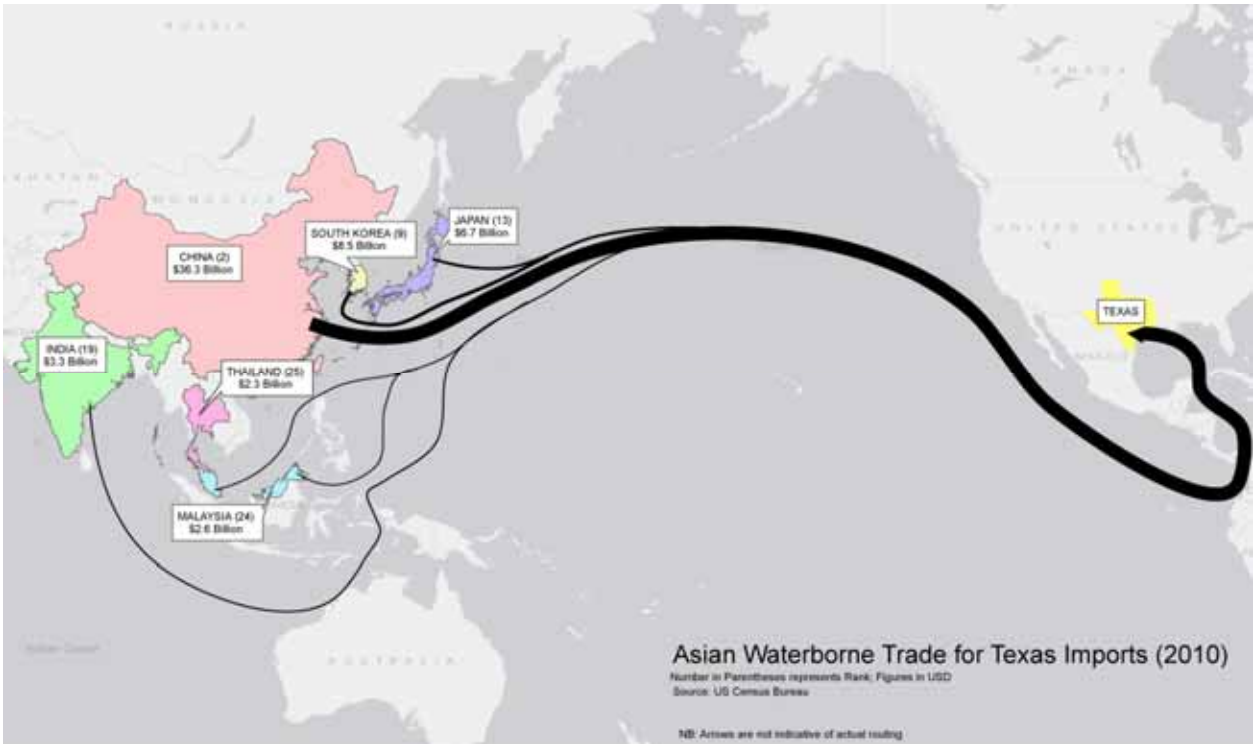
Increasing the volume of trade with Asia is a vital development for Texas ports. Data from the Office of the Texas Comptroller indicates that Texas exported more than $32.7 billion of goods to Asia in 2009, an 80% increase from 2005.[6] Notable is the amount of imports coming to Texas from Asia. Asian imports accounted for over 65% of total imports to Texas in 2009, totaling $154 billion; $16.3 billion of these imports were from China.[7]

Leading exports by commodity value to Asia include chemicals (27%), computers and electronic parts (24.1%), and machinery (18.1%).[8] Leading imports by commodity value include fuel and oil (41%), electronics and telecom (17%), and industrial machinery (10%).[9] The top commodities by weight imported from Asia in 2011 are steel products, tin, coal, fuel, and oil.[10]

The most common shipping methods between Texas and Asia are break-bulk and container ships. Commodities shipped this way include steel products, automobiles, other machinery and parts, and electronics. Fuel and oil are shipped via tankers, while coal and cotton are shipped as dry bulk. Container ships are predicted to play the largest role in the increase in Asian trade after the completion of the Panama Canal in 2015.

1.3 Imports

The top commodity imports from Asia can be measured in terms of dollar value or the weight of the goods shipped. When measured by weight, the top imports from Asia are predominantly steel products, which include pipes, bars, tubes, sheet metal, and beams (see Table 1.1).



Source: US Census Bureau[11]

Figure 1.1: Asian Waterborne Trade for Texas Imports

Table 1.1: Texas Imports from Asia by Weight, 2011

	Type	Short Tons
1	Steel, iron pipes & tubes	48,514,638
2	Steel bars	7,997,255
3	Tin plate, including scrap	4,059,190
4	Coal & coke	1,728,493
5	Steel, misc.	1,525,897
6	Carbon steel	1,434,680
7	Steel plate & sheet	1,406,334
8	Petroleum/crude & fuel oil	1,335,519
9	Steel flanges, angles, beams	1,141,903
10	Steel coils & strips	844,434

Source: Port of Houston[12]

Crude oil is the eighth largest commodity imported in short tons (at 1,335,519 short tons), but is the first when measured monetarily with a value of $92.818 billion in 2010 (see Table 1.2). In terms of value, other top imports to Texas include machinery, replacement parts, automobiles, and wiring. Many of the commodities listed in Table 1.2 have been declining since 2008, due to the downturn of the economy in 2008. While this data demonstrates a trend of decline, trade with Asia since the 1990s has experienced tremendous growth.

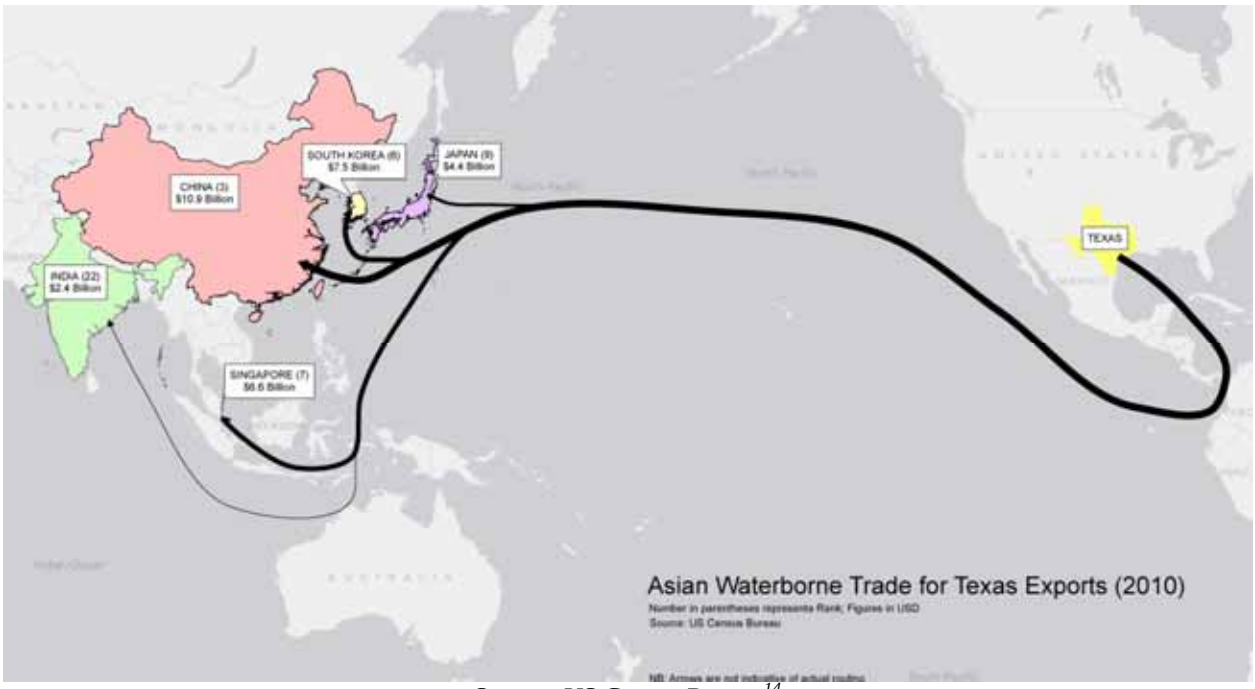
Table 1.2: Texas Imports from Asia by Value, 2008–2011

	Type	Amount 2008	Amount 2009	Amount 2010	% Change 2009–2010
1	Crude oil from petroleum and bituminous minerals	113,468	67,995	92,818	36.50
2	Phones for cellular networks or for other wireless network	13,446	14,715	14,442	-2.00
3	Oil (not crude) from petrol & bituminous mineral etc.	13,102	9,102	9,801	7.70
4	Digital processing units	1,097	3,376	7,304	116.30
5	Machinery for reception/conversion/ transmission/regeneration of voice/image/data	4,235	3,859	5,309	37.60
6	Parts and accessories for automatic data processing machines and units	2,298	3,593	4,055	12.80
7	Reception apparatus for television, color	2,113	2,856	4,021	40.80
8	Light oils & prep (not crude) from petrol & bituminous	7,705	2,599	3,683	41.70
9	Passenger vehicles with engine displacement larger than 1500 cc	2,728	1,679	2,809	67.30
10	Insulated wiring sets for vehicles ships aircraft	2,317	1,742	2,600	49.30

Source: US Census Bureau[13]

1.4 Exports

Texas exports to Asia are diverse, but also similar to many of the commodities Texas imports from Asia. The highest valued exports from Texas to Asia include a variety of non-crude oil valued at $20.877 billion in 2010. Texas also exports machinery, replacement parts, aircraft parts, semiconductor parts, and cotton. Cotton is the only top good Texas exports to Asia that varies significantly from the types of goods Texas imports from Asia.



Source: US Census Bureau[14]

Figure 1.2: Asian Waterborne Trade for Texas Exports

Table 1.3: Texas Global Exports by Commodity

Type	Amount 2008	Amount 2009	Amount 2010	% Change 2009–2010
Oil (not crude) from petrol & bituminous mineral etc.	16,879	14,268	20,877	46.3
Light oils and Prep (not crude) from petrol & bituminous	5,852	5,286	9,307	76.1
Parts for boring or sinking machinery	8,335	6,393	5,636	11.8
Parts and accessories for ADP machines and units	3,479	4,374	4,522	3.4
Processors and controllers, electronic integrated circuits	2,790	2,440	4,297	76.1
Civilian aircraft, engines, and parts	4,231	3,979	3,837	3.6
Machinery for reception/conversion/transmission/regeneration of voice/image/data	4,130	3,315	3,822	15.3
Machines for semiconductor devices and electronic integrated circuits	2,225	1,348	3,240	140.4
Cotton, not carded or combed	2,127	1,234	2,330	88.9
Electronic integrated circuits	2,346	1,793	2,251	25.5

Source: US Census Bureau[15]

1.5 Trading Partners

In terms of dollar value, the top US trading partners in Asia are China, South Korea, and Japan.[16] Singapore, Taiwan, and Malaysia are also notable trading partners, but do not compare to the substantial amount of trade the US engages in with China. In 2010, trade with China totaled $41.858 billion, trade with South Korea totaled $11.837 billion, and trade with Japan totaled $9.833 billion. Tables 1.4 and 1.5 show the largest Asian trading partners with Texas 2008–2010.

Table 1.4: Countries from which Texas Imports

Rank	Country	Amount 2008	Amount 2009	Amount 2010	% Change 2009–2010
2	China	31,906	27,134	31,583	16.4
9	Japan	6,040	4,713	5,834	23.8
11	South Korea	6,090	4,415	5,394	22.2
18	Malaysia	3,342	2,471	2,626	6.3
19	Taiwan	2,710	2,037	2,605	27.9

Source: US Census Bureau[17]

Table 1.5: Countries to which Texas Exports

Rank	Country	Amount 2008	Amount 2009	Amount 2010	% Change 2009–2010
3	China	8,422	8,907	10,275	15.4
5	South Korea	5,151	5,303	6,443	21.5
6	Singapore	5,479	5,135	5,926	15.4
8	Taiwan	3,883	2,586	4,227	63.4
10	Japan	3,629	2,784	3,999	43.6

Source: US Census Bureau[18]

1.6 China

According to the Port of Houston Authority, in 2011 the largest quantities of goods imported from China were steel products, minerals, and soybeans (Table 1.6). The steel products entered Texas exclusively on break-bulk ships arriving in Houston. The barium sulfate products entered Texas largely in Galveston, Houston, and Corpus Christi. Coal entered Texas in Port Arthur, Texas City, and Corpus Christi via dry-bulk ships. Soybeans predominately entered through Corpus Christi. A majority of the goods from China enter Texas through the Port of Houston. In

2011, approximately 17,325,954 short tons of imports from China entered Texas at the Port of Houston; only 2,469,033 short tons of goods entered the other Texas ports combined.

Table 1.6: Imports to Texas from China by Commodity, 2011

	Type	Short Tons
1	Steel bars	7,789,363
2	Steel, iron pipes & tubes	3,473,796
3	Coal &coke	4,059,190
4	Barium sulfate, natural	786,832
5	Soybeans & products	740,534

Source: Port of Houston[19]

1.7 South Korea

South Korea is our second largest trading partner in Asia. South Korea's top imports are various types of steel and tin (Table 1.7). These goods are shipped to Texas on break-bulk ships. In 2011, 56,525,692 short tons of goods from South Korea were delivered to Houston. The rest of the imports, approximately 2,166,585 short tons, were shipped to Brownsville, Freeport, and Corpus Christi.

Table 1.7: Imports to Texas from South Korea by Commodity, 2011

	Type	Short Tons
1	Steel, iron pipes & tubes	44,806,927
2	Tin plate, including scrap	3,700,977
3	Carbon steel	1,428,382
4	Steel plate & sheet	1,272,733
5	Steel flanges, angles, beams	1,131,657

Source: Port of Houston[20]

1.8 Japan

The state's third largest trading partner in Asia is Japan. The top commodities traded with Japan are ethers, various steel products, and coal (Table 1.8). The steel coils and plates enter predominately through Brownsville, with a small portion coming into Houston. The rest of the top imports entered through Houston, which saw 1,376,962 short tons. The remaining 573,511 short tons came into other Texas ports, predominantly Corpus Christi and Brownsville.

Table 1.8: Imports to Texas from Japan by Commodity, 2011

	Type	Short Tons
1	Ethers	474,537
2	Steel, iron pipes &tubes	227,370
3	Coal &cokes	194,396
4	Steel coils &strips	126,475
5	Steel plate &sheet	114,544

Source: Port of Houston[21]

1.9 Trade Lanes

The dominant trade routes for Asian goods to North America in the last decade have been those crossing the Pacific Ocean on distinct corridors to the most competitive gateway West Coast ports. Shippers also use a smaller number of direct all-water routes to serve customers in East Coast and Gulf markets, using the current Panama Canal locks. In 2011, there were 68 West Coast-Asia trade lanes and 22 East Coast-Asia trade lanes. The latter group traversed the Panama Canal and either passed directly to ports in the Gulf of Mexico or interlined at Caribbean ports, where the containers are moved using a hub-and-spoke system, much like the airline sector. US Californian ports have dominated the Asian container market for three reasons: 1) they have a large state market that takes around half of the boxes; 2) they have the most efficient landside intermodal distribution systems for much of the US, and 3) they can serve the largest containerships entering service. The choice of trade lanes is dynamic and reflects ship economies of scale and fuel prices. Recently, shippers have been offered a competitive Suez Canal trade lane for Asian goods to the US markets served by New York and Norfolk terminals. If successful, it would compete directly with current services using the Panama Canal. Containership routes are also impacted by size—as they get bigger, they call on fewer ports in their trip port rotation, again much like the airline sector. They make money sailing, not sitting in port. A typical Asian trade route in 2011 showing some of the typical characteristics of a Pacific service is now given.

1.9.1 Example of Trade Route: Mitsui O.S.K.

The itinerary of the MOL *Promise*, a container vessel operated by Mitsui O.S.K. Lines, provides an example of a service running between Hong Kong and Houston. The *Promise* departed from Hong Kong on February 6, 2012, carrying dead weight tonnage (DWT) of 73,063. It traveled a short distance north to the Port of Yantian where it spent one night before departing for Los Angeles. It took 13 days for the *Promise* to cross the Pacific, calling at the Port of Los Angeles on February 20. After unloading and loading cargo in Los Angeles, the *Promise* delivered a shipment of goods to the Port of Long Beach, then sailed to Oakland, calling at that port on February 23. On February 24, it set out from Oakland and made its way south, transiting the Panama Canal on February 25. The *Promise* reached the Port of Houston on February 27. In total, it took 21 days for the *Promise* to complete its journey from Hong Kong to Houston,

calling at four ports en route. In 2013, the service was changed to reflect a slower operating speed that translated to lower fuel consumption. The supply chains using this slower service have to adjust to a longer trip time but benefit from lower transportation costs.

[1] Harrison, Robert et al. "Impacts of US-China Trade on the Texas Transportation System." 29 Sept. 2006. Web. 5 Dec. 2011. http://library.ctr.utexas.edu/pdf1/IAC10406_US-%20CHINA_R1.pdf

[2] US Census Bureau. "Trade in Goods with China." US Census Bureau Web. 5 Dec. 2011. http://www.census.gov/foreign-trade/balance/c5700.html

[3] Ibid.

[4] Hervandi, Ray. "US-Southeast Asian Trade Triples Over Last Two Decades." Asian Matters for America Web. 24 May 2011. Web. 5 Dec. 2011. http://aseanmattersforamerica.org/us-southeast-asia-trade-triples-over-last-two-decades/522

[5] Ibid.

[6] *Texas Ahead*. 2010. Issue 1. Web. 5 Dec. 2011. http://www.texasahead.org/economic_developer/downloads/1313-1TexasAhead_China.pdf

[7] Ibid.

[8] Ibid.

[9] Ibid.

[10] "Foreign Trade: State Imports for Texas," U.S. Census Bureau.
Available at: http://www.census.gov/foreign-trade/statistics/state/data/imports/tx.html#ctry.

[11] Ibid.

[12] Port of Houston. "Texas Ports: Jan-Nov 2011" 2011. Microsoft Excel file.

[13] "Foreign Trade: State Imports for Texas," U.S. Census Bureau.
Available at: http://www.census.gov/foreign-trade/statistics/state/data/imports/tx.html#ctry.

[14] Ibid.

[15] Ibid.

[16] Ibid.

[17] Ibid.

[18] Ibid.

[19] Port of Houston. "Texas Ports: Jan-Nov 2011" 2011. Microsoft Excel file.

[20] Ibid.

[21] Ibid.

Chapter 2. Latin American Trade Lanes

2.1 Overview

Although Latin America trails Asia as a regional trading partner, US trade with Latin America is growing faster than trade with Asia. From 1998 to 2009, total trade with Latin America increased by 82%, whereas US-Asian trade increased by 72%.[1] As one of the largest state economies within the US, Texas is a significant portion of that equation.

2.2 Commodities

By weight, the top trafficked commodities are petrochemicals and coal, with sizable amounts of grains, which generally travel on tankers, and bananas, which are transported on container ships.[2] While a large number of these ships entail scheduled service, significant tramp (unscheduled) steamship services also run between Texas and Latin America.[3] Figure 2.1 illustrates the waterborne trade with Latin America.

2.3 Imports

Crude oil makes up the vast majority of imports into the state of Texas. The *Wall Street Journal* reported on July 18, 2011[4] that Venezuela surpassed Saudi Arabia in 2010 as the holder of the largest oil reserves in the world, making Venezuela one of our most important trading partners. The top 10 imports to Texas by value according to the US Census Bureau are summarized in Table 2.1.

Source: US Census Bureau[5]

(Note: number in parentheses indicates rank; figures in USD.)

Figure 2.1: Latin America Waterborne Trade for Texas Imports, 2010

Table 2.1: Global Texas Imports by Commodity, 2011

	Type	Amount 2008	Amount 2009	Amount 2010	% Change 2009–2010
1	Crude oil from petroleum and bituminous minerals	113,468	67,995	92,818	36.50
2	Phones for cellular networks or for other wireless network	13,446	14,715	14,442	-2.00
3	Oil (not crude) from petrol & bituminous mineral etc.	13,102	9,102	9,801	7.70
4	Digital processing units	1,097	3,376	7,304	116.30
5	Machinery for reception/conversion/transmission/regeneration of voice/image/data	4,235	3,859	5,309	37.60
6	Parts and accessories for automatic data processing machines and units	2,298	3,593	4,055	12.80
7	Reception apparatus for television, color	2,113	2,856	4,021	40.80
8	Light oils & prep (not crude) from petrol & bituminous	7,705	2,599	3,683	41.70
9	Passenger vehicles with engine displacement larger than 1500 cc	2,728	1,679	2,809	67.30
10	Insulated wiring sets for vehicles ships aircraft	2,317	1,742	2,600	49.30

Note: Values in millions of dollars

Source: US Census Bureau[6]

As shown in Table 2.2, top Latin American import partners are Mexico (also the state's number one global source of imports), Venezuela (number three global source of imports), Colombia (number thirteen global source of imports), Brazil (number fourteen global source of imports), and Costa Rica (number fifteen global source of imports).

In recent years imports decreased due to the recession but have now rebounded to pre-recession levels. Between 2009 and 2010, for example, imports from Colombia increased by 84.7% and imports from Costa Rica increased by 81.7%. Although impressive increases can be reported from 2009 to 2010, most of this can be accounted as a return to 2008 levels. In the case of Venezuela, for instance, from 2009 to 2010 Texas imports increased by 27.1%; however, the amount imported in 2010 is actually lower than the amount imported in 2008. Figure 2.2 illustrates Latin America's 2010 waterborne trade for Texas exports.

Source: US Census Bureau[7]

(Note: number in parentheses indicates world rank; figures indicate total value in USD.)

Figure 2.2: Latin America Waterborne Trade for Texas Exports, 2010

Table 2.2: Latin American Texas Imports by Country

Global Rank	Country	Amount 2008	Amount 2009	Amount 2010	% Change 2009–2010
1	Mexico	68,700	57,001	78,982	38.6
3	Venezuela	20,674	11,668	14,828	27.1
13	Colombia	2,835	2,846	5,258	84.7
14	Brazil	4,284	3,884	4,755	22.4
15	Costa Rica	378	1,904	3,460	81.7

Source: US Census Bureau[8]

2.4 Exports

The state's most valuable export to Latin America is oil, but chemicals, machinery, and cotton are also important to Texas-Latin America trade (Table 2.3). These exports are broken down at the port, with large machinery generally shipping on tramp or scheduled break-bulk vessels, many chemicals and cotton shipping in standard containers, and oil shipping on tankers.[9]

Table 2.3: Global Texas Exports by Commodity

Type	Amount 2008	Amount 2009	Amount 2010	% Change 2009–2010
Oil (not crude) from petrol & bituminous mineral etc.	16,879	14,268	20,877	46.3
Light oils and Prep (not crude) from petrol & bituminous	5,852	5,286	9,307	76.1
Parts for boring or sinking machinery	8,335	6,393	5,636	11.8
Parts and accessories for ADP machines and units	3,479	4,374	4,522	3.4
Processors and controllers, electronic integrated circuits	2,790	2,440	4,297	76.1
Civilian aircraft, engines, and parts	4,231	3,979	3,837	3.6
Machinery for reception/conversion/transmission/regeneration of voice/image/data	4,130	3,315	3,822	15.3
Machines for semiconductor devices and electronic integrated circuits	2,225	1,348	3,240	140.4
Cotton, not carded or combed	2,127	1,234	2,330	88.9
Electronic integrated circuits	2,346	1,793	2,251	25.5

Source: US Census Bureau[10]

Referencing Table 2.4, top Latin American destinations for Texas exports are Mexico (the state's number one source of exports globally), Brazil (number four globally), Colombia (number eight globally), Chile (number fourteen globally), Venezuela (number fifteen globally), Ecuador (number seventeen globally), Peru (number twenty globally), and Panama (number twenty-three globally).

Table 2.4: Latin American Exports from Texas by Country

Global Rank	Country	Amount 2008	Amount 2009	Amount 2010	% Change 2009–2010
1	Mexico	62,088	56,035	72,627	29.6
4	Brazil	5,960	5,044	7,161	42.0
8	Colombia	3,021	2,785	4,415	58.5
14	Chile	2,682	1,867	2,817	50.8
15	Venezuela	3,512	2,176	2,741	26.0
17	Ecuador	768	1,294	2,215	71.2
20	Peru	1,627	1,414	1,894	34.0
23	Panama	1,279	918	1,770	92.8

Source: US Census Bureau[11]

Again, some of these countries have experienced significant increases in Texas exports, but much of the growth can be explained as recovery from the global recession in 2009. Of note, Texas was the largest exporter of merchandise to Brazil in the US in 2010, with exports worth $7.16 billion.[12] With Brazil's increasing importance in the US import and export markets as well as new policies encouraging trade and investment between the US and Brazil, astute observers should monitor trends that involve Brazil. [13]

2.5 Trading Partners

2.5.1 Mexico

Between 1997 and 2008, 40% of Texas manufacturing exports went to Mexico.[14] Of Mexican exports, 80% went to the US in 2010; this is a striking majority of Mexican exports, but that amount actually represents a decrease from 90% in 2001, a result of Mexico's attempt to diversify its export market.[15]

In 2010 the top exports from the US to Mexico, in order of highest total value, were electrical machinery, machinery, vehicles, mineral fuel, oil, and plastic. The most valuable imports from Mexico to the US were electrical machinery, vehicles, machinery, mineral fuel, oil, and optic and medical instruments.[16]

Waterborne trade between Mexico and Texas is mainly between the ports of Altamira and Veracruz in Mexico and the Port of Houston. Because the ports of Altamira and Veracruz are located on the Gulf of Mexico, use of the Panama Canal to reach Texas is unnecessary. The vast majority of shipping from Mexico, measured in short tons, is petroleum, crude, and fuel oils.[17] At every port in Texas, petroleum, crude, and fuel oils are either the first or second greatest import from Mexico, measured in short tons, except for the Port of Brownsville, where petroleum products are the third most shipped commodity from Mexico.

For example, at Port Arthur, of 12.66 million short tons of goods imported from Mexico from January to November of 2011, 11.93 million (94.21%) were petroleum, crude, and fuel oils. At the Port of Houston, 34.61 million short tons were imported from Mexico during the same period. Of those, 17.06 million (49.3%) were petroleum, crude, and fuel oils.[18]

The nature of Mexico-Texas trade is unique, however, because many goods are transported by truck. Texas imports from Mexico in 2010 by land modes of transportation totaled 18.7 billion tons and were valued at $63.8 billion. Total Texas imports from Mexico in 2010 by all modes of transportation weighed 64.8 billion tons and were valued at $82.6 billion. This figure underscores the importance of surface movement of goods from Mexico to Texas, but also highlights the fact that goods being shipped by land are lighter in weight and more expensive.[19]

2.5.2 Brazil

As South America's largest economy, Brazil continues to grow in importance for Texas trade. Texas ports handled 14.03 million short tons of Brazilian cargo in 2011, 9.4% of total trade with Latin America by tonnage.[20] The country's main trading commodities by volume with Texas ports are chemicals, including petrochemicals, plastic resins, and industrial alcohols. Other commodities include raw minerals, including bauxite, coal, granite, and agricultural products, like cotton, wheat, wood products, and coffee. A significant amount of finished material is handled by Texas ports, like agricultural and oil field equipment.

The vast majority of trade is between southern Brazil (the Port of Santos) and the Port of Houston, with the commodities being split between tankers and container vessels for the chemicals, dry-bulk, break-bulk, and container vessels for the raw minerals, and container and dry-bulk vessels for the agricultural products.[21] These items generally travel on ships that collect containers and cargo from Argentina, then Uruguay, and then make stops along the Brazilian coast. These agricultural products are picked up in the south at the ports of Rio Grande and Navegantes. Industrial and finished products are shipped from the ports of Santos and Rio de Janeiro, while minerals and chemicals, as well as some agricultural products in the northeast at the Port of Suapes, before arriving at the Port of Houston.[22]

According to trade statistics from the Port of Houston, different ports in Texas handle different commodities from Brazil, though chemicals (including fuels) are the bulk of Brazilian business at all Texas ports except Brownsville. Those chemicals are the only Brazilian imports at the Port of Texas City. Large amounts of wood pulp are delivered to Beaumont and Port Arthur, construction and vehicle equipment to Galveston, steel to Brownsville, medical equipment and generators to Freeport, general cargo to Corpus Christi, and a large variety of other items to Houston.

By value, exports to Brazil have increased significantly over the last several years and were only minimally impacted by the global recession, increasing 20% in value from 2008 to 2010. Brazil's share of the total value of exports from Texas continues to grow, but Texas imported less from Brazil in 2010 than it did in 2009, a trend that should be monitored in the context of the international economic climate surrounding Brazil, the US, and China.[23]

2.5.3 Colombia

Colombia's economy, the third-largest among Central and South American countries, imported $12 billion of goods from the US in 2010.[24] The US imported over $15.6 billion of goods from Colombia in 2010. [25] Trade between the US and Colombia grew in the decade between 2000 and 2010. After adjustment for inflation, the value of total exports to Colombia grew by 159%, and

the value of total imports from Colombia grew by 77%.[26] The US is Colombia's largest trading partner.

President Obama signed legislation for the US-Colombia Trade Promotion Agreement into law on October 21, 2011.[27] However, the agreement did not take immediate effect. Colombia must demonstrate compliance with certain stipulations in the agreement before it can officially be approved.

Of the total value of American exports to Colombia in 2010, $832 million (6.93%) comprised agricultural products, which are specifically targeted for tariff elimination in the pending free trade agreement.[28] US agricultural exports to Colombia have been dwindling due to an increase in trade between Colombia and other agriculturally rich nations (such as Argentina). The US is still Colombia's largest supplier of wheat. [29]

Oil is the top Colombian product shipped to the US over a 5-month period (January-May) in 2010, oil accounted for 66% of the value of all Colombian exports to the US.[30] Second was gold (7.8%), followed by flowers, coal, and coffee.[31]

According to unpublished data provided by the Port of Houston[32], in the period January–November 2011, Texas ports handled over 9 million short tons of petroleum, crude, and fuel oil exported to the US from Colombia. This figure represents 85% of all exports by volume/weight from Colombia that passed through Texas ports. Texas City handled the most at a little over 4 million short tons. Petroleum, crude, and fuel oil are by far the most-handled exports in the Texas ports of Texas City, Port Arthur, Houston, Beaumont, Corpus Christi, Galveston, and Freeport. Other important exported commodities handled by Texas ports are vegetables (Texas City, Port Arthur, and Houston), bananas (Freeport and Galveston), still wines (Texas City), and coffee (Houston).

Although the US is the biggest supplier of wheat to Colombia, wheat only accounts for 1% of the value of all exports. The commodity with the largest value is oil and mineral fuels, which accounted for 20% of the total value of all American exports to Colombia during the 5-month period of January through May 2009. Chemicals accounted for 9% of the value of Colombia-bound exports, and transportation equipment made up 8% of export trade. Chemicals and fuel travel by tanker ship. Transportation equipment travels via a variety of means, including roll-on/roll-off ship.[33]

Texas exported an average of $3.4 billion in goods yearly to Colombia from 2008 to 2010. Exports from Texas accounted for approximately 28% of the total amount of goods exported from US to Colombia in 2010. Over 60% of exports consisted of chemicals and petroleum/coal products. Almost 20% was non-electrical machinery. Computers and electronic products were 5%. All other commodities made up 14% of the total amount of goods exported to Colombia from Texas.[34]

From January through November 2011, the Port of Houston handled a little over 1,124,000 short tons of petroleum, crude, and fuel oils exported to Colombia—roughly half of the total amount of exports to Colombia sent from Houston (2.35 million short tons). Rounding out the top five

commodities exported by volume/weight to Colombia from Houston were aliphatic hydrocarbons (107,000 short tons); mineral oil (106,000); styrene monomer (82,200); and gasoline and aviation fuel (78,100).[35]

During the same period, the Port of Corpus Christi handled over 245,000 short tons of halogenated hydrocarbons exported to Colombia. Petroleum, crude, and fuel oil also pass through Corpus Christi on the way to Colombia. Corpus Christi also handles non-liquid exports to Colombia, such as oil field, construction, and building equipment. Other noteworthy commodities exported to Colombia through Texas include fabrics (including raw cotton) from Freeport (almost 35,000 short tons from January through November 2011), paper and paperboard (including waste) from Freeport (over 33,000 short tons), and grains and flour products, which passed through Galveston and accounted for 275,000 short tons during January through November 2011.

Colombia's main ports are all located on the country's Caribbean coast, as opposed to the Pacific coast. The implications for this are that any Colombia-Texas maritime trade will not transit the Panama Canal. A recent search on the *Journal of Commerce*'s website *JOC Sailings* showed 122 sailings scheduled over a period of 60 days from Colombian ports to Houston. (Note: some sailings will call at more than one Colombian port, and are thus double-counted.)[36]

Ninety of the scheduled 122 sailings to Houston include Cartagena as a port-of-call. In 2010, a total of 2,216 ships called at Cartagena.[37] Of these, 1,807 were container cargo ships. Barranquilla is another major Colombian port. The *JOC Sailings* search results indicate that 20 sailings to Houston will call at Barranquilla. In 2010, Barranquilla handled 643 ships. The major import commodity handled at Barranquilla is grain: over 1 million tons were offloaded in 2010.[38] The major export commodity at Barranquilla is coal: over 500,000 tons were loaded in 2010. Barranquilla also handled 436,000 tons of container cargo. [39]

Chemicals, fuels, and coal comprise the majority of imports and exports between Colombia and the US. These commodities travel mainly via tanker ship, and less by container vessel. Note that tankers generally do not operate on regular schedules or a charter basis, and therefore do not appear in searches on the *Journal of Commerce Sailings* website.

2.5.4 Chile

Top exports from the US to Chile in 2010 were machinery, mineral fuel, vehicles, electrical machinery, and plastic; top imports from Chile to the US in 2010 were copper, fruits and nuts, fish and seafood, wood, and beverages.[40]

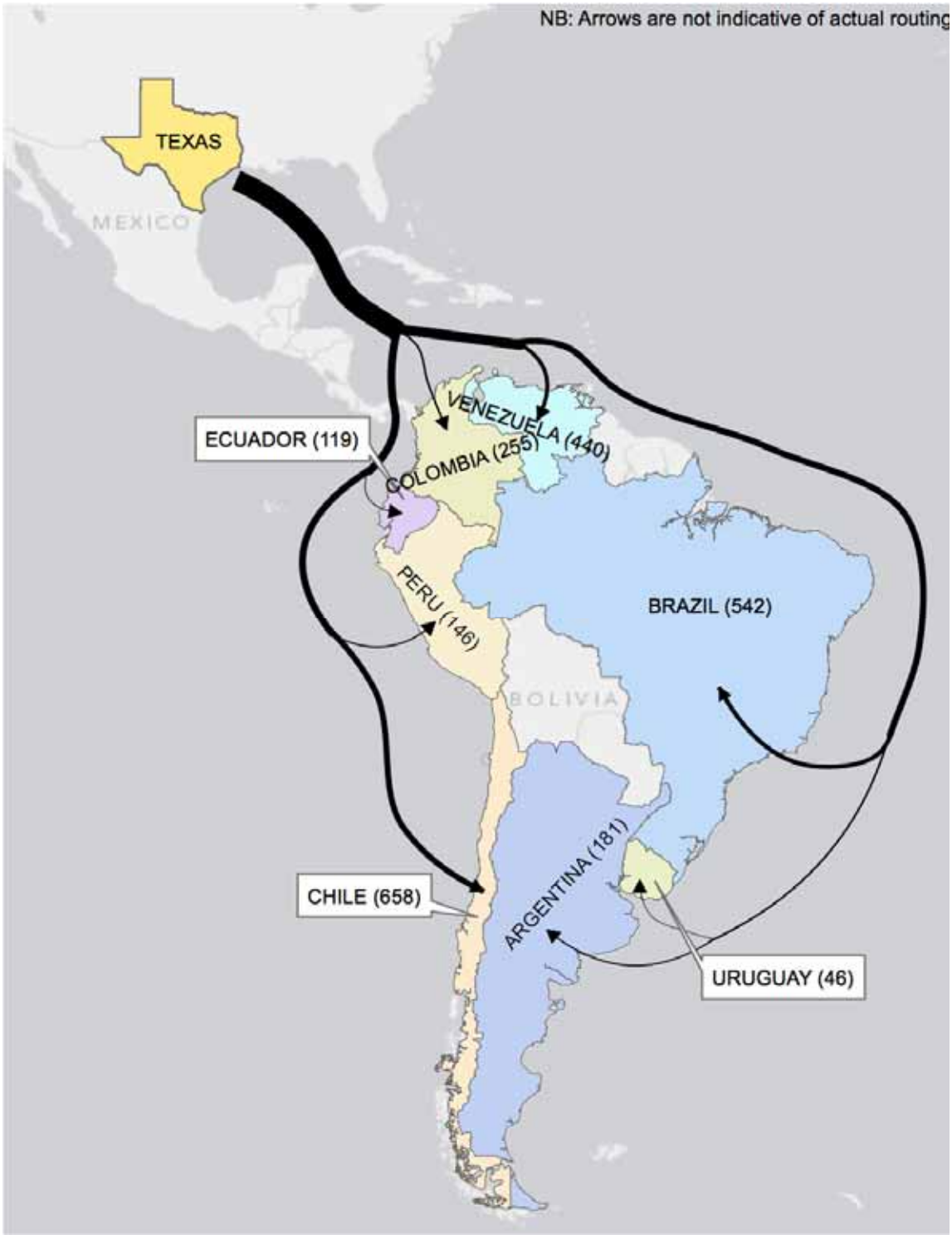
In a recent search of all scheduled sailings from Chilean ports, 33 ships, a mixture of general cargo and container carriers, were scheduled to leave Houston within 60 days. Chile's largest port in terms of metric tons moved, Valparaiso, accounted for 20 of those sailings. In comparison, a similar search of the Port of Santos, Brazil's largest port, 55 ships were scheduled to go to Houston within 60 days, all of them container carriers.[41]

Looking at imports from Chile in terms of short tons, petroleum, crude, and fuel oil make up the vast majority. Oil is the first or second-ranked import in monetary value from Chile at all Texas

ports, except for the Port of Brownsville, which recorded no imports from Chile between January and November of 2011. Because liquids are transported by tanker that are generally sub-Panamax, the increasing size of the locks in the Panama Canal will not have a direct effect on the ships used to transport oil from Chile to Texas. Wait time at the Panama Canal, however, could be affected as the Canal expands. If container and non-container ships alike are able to pass through the Panama Canal more quickly, the transport of goods from Chile to Texas is likely to become timelier.

Of the state's top trading partners, Chile is the only country that must use the Panama Canal for all of its shipping to Texas. However, because the volume of trade between the US and Chile is relatively small compared to other trading partners, as well as the fact that some of the ships coming to Texas from Chile are general cargo, the expansion of the Panama Canal will not likely significantly alter the nature of Chile-US trade.

In summary, Figure 2.3 depicts the scheduled non-containerized sailings from Texas ports to South America (November 2011–May 2012).



Source: US Census Bureau[42]

Figure 2.3: Scheduled Non-Containerized Sailings from Texas Ports to South America (November 2011–May 2012)

2.6 Trade Lanes

Maritime trade lanes are vital to Texas imports and exports. In the case of Latin American trading partners, moving goods over water is practically the only option, save for a few land connections between Texas and Mexico. Depending upon the destination, goods may or may not move through the Panama Canal during their transit between Latin America and Texas. Latin American ports of origin/destination for Texas imports/exports can be divided into four geographical categories:[43]

- Mexico/Central America
- Northern coast of South America (includes Colombia and Venezuela)
- Eastern coast of South America (includes Brazil, Uruguay, and Argentina)
- Western coast of South America (includes Ecuador, Peru, and Chile)

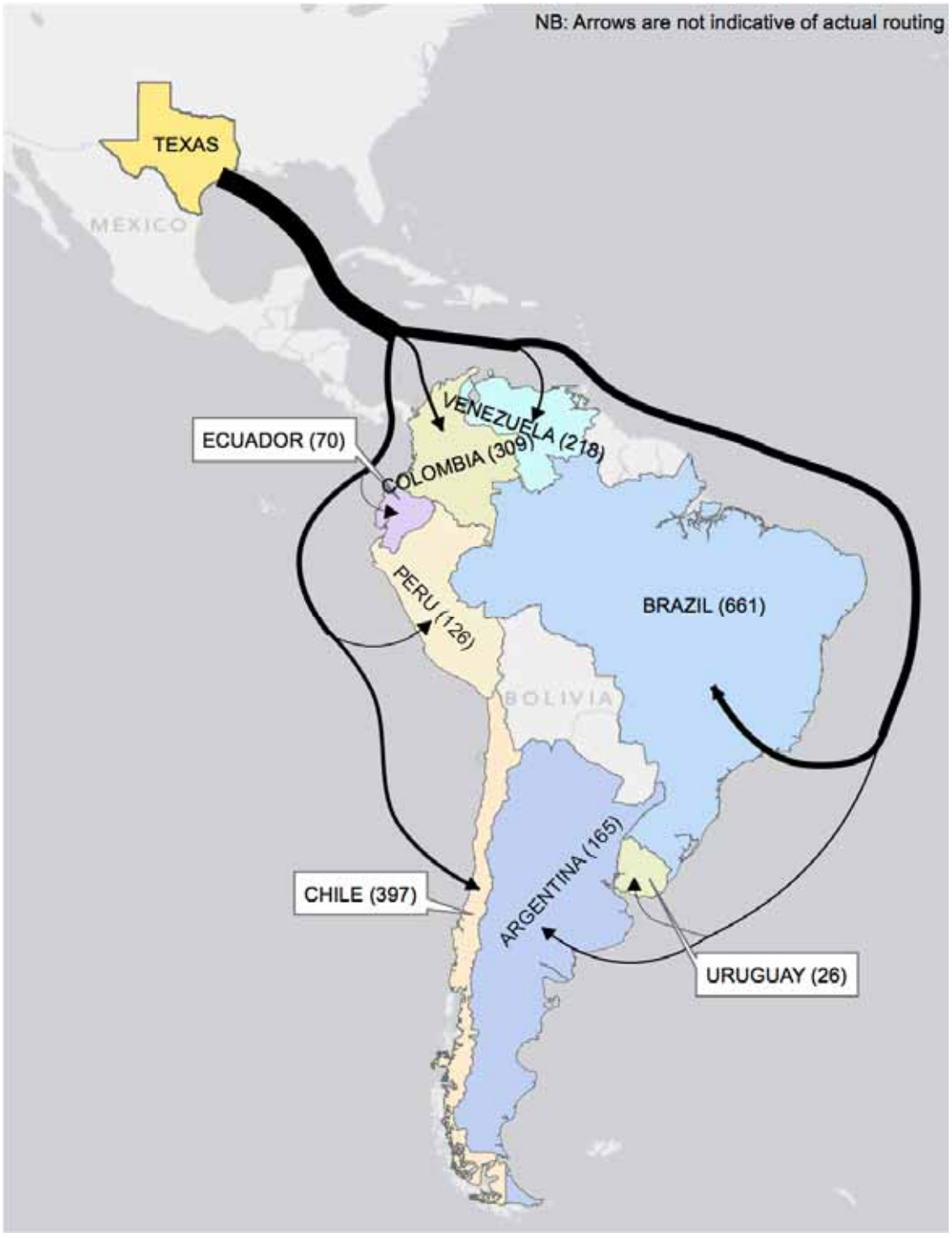
Of these four categories, only goods moving between Texas and the western coast of South America can be expected to transit the Panama Canal. No country on the western coast of South America is in the top 15 countries of origin for Texas imports.[44] Therefore, the Panama Canal does not play a large role for Latin American-sourced imports into Texas.

The 3 countries on South America's western coast rank among the top 20 destinations for Texas exports. Goods traveling to Ecuador, Peru, and Chile accounted for almost $7 billion in waterborne trade in 2010, a 52% increase over the same amount in 2009.[45] However, this amount accounts for only about 7% of total exports from Texas to its top Latin American trading partners. Note that trade running between Texas and the western coast of South America is "captive" to the Panama Canal; i.e., alternative routes do not exist.[46] Therefore, the Panama Canal does play a small but important role in Latin American-bound exports from Texas.

Despite continued growth in the dollar amount of imports and exports transiting between Texas and Latin America, the balance is heavily skewed towards Mexico. Trade with Mexico vastly overshadows trade between Texas and any other Latin American country.[47] Consequently, maritime links between Texas ports and Latin America are heavily concentrated between Texas and Mexico. Goods transiting the Panama Canal to Latin America are bound for South America's western coast, home to the quickly growing economies of Chile and Peru. Also important are the trade lanes between the north and east coasts of South America, which do not transit the Panama Canal.

2.7 Scheduled Shipping

Not all Texas ports have regularly scheduled sailings to South America. As stated above, and as is generally applicable, the Port of Houston is the most active in Texas in terms of both containerized and general cargo. The Port of Galveston does have significant general cargo sailings to South America, but no scheduled container service. Figure 2.4 depicts the scheduled containerized sailings from Texas Ports to South America (November 2011–May 2012).



Source: US Census Bureau[48]

Figure 2.4: Scheduled Containerized Sailings from Texas Ports to South America (November 2011–May 2012)

Chile and Brazil are the destinations of the most sailings of both containerized and general cargo. Venezuela is a close runner up for general cargo sailings (300), likely due to chemical trade with the US.

The Ports of Houston, Galveston, and Freeport are the only Texas ports with scheduled service to South America, though only four scheduled sailings issue from Freeport, all of which are refrigerated container ships to Colombia.[49] Freeport and Galveston both import significant amounts of bananas by container, but those sailings are not regularly scheduled services. Numbers listed are results for a search of sailing in an average 190 day period in late 2011. There is some inflation between the number of vessels and the number of results due to multiple ports and joint ventures, but the magnitude of the results is measurably correct. The great majority of scheduled results from Texas to South America, both of containerized and general cargo, sail from the Port of Houston. In an average 6-month period, Houston sends about 1,800 scheduled non-containerized shipments to South America, and about 1,900 containerized. The most common destinations for general cargo are Chile (658 results on *JOC Sailings*) and Brazil (542 results), while the most common destination for containerized cargo from Texas is Brazil (661 results), followed by Chile (397 results). From Galveston, 789 general cargo sailings and no container sailings are scheduled for South America. These numbers do not account for tanker vessels, which are not regularly scheduled and generally cannot be chartered.

As an illustration, a containerized bale of cotton is loaded onto a Grupo Libra ship in Houston on a Monday in February, which departs for Santos, Brazil on Tuesday. The ship arrives in New Orleans 2 days later, and then spends 4 days at sea en route to Caucedo, in the Dominican Republic. The ship departs Caucedo the same day, arriving 6 days later in Suape, on the northeastern coast of Brazil. After 24 hours of loading and unloading, the ship departs for Santos, arriving after 4 more days at sea, for a total trip of 17 days. The ship then makes stops in southern Brazil, Uruguay, and Argentina before returning back up the South American coast to Houston less than 60 days after the bale was loaded.

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Chapter 3. Transshipment and the Caribbean Hub Port System

3.1 Introduction

In the past, shipping in the Caribbean was set out in a system of direct trade—a single shipping vessel would transport goods from their point of origin to their final destination. Today, many ocean carriers utilize an alternative method: transshipment. Shipping companies store their goods in uniform containers and pack them into massive cargo ships en route to key ports in the Caribbean. From these hub ports, goods are distributed onto smaller vessels and delivered throughout the region and beyond. This chapter examines how these ports developed, how they operate, and forecasts how transshipment and the shipping industry will evolve within the Caribbean.

3.2 The Role of Transshipment

Container ships are one of the most common means of commercial freight transport and dominate the shipping trade throughout the Caribbean. Containerization, developed in the 1950s, allows for mass amounts of cargo to be grouped together and unloaded from ships at high speed. Before the development of containerization, items were loaded, lashed, unlashed, and unloaded from a ship, resulting in inefficient, piecemeal delivery of cargo. Once merely converted tankers, the "container ship" designation is now used to describe massive post-Panamax vessels with molded breadths of over 32 meters (35 yards). However, using large, new container ships for all transfers faces some impediments. The cargo lines serving northern and eastern South American countries must span vast coastlines with great distances between ports. The shipments to and from these ports are significant, but not large. In this environment, using direct shipping by exclusively large or small containerships would be inefficient. Instead, a system of transshipment is in place in the Caribbean in which mega containerships make deliveries to shipping hubs. These shipments are distributed onto smaller feeder vessels for delivery to their final destinations.

Transshipment has consistently increased over the past decade. Container trade to and from South America grew from 13,628 million TEU (twenty-foot-equivalent) container boxes in 1999 to 20,705 million TEU in 2005.[1] Transshipment within the region continues to increase both in volume and quantity of carriers. The Gulf of Mexico and the north and east coasts of South America totaled 8.621 m TEU, over 4.5 TEU of which is directly involved in transshipment. Today, approximately 90% of non-bulk cargo is transported by container and modern ships can transport over 12,000 TEU.[2] Container ships are among the largest commercial vessels manufactured worldwide. These mega-mainline vessels distribute their containers to and from numerous destination points, each of which contributes or withdraws only a portion of the total cargo.[3]

Transshipment is not simply a logistics convenience, but also an opportunity to increase the value of the goods being transported, especially for carriers and shippers with low to medium loading/discharging costs.[4] A primary function of transshipment is the reduction of total costs in the collection and distribution of cargo, but the system offers many more benefits, including the ability to improve just-in-time delivery of cargo, reduce in-transit inventory, and streamline the

routine complications involved in origin-to-destination transportation. Additionally, the effective utilization of transshipment strategy can optimize the logistics chain performance as the level of efficiency can be analyzed though the different stages of the process.[5]

Transshipment also allows for on-the-go adaptation such as assembly, calibration, cargo consolidation/deconsolidation, and customization. If a problem with a shipment arises, fixing it mid-route becomes a possibiliy. Additionally, the flexibility of delivery made available by multiple small-scale transfers ensures that cargo will always arrive on time. In order for transshipping to remain an attractive option, the economic and operational benefits must outweigh added economic and operational costs such as additional handing costs, port dues, extra voyages, and schedule deviations.[6] These value-adding strategies allow carriers to optimize their efficiency and maximize profits.

3.3 Development and History of Hub Ports in the Caribbean

Transshipment ports developed within the Caribbean largely as a reaction to the islands' proximity to established shipping lanes. Infrastructure is essential to transportation.[7] Thus, the convenience offered by transshipment finds a natural home in close proximity to high-frequency, long-distance shipping lanes. The mega container ships that frequent these trade lanes must avoid any unnecessary detours and the smaller delivery ships stationed at transshipment ports provide a perfectly situated local delivery service.[8] The Panama Canal serves as a funnel for shipping lanes between the Atlantic and Pacific oceans; thus, the ports on either side of the canal (Balboa and Colon) primarily drop off or pick up cargo at that location. With its central location, Kingston serves the Gulf of Mexico, the US East Coast, and transatlantic routes. Freeport also serves the Gulf of Mexico while Cartagena serves the southeast coast of the US.

Another reason for the rise of transshipment ports in the Caribbean is the low cost of labor and the availability of land in the region. A joint study by the National University of Singapore and The University of British Colombia identified that a "bigger port can set a lower port price to attract more demand as it is more likely to have spare capacity and hence less congestion."[9] These ports are located in developing countries, setting them apart from other ideally located, first-world ports such as Miami. Due to the higher business costs and more restrictive cabotage restrictions, set out by legislation including the Merchant Marine Act of 1920 (also known as the Jones Act), Freeport has attracted much of the business instead. Transshipment ports such as Freeport, Cristobal, and Balboa are investing in terminal developments and expanding to accommodate new generations of containerships. The availability of land in these locations allows for this expansion. Most transshipment activity takes place within the Caribbean transshipment triangle, a shape roughly following the perimeter of a round-trip Freeport-Colon-Port of Spain journey.[10] With the expansion of the Panama Canal, this triangle is expected to accommodate ships of approximately 14,000 TEU. This development will further drive growth and commerce within the region.

3.4 Caribbean Hub Port System

The Caribbean hub port system is situated perfectly for growth in containerized trade due to the nature of the geography and the positioning of the ports in relation to the major north-south and east-west trade lanes. Kingston is the leading port in terms of annual throughput. Sitting at the

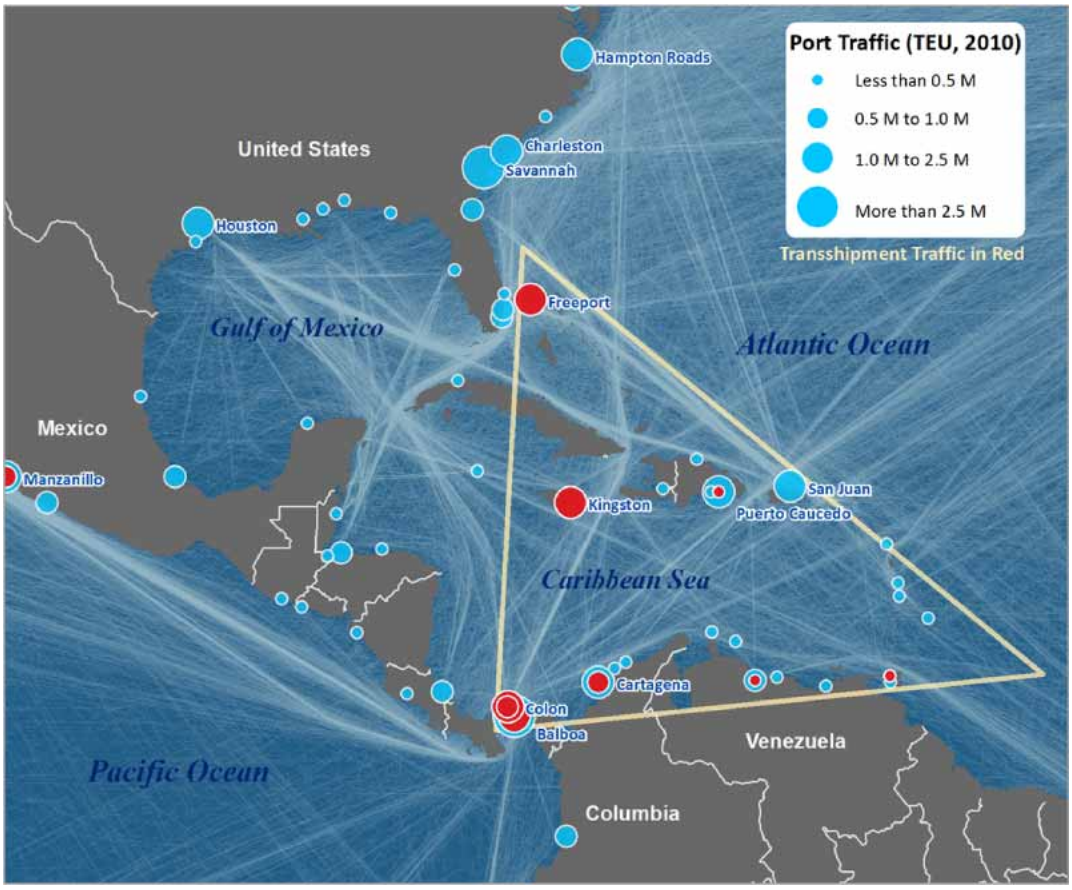
center of the triangle, Kingston is well positioned to capture a significant share of the containerized traffic destined for Florida and the US Gulf Coast, especially the Port of Houston. Many of the hub ports have begun preparations for greater channel depth, more berth space, and larger equipment to handle post-Panamax and super-post-Panamax vessels.

This report considers two types of ports in the Caribbean: global and regional hubs. The ports of Kingston, Freeport, Manzanillo, and Caucedo are the global hubs, while the other ports serve as regional hubs or service ports. Table 3.1 lists the TEU throughput for these hub ports while Figure 3.1 situates them on a map. The defining characteristic of a *global hub port* is that the amount of TEU throughput is significantly more than the local market could support. For this reason, the chapter will focus on the following ports: Kingston, Colon (all terminals), Freeport, and Caucedo. The following port profiles will define the history, operations, and infrastructure of each port as well as any specific projects designed to capture growth in the transshipment industry.

Table 3.1: TEU Throughput for Caribbean Hub Ports

Port	Country	2010 TEU	2009 TEU	2008 TEU	Classification
Kingston	Jamaica	1,891,770	1,689,670	1,915,493	Global Hub
Manzanillo	Panama	1,599,676	1,406,030	1,600,792	Global Hub
Cartagena	Colombia	1,581,401	1,237,873	1,064,985	Regional Hub
Freeport	Bahamas	1,125,000	1,297,000	1,702,000	Global Hub
Caucedo	Dominican Republic	1,034,901	906,729	736,789	Global Hub
Colon	Panama	-	802,120	1,096,058	Regional Hub
Cristobal	Panama	699,058	354,956	249,244	Regional Hub
Port of Spain	Trinidad	388,960	403,000	385,000	Regional Hub
Rio Haina	Dominican Republic	288,417	277,949	283,229	Regional Hub

Source: Containerisation International 2012



Source: American Association of Port Authorities[11]. Transshipment data adapted from Drewry Shipping Consultants.

Figure 3.1: Caribbean Hub Ports

3.5 Caribbean Hub Port Profiles

3.5.1 Port of Colon

History and Operations

The Port of Colon sits atop the east-west and north-south international shipping corridors in the Western Hemisphere. Located on the eastern side of Panama, the Colon Container Terminal services the Atlantic entrance to the Panama Canal. Its sister port, the Port of Balboa, is located on the Pacific access point for the Canal. The ports belong to the greater Panamanian port system and both are privately operated. Balboa services the greater Panama City area while the Port of Colon services the Colon Free Zone and Panamanian hinterlands.[12] Strategically located at the Atlantic entrance, the Port of Colon is perfectly situated to capture significant growth in Caribbean containerized transshipment with the Canal expansion.

Formerly a US Navy base, the Port of Colon was returned to Panama in 1997 and privatized. The port serves as an intermodal hub for oceangoing cargo and specializes in containerized, general, and rolling stock cargo. Transshipment is the primary function of the port. Three private container operations companies at the port: Colon Container Terminal S.A., Port of Cristobal

Terminal, and Manzanillo International Terminal.[13] The Panama Ports Company (a subsidiary of Hutchison Port Holdings) and a foreign affiliate jointly operate all ports in Panama. For instance, Stevedoring Services of America Panama, SSA Seattle, and private families operate the Manzanillo Terminal. The Panama Ports Company, along with Evergreen International Panama S.A. and Taiwan's Evergreen Group, operate the Colon Container Terminal.[14]

In 2011, over 14,600 ships made the transit through the Panama Canal and over a third of these transits were expected to call on one of Panama's ports.[15] The goal of these ports is to capture the expected increase in containerized traffic passing through the Canal and provide maintenance and bunkering for passing ships. The Panama Ports Company hopes to create "mega ports" on the Atlantic and Pacific access points to the Canal with a capacity of over six million TEUs annually.[16]

Infrastructure

The Colon Container Terminal is a medium-sized transshipment center located next to Coco Solo on the northeast corner of Colon. It covers over 74 hectares (183 acres) and has channel access of 14 meters (46 feet). In 2008, a new pier was added with a 15-meter/16-yard draft and a turning basin of over 600 meters/656 yards. The three piers combine for over 980 meters/1071 yards of container berth. Colon also has 10 gantry cranes, half of which are post-Panamax (18 row reach) while the other 5 are Panamax (14 row reach).[17] The terminal also has over 900 reefer plugs, space for 400 TEUs of high-risk containerized cargo, and a railway connection adjacent to the property provided by The Panama Railway Company.[18]

The Port of Cristobal is approximately 3 kilometers (1.8 miles) southwest of the Colon Container Terminal and is unique in its man-made isthmus created in 1914 as the primary entry point for supplies in building the original canal.[19] The Panama Ports Company manages this port as well as the Port of Balboa on the Pacific side of the Canal. The port covers 143 hectares (353 acres); when combined with the isthmus layout, this allows for two container berths, seven multi-purpose berths, and two additional berths. This accounts for approximately 3,750 meters (4,101 yards) of berth space with alongside depths of 12 to 14 meters (39 to 46 feet). The port is equipped with 6 container quay cranes, 1 harbor crane, and 10 rubber-tired gantry cranes. A recent expansion of the port in 2005 increased the berth space by 660 meters (721 yards) along with 7 gantry cranes, 18 rubber-tired gantry cranes, and 6 additional hectares (15 acres) of warehouse space.[20]

The Manzanillo International Terminal is the third privately operated terminal at the Port of Colon. Located adjacent to the Colon Container Terminal, the Manzanillo terminal is the distribution center for cargoes destined for Panama and neighboring countries in Central America. The Manzanillo International Terminal is the only Panamanian terminal with a secure direct link to the Western Hemisphere's largest free zone, the Colon Free Zone.[21] The terminal has over 1,200 meters (1,312 yards) of alongside berth space with a 14-meter (45-ft) alongside depth. Also available is 400 meters (437 yards) of container berth space along with over 50 hectares (123 acres) of containerized store space.[22]

Example of Trade Route: Maersk's *Wolfsburg*

In order to paint a picture of the voyage of a containership travelling between a Caribbean Hub Port and the Port of Houston, an illustrative example is given here. Maersk Lines operates several Caribbean feeder routes; one in particular reaches from the Manzanillo terminal to Houston. The *Wolfsburg* travels in a circular feeder route and is capable of carrying 1800 TEUs. On February 8, 2012, the *Wolfsburg* was scheduled to depart the Manzanillo terminal and return on February 28, 2012. On its route it called upon Puerto Limon, Puerto Cortes, Santo Thomas de Castilla, Port of Houston, Freeport, New Orleans, and Mobile. On the southbound journey the *Wolfsburg* was scheduled to call upon some of the same ports, but each trip is slightly different depending on the cargo and its destination. This Maersk Line route is named the Expreso, and the endpoints for all vessels servicing this route are Houston and Santa Marta, as Figure 3.2 depicts. The Manzanillo terminal in Panama is the hub of this route.[23]

Source: Maersk Line Expreso Route 2011[24]

Figure 3.2: Maersk Line Expreso Route

3.5.2 Port of Freeport

History and Operations

The Port of Freeport consists of the Freeport Container Port, the Freeport Harbor, and a free trade zone. The Grand Bahamian Port Authority manages the greater port area overseeing the cruise ship terminal, the container port, and a ship maintenance facility.[25] Opened in 1997, the Freeport Container Port straddles the shipping lanes between the western coast of South America and the eastern coast of North America, and the Asia-Europe Pacific connection. Operated by Hutchison Port Holdings, a global port investor and operator, it is open 24 hours every day of the year and can handle the largest ships built to date.[26] In 2004, the US and the Bahamas signed a Memorandum of Understanding to begin the Megaport's initiative. The objective is to "deter, detect, and interdict illicit nuclear and radioactive materials being trafficked through the global maritime system."[27] The understanding is expected to solidify Freeport's standing as a necessary component of the transshipment system in place today.

The rationale for the development of Freeport as a container transshipment center is unique. Located approximately 100 miles east of the Port of Miami, Freeport has flourished alongside one of the larger US container ports on the East Coast. This is due to the short-sea-shipping barrier in the US, a result of the 1920 Jones Act (covered in Section 3.6). Simply put, the Act creates higher operating costs for shipping companies traversing between American ports. To evade this cost of business, Freeport has stepped in as an intermediate hub for transshipment.[28]

Infrastructure

The port boasts over 1,030 meters (1,126 yards) of berth space with an alongside depth of 15.5 meters (51 feet). It also has 10 super-post-Panamax quayside gantry cranes, 2 Gottwald mobile harbor cranes, and 76 straddle carriers, 1 of which is a megaport straddle carrier with radiation detection capability. The port provides 49 hectares (121 acres) of space for container stacking and has an annual throughput capacity of 1.5 million TEUs.[29] Freeport is not currently expanding its facilities.

3.5.3 Port of Kingston

History and Operations

The Port of Kingston is located in the capital of Jamaica, Kingston. On the southern side of the island, its location is ideal for transshipment due to its proximity to shipping lanes and a naturally deep harbor. The port is the largest English-speaking terminal in the Americas, outside the US.[30] Much of the port's current infrastructure, such as the wharves and major waterfront development, is due to modernization efforts undertaken during the 1980s and 1990s.[31] Kingston's market strategy has been to tie shipping companies to its port by leasing specialized facilities to specific carriers. Shipping companies, or their subsidiaries, privately operate many of the terminals at Kingston.[32]

The Port Authority of Jamaica is the primary regulator and owner of all Jamaican ports, but the Kingston Container Terminal handles the bulk of Jamaica's transshipments. The terminal consists of three properties—the North, South, and West Terminals—that together are capable of handling 2.8 million TEUs annually. Put another way, more than 2,600 vessels called on the port in 2008, and the majority were containerized cargo vessels. The North and South Terminals are equipped with IT systems for management, operations, and maintenance.[33] If Shanghai and Rotterdam are the axis of European and Asian trade, then Kingston is the hub of the Caribbean system of containerized transshipment. The Kingston Container Terminal is also undergoing another round of modernization; when complete, the terminal will be able to handle 3.2 million TEUs of throughput.

Infrastructure

Combined, the three Kingston Container Terminals boast of 19 ship-to-shore gantry cranes, 4 of which are super-post-Panamax size with computer-aided operations systems. Also available are 73 straddle carriers, 9 forklifts, 24 trailer trains with 9 train tractors, and 744 reefer plugs.[34]

The North Terminal has 535 meters/585 yards of berth space along with 47 hectares (116 acres) of yard space for storage. The four super-post-Panamax ship-to-shore gantry cranes are located at

this terminal. The South Terminal, also called Gordon Cay, has 1,300 meters/1,422 yards of berth space, five post-Panamax gantry cranes, six post-Panamax ship-to-shore gantry cranes, and 82 hectares/202 acres of container storage space (25 hectares/62 acres of which are not paved). The West Terminal has 475 meters (519 yards) of berth space, 65 hectares (161 acres) of storage space, and four super-post-Panamax ship-to-shore gantry cranes.[35]

Example of Trade Route: CMA-CGM's *Auckland*

The *Auckland* is operated by CMA-CGM, which is the world's third-largest steamship line[36] and is headquartered in France. *Auckland* operates on the Gulf Bridge Express Route, as seen in Figure 3.3. In addition, four vessels of relatively equal size to the *Auckland* (at approximately 2,500 TEUs) operate along this route, making scheduled calls at all the ports. The southbound route begins at the Port of New Orleans and ends 10 days later at Cartagena. Likewise, the northbound route begins at Cartagena and the *Auckland* can expect to call at the Port of New Orleans 26 days after starting south.[37] The important note about this route is that it does not connect with any Panamanian ports. Therefore, larger vessels traveling east to west, or vice versa, are depositing containers at Kingston, the only deep-water port that is correctly positioned in the Caribbean.

Source: CMA-CGM Lines Services[38]

Figure 3.3: CMA-CGM Gulf Bridge Express Route

3.5.4 Port of Caucedo

History and Operations

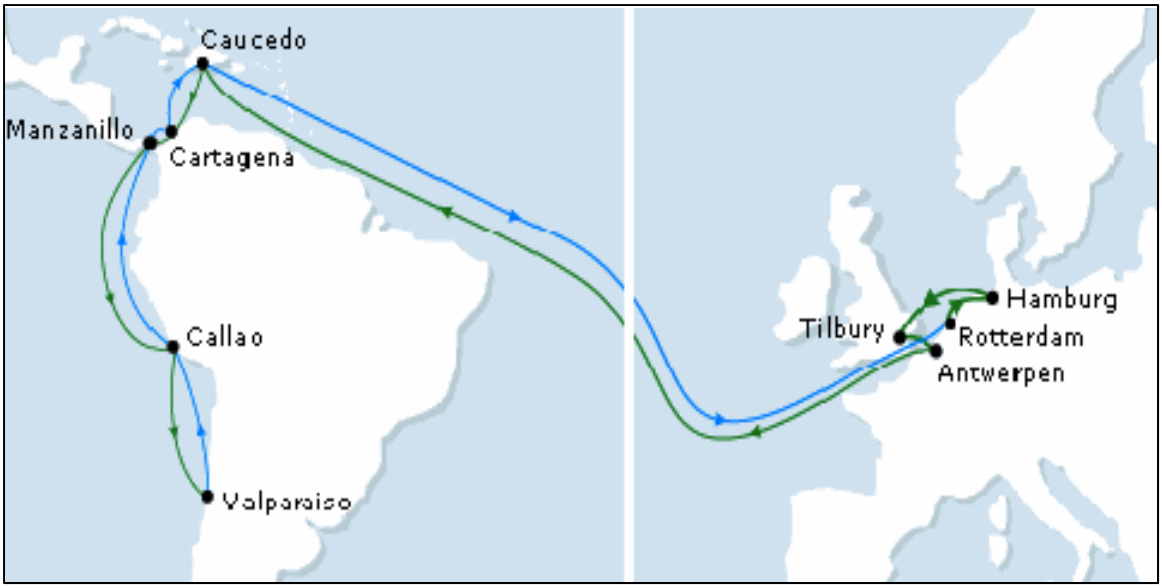
The port at Caucedo, or Punta Caucedo, is located approximately 25 miles east of Santo Domingo, the commercial and capital city of the Dominican Republic. Facing south to the Caribbean, the port serves as another hub for east-west containerized trade, as well as north-south trade. Specifically, containers bound for the US East Coast from South American ports can use Caucedo to transship them. In 2003, DP World, a Dubai-based port authority and operations company, purchased Caucedo from a CSX Corporation unit.[39] The port of Caucedo handled just over one million TEUs in 2010 and is positioned, along with the other ports mentioned, to gain from increases in containerized traffic through the Caribbean.

Infrastructure

The port's infrastructure was updated in 2003 to prepare for post-Panamax shipping. The figures here represent a general list of specifications of the port's capabilities. Caucedo has 922 meters (1,008 yards) of alongside berth space with an alongside depth of 13.5 meters (44 feet). The container yard has approximately 50 hectares (124 acres) for storage with over 650 reefer plugs. An additional 350 reefer plugs are also available with mobile power generators if the need should arise. Caucedo also has 5 post-Panamax gantry cranes, 2 mobile harbor cranes, and 20 rubber-tire gantry cranes. Like many modern ports, Caucedo also uses a Navis operating system for command and control of the port and containers.[40]

Example of Trade Route: Hapag Lloyd's *Glasgow Express*

The *Glasgow Express* is operated by Hapag Lloyd CC (CMA-CGM is the shipping agent) and calls on 13 ports during its sling route from Northern Europe to the western coast of South America (as Figure 3.4 shows). Beginning in Rotterdam, the *Glasgow Express* makes its first Caribbean stop at Caucedo. With a nominal capacity of over 4,000 TEUs, the *Glasgow Express* is by no means one of the larger vessels in containerized trade. However, with eight vessels on this route for CMA-CGM with capacities ranging from 2500 to 4300 TEUs, and with each port being called upon once a week, this route is responsible for a considerable amount of TEU throughput in the Caribbean. The *Glasgow Express* and the rest of the fleet on this route service it year round; a full trip beginning and ending in Rotterdam takes roughly 56 days.[41]



Source: CMA-CGM Lines Services[42]

Figure 3.4: CMA-CGM West Coast Chile Eurosal Sling 1 Route

3.6 Cabotage Laws and Transshipment to the US

Most nations have cabotage laws that severely restrict how passengers and cargo may be transported within the legal boundaries of a country. Cabotage law restricts who and what are permitted to bring goods from one domestic port to another. Since 1989, the US has been the

vanguard for forming cabotage legislation. The Merchant Marine Act of 1920 (aka the Jones Act), which requires that vessels involved in domestic shipping must be US-owned, US-built, US-crewed, and US-flagged, has come to be known as the international standard by which other nations' cabotage legislation is judged.[43] While most nations in the Americas have yet to develop the capacity to fulfill all of the duties established by the Jones Act, it has become commonplace to limit cabotage to domestically flagged vessels. Requirements dictating that shipping crews remain local and that vessels be domestically owned are also the norm. Domestic construction requirements are much more rare and only in place in Brazil, Peru, and the US.[44]

Transshipment gives carriers the option to reduce the cost barriers of cabotage, by utilizing foreign ports as bases of operations for feeder ships. Large shipping companies have the ability to register their delivery ships locally. This allows carriers to avoid paying foreign duties. Because their cargo is not coming directly from a foreign nation, carriers may be able to take advantage of regional trade agreements and/or avoid harsh penalties.[45]

The domestic construction requirement set out in the Jones Act is a financial impediment to shipping companies serving the US. This requirement stipulates that companies must purchase American ships over the less expensive Korean or Japanese counterparts. If companies were able to utilize these alternative sources, North American transshipment would become more profitable and domestic revenues would increase between 2.5 and 6.8%. However, U.S shipyards may lose up to 15% of their production with this change in policy.[46] With the possible exception of the domestic construction requirement, cabotage legislation is strongly supported by the carriers engaged in the activity. Such laws serve as effective barriers to entrance for new cabotage shippers and traders and also protect domestic industry. According to the Maritime Cabotage Task Force, the Jones Act "provides direct employment for 124,000 Americans."[47]

Cargo is transshipped to the US primarily through Canada and Mexico. By sending their goods through these two nations, other counties may attempt to gain benefits offered by NAFTA. US imports transshipped through Canada tripled in the decade between 1990 and 2000, from 6.2 to 19.1 billion.[48] The route through Canada is used primarily for US trade with Europe and the Mediterranean, while the route through Mexico is used primarily for imports from the Far East.[49]

3.7 Future of Transshipment in the Caribbean

It is reasonable to expect that transshipment within the Caribbean will continue to grow, especially in increased north-south trade. With the expansion of the Panama Canal, even larger vessels will become involved in transshipment. Ports with larger volumes of domestic cargo will have an advantage over those with less industry and will have an advantage in becoming a hub. Carriers will continue to move their businesses to the region and the Caribbean will become a more competitive market for the largest carriers.

Transshipment of container shipping offers potential improvements in flexibility, cost-savings and reduced origin-to-destination times. In order to maximize the value of transshipment, analysis must focus on identifying indigenous cargo, identifying cabotage bypasses, affecting efficient intra-modal low-cost transfers, and implementing value-added activities such as physical improvements (customization, calibration, assembly, etc.) of cargo. Applying these

strategies bolsters the assumed benefits of the economies of scale that result from mega container ships interacting with smaller feeder vessels.

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Chapter 4. Panama Canal

4.1 Introduction

In 1914, the Panama Canal will celebrate its centennial. First administered by the US government, the Canal has been successfully operated by the Panamanian government's Panama Canal Authority (Authoridad Canal de Panama [ACP]) since the official government-to-government transfer at the end of 1999.

This chapter consists of two parts. It first describes the Panama Canal's current operations in terms of tolls, vessel transits, traffic by market segment, and its physical dimensions. Afterwards, the discussion turns to the $5.2 billion expansion of the Canal, approved in a national referendum in 2006, and its possible economic impacts following the 2015 completion date.

4.2 How the Canal Works

The Panama Canal is a conduit between the Atlantic and Pacific oceans. The current canal system uses a series of locks to allow vessels to rise to the current sea level of Gatun Lake and begin their voyage to their destination ocean. A vessel coming from the Pacific Ocean will go through two different systems of locks: a two-tier set in Miraflores and another one-tier set of locks in Pedro Miguel. The vessel will then make its way through Lake Gatun to the final set of locks at Rio Chagres. Table 4.1 specifies the lock dimensions.

Table 4.1: Lock Dimensions for Panamax Ships

Width	33.5 m (36.6 yards)
Long	305 m (333.5 yards)
Deep	26 m (28.4 yards)

Source: Panama Canal Authority[1]

The current dimensions of the locks have served as the guidelines of how large of a ship can fit through the locks and its size is known as Panamax. Once a ship enters a lock passage, water is allowed to flow into the area the ship has occupied, lifting the ship to a new sea level that allows it to move to the next set of locks. Ships entering from the Pacific Ocean will be lifted a total of 26 meters (85.3 feet) while those entering from the Atlantic Ocean will be lifted 25.9 meters (84.9 feet). The amount of lifting needed when entering from the Pacific Ocean may vary as this side of the Canal experiences extreme change in water levels during high and low tide. The Atlantic Ocean water levels remain fairly consistent during tide fluctuations.

Large ships that enter the locks and push the limits of the current dimensions are often guided by a set of machines on each side in order to prevent the ship from striking the walls of the locks. The machines tasked with this responsibility are known as *mules*. With large, modern ships, up to eight mules—four on each side—may be used to guide the ship through the locks.

Gatun Lake is a man-made lake that serves as the connecting body of water from the Pacific Ocean to the Atlantic Ocean. Vessels will travel the 33 kilometers/21 miles across the lake from

the locks they entered to those that will allow them to exit the canal. Gatun Lake was created by clearing and deepening the land, then feeding the area via the Gatun Dam created on the Chagres River. The lake serves as the source of water that both locks use to lift vessels. Every ship that leaves the canal releases the used water into the ocean. The lake is constantly refilled by the dammed river or serves as a reservoir of water during the rainy season in Panama.

4.3 Traffic Operations

All traffic operations are overseen by the ACP, which was created in Title XIV of the Constitution of Panama. Article 316 of Title XIV outlines the ACP's roles and responsibilities:

> An autonomous legal entity by the name of Panama Canal Authority is hereby established under public law, which shall be exclusively in charge of the administration, operation, conservation, maintenance, and modernization of the Panama Canal and its related activities, pursuant to current constitutional and legal provisions in force, in order that it may operate the Canal in a manner that is safe, continuous, efficient, and profitable. This entity shall have its own patrimony, and the right to administer it.
>
> The Panama Canal Authority, in coordination with other government agencies as established by the Law shall be responsible for the administration, maintenance, use and conservation of the water resources of the Panama Canal watershed, which include the waters of the lakes and their tributary streams. Any plans for construction, the use of waters, and the utilization, expansion, and development of the ports, or any other work or construction along the banks of the Panama Canal shall require the prior approval of the Panama Canal Authority.
>
> The Panama Canal Authority shall not be subject to the payment of taxes, duties, tariffs, charges, rates or tribute of a national or municipal nature, with the exception of Panama Social Security payments, educational insurance, workmen's compensation, and public utility rates, except as provided in Article 321.[2]

The ACP is led by a director, deputy director, and an 11-member Board of Directors. The constitution mandates that the board comprise

- One member designated by the President of the Republic, who shall preside over the board of directors and hold the rank of minister of state for Canal affairs;
- One member to be designated or removed freely by the legislative branch; and
- Nine members appointed by the president of the Republic as agreed with the Cabinet Council and ratified by the Legislative Branch by an absolute majority of its members.[3]

Article 319 of the constitution tasks the board with duties such as appointing a director and deputy director and setting tolls, charges, and fees, as well as securing and paying off loans.

4.4 Current Practices

Recently, the ACP has taken major leaps in technology to make navigation through the Canal as efficient as possible. The Electronic Data Collection System (EDCS) was created to allow vessels to communicate with the ACP as they approach the canal and provide all preliminary

information pertaining to operational and security requirements before passing through the Canal.[4] Some of this information includes the presentation of credentials, voyage code, and the Bay Plan/Stowage Plan. The system also allows vessels to make a formal booking request with the authority. Once the preliminary information has been submitted, vessels have three options on how they can enter the canal:

1. First come, first serve queuing
2. Completing a reservation and paying an additional fee
3. Transit slot auction

The Panama Canal currently operates at or near full capacity on most days, transporting 35 vessels a day on average.[5] With international shipping a primary means of transporting goods, many ships wait their turn at the Canal's entrance. In order to accommodate customers who have time-sensitive cargo, a reservation system was created.

Currently, ships can reserve a date a year in advance with the Transit Booking System. Ships and their owners are able to view 24 slots in a day and pay a fee, usually 15% above the set toll for their vessel size. A listing of open slots is available on the ACP's website; a spot can be purchased online.

Finally, a third option was created. Every day, one additional slot is reserved for auction. This allows ships to compete with each other, with the highest bidder of the day getting priority. The highest amount paid since the program as introduced was $220,300 in August 2006 by the tanker *Erikoussa*.[6]

Table 4.2 provides the canal's current toll schedule.

Table 4.2: Current Toll Figures for the Panama Canal

	2012				2013			
Market Segment	Approved Tariff				Approved Tariff			
Tolls per PC/UMS Ton								
	Effective 1st of	1st 10K	2nd 10K	Rest	Effective 1st of	1st 10K	2nd 10K	Rest
General Cargo	October	4.74	4.64	4.57	October	5.10	4.99	4.91
		3.79	3.72	3.66		4.07	4.00	3.93
Dry Bulk	October	4.71	4.55	4.47	October	5.06	4.89	4.81
		3.76	3.63	3.58		4.04	3.90	3.85
Tanker	October	4.68	4.61	4.53	October	4.92	4.84	4.75
		3.75	3.69	3.62		3.94	3.87	3.80
Chemical Tanker	October	4.82	4.74	4.65	October	5.06	4.98	4.89
		3.86	3.79	3.73		4.05	3.98	3.91
LPG	October	4.75	4.68	4.59	October	4.99	4.91	4.82
		3.84	3.77	3.71		4.07	4.00	3.93
Vehicle Carriers and RoRo	October	4.40	4.31	4.24				
		3.52	3.45	3.40				
Others	October	4.96	4.86	4.78	October	5.33	5.22	5.14
		3.97	3.89	3.83		4.27	4.18	4.12
Tolls per Displacement ton								
Displacement	October	3.25			October	3.49		

Note: The tolls for the full container, reefer, passenger vessels segments, and the toll applicable to TEU on-deck in vessels other than full container, are not adjusted at this time

Source: Panama Canal Authority[7]

4.5 Traffic Figures

Over the past 3 fiscal years, beginning in 2010, the Panama Canal has not experienced a significant change in total transits for commercial traffic. In FY2010, the Canal experienced the passage of 12,582 oceangoing commercial vessels. Table 4.3 presents the figures for this period.[8]

Table 4.3: Oceangoing Commercial Traffic

Year	Number of Transits
2008	13,138
2009	12,849
2010	12,582*

*Note: this number does not include the nine vessels under Panamanian and Colombian flags that were in transit for the Canal or vessel repairs for the ACP.

The ACP only experienced a 4.23% decrease in FY2010 when compared to 2008. Early figures for FY2011 indicate a slight rebound, with approximately 12,988 oceangoing commercial vessels passing through the Canal, a 3.12% increase from FY2010.[9] By the end of FY2010, 1,001,037 vessels had used the Panama Canal since its opening on August 15, 1914.[10] Table 4.4 breaks down the Panama Canal traffic by market segment.

Table 4.4: Panama Canal Traffic by Market Segment

Market	Number of Transits
Container	3,031
Dry-Bulk	3,050
Refrigerated	1,718
Tankers	2,233
General Cargo	834
Vehicle Carriers	607
Others	893
Passengers	225
Total	12,591

Source: Panama Canal Authority[11]

4.6 Panama Canal Expansion

In April 2006, less than 7 years after the US turned over control of the canal, Panama published a proposal to expand the canal with a new system of locks. The proposal laid out three goals for the expansion of the Canal:

1. The construction of two lock facilities—one on the Atlantic and one on the Pacific Ocean side—with three chambers, housing three water reutilization basins;
2. The creation of a new channel connecting the new locks to each other as well as widening the current channels; and
3. Deepening the current channels and elevating Gatun Lake's operating level.[12]

This proposal would have to be approved by the Executive Branch of the government and then go through the necessary steps laid out in the Panamanian Constitution. Specifically, Article 325 of Title XV[13] states the following:

> Any treaties or international conventions signed by the Executive Branch relative to the Locks Canal, its adjacent zone, and the protection of said Canal, as well as the construction of a sea level Canal or a third set of locks, must first be approved by the Legislative Branch and not before the three months following its legislative approval, should be submitted in a national referendum.

> No amendment, exception, or agreement relative to such treaties or conventions shall be valid if the above requirements established in the above paragraph are not met.

The referendum took place on October 22, 2006 and was expected to easily pass. A small opposition feared that corruption at the government level would prevent the successful expansion of the canal. Other opposition leaders also stated that the projections of continued international trade were not sound and that any plan for expansion should also present a clear plan for social development.[14]

Official results of the referendum were announced on October 26, 2006, with those in favor of expansion receiving 76.83% of the vote and the opposition party receiving 21.76% of the vote.[15] Ground was broken for the expansion project on September 3, 2007.[16] The ACP's successful referendum is an example of how its growth has been fueled by public initiatives.

In 2005, the ACP published its "Master Plan for the Panama Canal," including the strategic steps necessary from 2000 to 2025. The first goals were laid out to include reducing inventories and costs, increasing transparency, modernizing technology, and other items. By targeting these goals, the ACP was positioned to begin its expansion.

Included in the Master Plan were a few major figures that allowed for investment from foreign investors as well as publicly financed initiatives. These would include deepening and widening channels, dredging marine channels to accommodate Panamax ships, planning the new lock system for a more environmental and efficient approach, as well as a marketing push to portray the Panama Canal as a one-stop resource and not just a channel to pass through.

The ACP published a study prior to the release of the expansion proposal that detailed the rationale for expansion. One of the main factors was that the Panama Canal currently competes with the US intermodal system when it comes to the Northeast Asia–US East Coast trade routes. The report states that the Canal, when compared to the intermodal system, is "less costly and highly reliable but has larger navigation times."[17] The intermodal system is able to transport goods in a shorter time but with a higher fee. The report went on to state that as of 2005, the US intermodal system had a 61% market share of the Northeast Asia–US East Coast route and the Panama Canal had 38%, while the Suez Canal route had 1% of the market.[18]

One driving factor in arguing for an expanded Panama Canal that could handle post-Panamax ships was that the US West Coast ports were already deep enough to receive these ships. Vessels coming to the West Coast could unload their large ships and have the cargo delivered to major consumer centers in the US via the intermodal system. If the production of post-Panamax ships were to continue, the Panama Canal, they argued, would continue to lose out on more customers who could rely on the US intermodal system. Other reports also cited concern about the Suez Canal creating new routes to the US East Coast since it was able to accomodate post-Panamax ships, but this was not explored in detail. The same could be said about exploring the potential competition that could arise from a dry canal somewhere in Central America. In a dry canal, a ship would have to be unloaded on the Pacific Ocean side and the cargo moved onto a train that takes it to the Atlantic Ocean where another vessel waits to carry the goods to their destination. This process is excessively costly and necessitates loading, unloading, loading again, and finally unloading a ship at its final destination.

4.7 Economic Effects of Panama Canal Expansion

Beginning in 1998, the ACP began working on a 20-year Master Plan for the Canal. ACP commissioned a series of studies on the environmental, economic, geological, and legal ramifications of expanding the Canal. The studies identified an increasingly profitable and robust demand for transporting goods through the Panama Canal. The studies also found that as the size of ships increased, in order to remain competitive in the long run, the Canal would need to increase the number of ships and allow the transit of larger ships. Larger ships would allow steamship operators to take advantage of economies of scale, which would also benefit the Panama Canal.

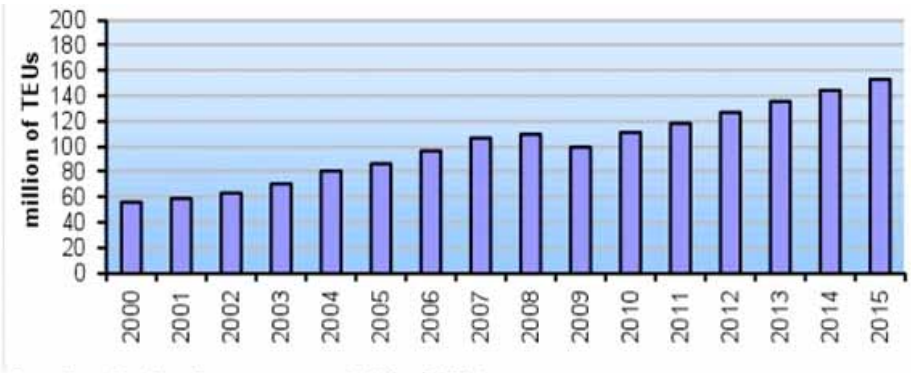
Approximately 50% of the ships that pass through the locks are Panamax vessels. The current locks, which operate near capacity, cannot allow any more traffic to pass from the Atlantic to the Pacific. As demand has grown for imports in the US, other methods of transport between US West Coast ports and central US suppliers have come online. In response to this development, the ACP undertook a project to build a third set of locks though the Panamanian isthmus. The construction of a new set of locks and the continued operation of the current locks will allow the Canal to increase the amount of traffic movements. Furthermore, with larger ships using the Canal, shippers will be able to take advantage of economies of scale—by using bigger ships, steamship operators can transport more cargo, cutting the overall price per unit shipped.

4.7.1 Demand

The current set of locks operates 24 hours a day, 7 days a week, 365 days a year. Close to 13,000 passages are completed each year, averaging approximately 35 per day.[19] According to the ACP, the most probable demand scenario for the next 20 years involves an average growth rate of 3% per year of cargo through the Canal. Thus, 2025 will see twice the amount of tonnage that passed through the Canal in 2005.

The third set of locks represents an economically viable alternative to competing routes. Currently, demand is defined by several factors. The current size of the locks has prevented steamship operators from increasing the number of containers that will fit on a ship. A Panamax ship can currently hold about 5,000 TEU container boxes. By increasing the size of the third set of locks, ships that can carry in excess of 11,000 TEU containers will be able to transit through the Panama Canal.

Containerized traffic represents the largest growth sector for the Panama Canal. Container ships operate on a scheduled itinerary, called *liner services*, with specific ports of call and established timetables. These ships require specific reliable time slots to pass through the canal and any delay on those slots can be costly to steamship operators. The continued growth of container trade is expected in the future. Figure 4.1 illustrates the projected growth of container traffic through 2015. The graph shows an expected 8% growth in trade passing through the canal from China, 7% growth in containers from Korea, 5% from Taiwan, and 4% from Japan. Further, the chart shows that the ACP expects to see a 5% growth in traffic from the US over the next 15 years. Despite the global economic slowdown, containerized traffic maintained its strong growth rates through 2010.[20]



Containerized trade (million TEUs)

Exporter	2007	2008	2009	2010	growth rate 2010-2024
China	28.9	29.6	25.9	29.2	8.1%
Japan	5.9	6.0	4.8	5.8	4.7%
South Korea	4.3	4.5	4.4	5.0	7.2%
Taiwan	3.2	3.2	2.9	3.4	5.5%
USA	9.7	11.0	10.1	11.3	5.7%

Source: Sabonge1[21]

Figure 4.1: Total Container Trade Projected though 2015

In order to cater to the needs of containerized shipping companies, the Panama Canal needs to have enough capacity to avoid delays. The itineraries required by container ships demand that there be no delay or failure at the Panama Canal that could require the ship to have to skip a port of call in order to remain on schedule. Additional capacity on the canal will allow the steamship operators and their customers the ability to avoid delays. Further, other operators that operate on fixed schedules, including vehicle carriers, cruise ships, and other specialized ships, will likely increase their use of the canal with the implementation of the third set of locks.

4.7.2 Tolls

Currently prices are set based on the type of ship passing through the Canal, its capacity, and the type of cargo carried in its hold, and a type of membership fee called a "regular fee." Further, a slot can be procured for a higher price to guarantee a time and direction. (Table 4.2 specifies the current tolls.) Each ship is priced based on the number of containers or number of passengers, or amount of cargo. Then the amount of cargo is multiplied by the price. In 2010, due to the global economic slowdown, the canal suspended its fee adjustment.[22] A new toll schedule was later issued for 2012 and 2013, however, shown earlier in Table 4.2.

Most likely, the current lock system will continue using the same pricing system that is currently in place with a regular 3.5% annual increase in the costs to use the canal. The new locks will have a different pricing structure, most likely market-based, that charges for the larger set of locks. The structures for the fees will likely look similar to those for the old locks. However, because fewer ships will be able to use the locks, demand for the larger locks will be higher, and the prices will likely reflect this increased demand.

4.7.3 Canal Competitors

The new set of locks will increase the Panama Canal's competition with other waterways, shipping lanes, and railways around the world. The most likely competitors will be currently established methods of transport, including the US intermodal system, where goods are brought into the West Coast ports and transported by train across the continental US. Another competitor is the Suez Canal, which connects the Red Sea and Mediterranean Sea and currently allows post-Panamax ships passage between the two waterways. Other competitors could come online in the next 25 years, including the development of an intermodal system across a different part of Central America, or the opening of an all-water route through the Arctic Ocean.

Suez Canal

The Suez Canal is located at an intersection of much of the world's commerce; oil from the Middle East passes through the man-made canal, along with goods from Asia on their way to Europe and vice versa. The Suez Canal allows ships to avoid sailing around the southern horn of Africa, shortening the journey by 2,700 miles. The other alternative is passage though the North Sea; however, sea ice causes closure of this route part of the year. The Suez Canal can accomodate post-Panamax ships because of the lack of locks. Currently, partially loaded very large crude carriers and ultra large crude carriers can pass through the Suez Canal. These vessels have capacities that are 2.5 to 7 times larger than current Panamax vessels.[23]

Direct comparison between the two canals is difficult because both use different measures to evaluate the price of freight. However, it is important to note that the Suez Canal fee schedule essentially offers a bulk rate, with the rate decreasing as tonnage rises. For example, for the first 5,000 tons of crude oil, the price would be 6.70 SDR[24] per ton; for the next 5,000 tons the price falls to 4.20 SDR per ton, and so forth, as Table 4.5 indicates.

Table 4.5: Suez Canal Net Tonnage

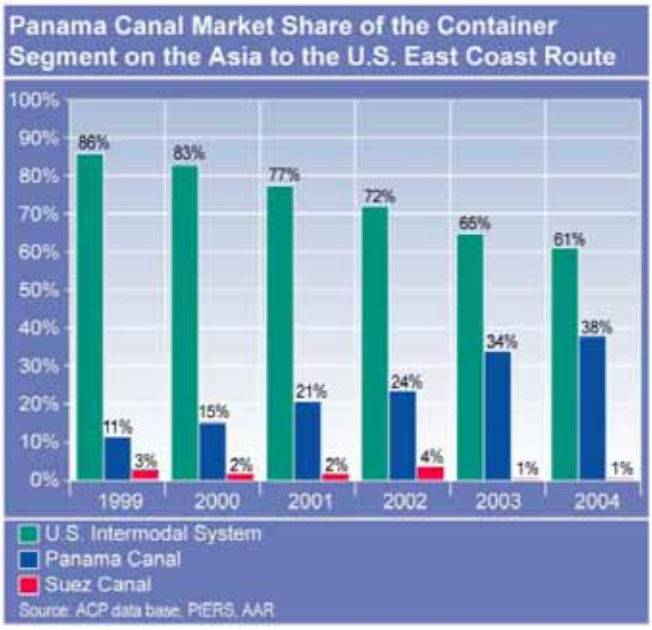
Vessel Type		SC Net Tonnage													
		First 5000		Next 5000		Next 10000		Next 20000		Next 30000		Next 50000		Rest	
		Laden	Ballast	Laden	Ballast	Laden	Ballast	Laden	Ballast	Laden	Ballast	Laden	Ballast	Laden	Ballast
1	Tankers of Crude Oil	7.88	6.7	4.94	4.2	4.02	3.42	1.75	1.49	1.55	1.32	1.44	1.23	1.34	1.14
2	Tankers of Petroleum Products	7.88	6.7	4.94	4.2	4.02	3.42	2.42	1.49	2.37	1.32	2.27	1.23	2.16	1.14
3	Dry Bulk Carriers	7.88	6.7	5.36	4.55	4.53	3.85	1.44	1.23	1.34	1.14	1.29	1.09	1.24	1.05
4	LPG Carriers	7.88	6.7	5.05	4.3	4.02	3.42	2.88	2.45	2.68	2.28	2.58	2.19	2.58	2.19
5	LNG Carriers	7.88	6.7	5.46	4.65	5.05	4.3	3.5	2.98	3.4	2.89	3.3	2.8	3.19	2.72
6	Chemical Carriers & Other Liquid bulk Carriers	8.24	7	5.67	4.82	4.84	4.12	3.09	2.63	2.99	2.54	2.88	2.45	2.88	2.45
7	Containerships	7.88	6.7	5.15	4.38	4.12	3.5	2.88	2.45	2.68	2.28	2.11	1.79	2.01	1.71
8	General Cargo Ships	7.88	6.7	5.67	4.82	4.12	3.5	3.09	2.63	2.99	2.54	2.94	2.49	2.88	2.45
9	Ro/Ro Ships	7.88	6.7	5.46	4.65	4.43	3.77	3.19	2.72	2.99	2.54	2.88	2.45	2.78	2.37
10	Vehicle Carriers	7.88	6.7	5.15	4.38	3.97	3.37	2.83	2.41	2.68	2.28	2.11	1.79	2.01	1.71
11	Passenger Ships	7.88	6.7	5.15	4.38	4.43	3.77	3.14	2.67	3.09	2.63	2.99	2.54	2.88	2.45
12	Special Floating Units	8.55	-	5.25	-	4.94	-	3.5	-	3.3	-	2.99	-	2.88	-
13	Other Vessels	8.24	7	5.15	4.38	4.53	3.85	3.3	2.8	3.19	2.72	2.99	2.54	2.88	2.45

Source: Suez Canal Toll Circular 2012[25]

The US Intermodal System

The US intermodal system refers to the transportation infrastructure that currently moves goods throughout the US. It includes the roads, railroad facilities, and inland waterways. Currently, a majority of imports from Asia flow into US West Coast ports and are transported eastward via train and truck. Over 60% of the steamship operators currently use the West Coast ports to deliver their goods, which are then transported to the rest of the country via road and rail.[26]

Over the past decade, congestion within the intermodal system created a greater demand for the Panama Canal. Figure 4.2 depicts a 5-year span of the canal's market share.



Source: USACE[27]

Figure 4.2: Panama Canal Market Share

Between 1999 and 2004, service through the Panama Canal to the US East Coast has emerged as a viable alternative to the US intermodal system. Over the course of the 5 years pictured in Figure 4.2, the Panama Canal gained over 25% of the market of goods being transported between the Pacific and the East Coast. This corresponds with increased trade with China and other Asian powers, and further demonstrates that the intermodal system currently operates at or near a market-efficient capacity. As imports from the Pacific Rim increase, an increasing amount of trade will move through the Panama Canal.

Depending on the pricing structure and the ability to reliably schedule service through the Panama Canal, the third set of locks could provide steamship operators a competitive option for moving goods to the West Coast.

4.8 Third Set of Locks—Changes to Come

There is no single estimate or approximation of how the new set of locks at the Panama Canal will affect steamship traffic, trade patterns, or competition between different modes of transport. However, in the next few years, dramatic shifts in traffic could potentially take place at US ports, including those in Texas. Below, we summarize some of the variables and changes that can be expected in the years to come.

Construction of the Panama Canal expansion project is underway; barring a cataclysmic event, the third set of locks will open between the middle of 2014 and early 2015. The opening of these locks will alter the choices available to steamship operators for moving goods to and from the US Gulf and Atlantic coasts. The opening will shuffle the current status quo in trade through the Panama Canal, possibly dramatically. In the reshuffle, some ports will gain more traffic while other ports may lose traffic. As larger ships begin to navigate the locks, those ports that are ready

to accommodate larger ships will stand to benefit, while those which received smaller ships could lose traffic.

The current ACP estimates of growth are based on a slowly recovering global economy. If the current recovery gains momentum, the ACP growth projections could be far too low. Additionally, the ACP has built in time for shippers to adjust their commodity patterns based on the availability of passage through Panama. Break-bulk and steamship auto carrier operators claim that their current vessel sizes match the patterns of demand around the world and can continue to operate in the current Panamax lock detentions.[28]

In the future, the hub-and-spoke model of trade could become far more common as larger container ships begin to move through the new set of locks. The hub-and-spoke model could create a significant advantage for both imports and exports from Texas ports.

Given that the future toll structure of the Panama Canal is unknown, exact estimates of the economic impacts of the new canal would be mere speculation. However, when the pricing system is announced, steamship lines will rush to modify their pricing structure to reflect the changes. However, if the steamship lines do not pass the cost savings (provided by the greater economies of scale and the shift in demand) along to their customers, change could come very slowly to the Panama Canal. Given the competition among steamship operators, shifts in trade routes and patterns will likely occur shortly after the new locks at the Panama Canal open.

The Panama Canal will be in a strong position moving forward once the expansion project has been completed. The new locks are set to open and will be ready to provide new services to the shipping industry, even beyond passing through the Canal. While initial gains in demand may be minimal due to the slow recovery of the global economy, it is clear that the Panama Canal will be ready to provide services once a true recovery has been achieved. The fee schedule will play a large role in determining how much demand there will be while other variables such as rising fuel costs may also have an impact.

The multitude of variables at play make it difficult to predict exactly how much change the expansion will have but clearly change is imminent. The coming years will be an exciting time for the canal and for those who continue to benefit from its services.

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Chapter 5. Texas Port Profiles

Texas ports are well-situated to capitalize on the expansion of the Panama Canal. Although none of the ports can currently accommodate post-Panamax shipments, the expansion of the Panama Canal will decrease wait times and increase economies of scale. Considering also the state's certain growth as a consumer market, Texas will become an increasingly advantageous choice for shippers, especially for Asian trading partners.

The 16 Texas ports[1] handle 19% of the nation's port tonnage. Four Texas ports are in the top 10 largest in the nation[2] in terms of tonnage. To develop a forecast for the future of Texas ports as a whole, this project selected four ports to profile in depth: Beaumont, Brownsville, Corpus Christi, and Houston represent a substantial share of shipping in Texas, yet vary widely in their specialties, size, and tonnage.

5.1 Strengths of Texas Ports

The marketability of Texas ports is tied to the overall strength of the state's economy. Through a difficult economic season for the nation as a whole, Texas emerged as the most recession-proof of the states, thanks to robust population growth and a business-friendly climate.[3] It is second only to California in size of economy, and is growing at a faster rate. The size of the state's consumer market makes use of its ports an obvious choice.

Each port surveyed in this study has identified specific opportunities for growth and is taking measures to develop, build, or otherwise improve in order to capitalize on those opportunities. These improvements will be discussed in depth in the profiles.

Finally, West Coast ports have previously experienced congestion and troubled union relations. The expansion of the Panama Canal introduces an attractive alternative that will prove cost-effective for many users of West Coast ports.

5.2 Challenges to Growth

While Texas ports are prioritizing growth, none is prepared to handle the full potential of post-Panamax ships, especially in the containerized trade market. Additional dredging is necessary, for which no port but Corpus Christi is even permitted.

Related is the lack of infrastructure of any port but Houston to handle containers. Containerized shipping is widely projected to be the industry most affected by the Panama Canal expansion, and most Texas ports will not capture a share of this growth without major changes in their strategic plans. Furthermore, Houston is near capacity for handling containers.

The economic strengths of Texas as a whole support the marketability of its ports, and the Panama Canal expansion enhances their viability. The following port profiles examine the prospects of specific ports to further support the forecast this report offers.

5.3 Port of Brownsville

5.3.1 Introduction

The Port of Brownsville is a southern Texas port with a location and infrastructure that make it particularly popular for imports to markets in northern Mexico. Although the effects of the Panama Canal's expansion on the port are uncertain, the port will certainly remain a prime port-of-entry for goods destined for regional markets.

5.3.2 History

Although the region has been used as a port since Fort Brown was established in 1849, the deep-water port currently operating opened in 1936. It became a popular shipping point for lower Rio Grande Valley and northern Mexico, as well as a popular site for shrimping operations. In 1949, the Gulf Intracoastal Waterway was extended to Brownsville, helping facilitate access to Gulf-area trade. The port has remained a popular access point for both the lower Rio Grande Valley and the northern region of Mexico, and is likely to remain so.

5.3.3 Facilities

The Port of Brownsville is made up of three areas: the Main Harbor, the Fishing Harbor, and the 17-mile-long Brownsville Ship Channel that connects to the Gulf of Mexico. All facilities on the waterfront of the port, including shipping terminals, are owned by the public Brownsville Navigation District, although some sites, mainly fishing facilities and docks for small watercraft, are leased to private operators.

The port's cargo facilities include 10 deep-sea docks for dry cargo, four deep-sea docks for liquid-bulk cargo, two liquid-cargo docks for barges, and one dry-cargo barge dock. In addition, the port operates eight transit sheds totaling approximately 444,000 square feet, as well as 450,000 square feet of open dockside aprons. There is also 1.23 million square feet of public warehousing very close to the docks, as well as three public grain storage and elevator companies, with the largest grain elevator possessing a capacity of over three million bushels. Away from the docks, assorted commodities can be stored on more than 80 acres of surfaced open-storage space.

The port's Fishing Harbor provides support for many shrimp fishing operations in the area. The Fishing Harbor consists of three 12-foot-deep basins and over 10,000 linear feet of docks.

The Port is also home to a facility leased to Keffel-amFELS, a Singaporean firm that is the major private employer for the area, specializing in refurbishing rig builds such as oil rigs, oil platforms, and submersible rigs. The port is also the site of substantial ship breaking activities, which are carried out by four firms: ESCO Marine, International Shipbreaking Limited, Transforma Marine, and Bedoli Group. The port currently has no permanent facility for ship breaking; instead, cuts are made in the shoreline for ships to be beached on, at which point ship breaking can commence.

5.3.4 Access to Infrastructure

The port is within road access to several highways. Of these highways, two (US Highway 77/83 and State Highway 4) permit the use of trucks that are graded for the Mexican Legal Weight Limit, which exceeds the weight limit generally permitted on US roads. Because approximately 10% of cargo entering the Port of Brownsville is transported by truck to Mexico, this feature is especially convenient for companies shipping goods to Mexico that want to minimize the number of truckloads required to transport entire shipments.

The Port of Brownsville operates the Brownsville & Rio Grande International Railroad. This short-line railroad facilitates cargo linkages with the Union Pacific (UP) Railroad. Switching with UP is carried out between the two railroads at UP's local switching yard, which is approximately 3 miles from the Port of Brownsville. A haulage agreement between UP and the Burlington Northern Santa Fe (BNSF) Railway permits UP to transport BNSF cargo between Brownsville and Houston. For cargo crossing the Mexico border, UP operates cargo interchanges with Kansas City Southern de México (a wholly owned subsidiary of the Kansas City Southern Railway) at the Brownsville & International Matamoros Bridge.

The port is approximately 2 miles from Brownsville/South Padre Island International Airport. This airport primarily serves the purposes of the military general aviation, with charter aircraft taking up approximately 17% of operations and commercial aircraft accounting for less than 1% of operations. Only about 13% of the aircraft registered at the airport are multi-engine.

The Port of Brownsville is the westernmost point on the Gulf Intracoastal Waterway. This inland waterway facilitates barge transportation along the US Gulf Coast.

5.3.5 Commodities

Most of the shipping operations at the port are liquid-bulk shipments, primarily under a contract with Petróleos Mexicanos (Pemex), under which Pemex is shipped gasoline, diesel fuels, and other petroleum products. Other products that represent significant shares of liquid-bulk cargoes at the Port of Brownsville are industrial solvents and lubricants.

The Port of Brownsville is also involved with substantial break-bulk shipments, especially shipments associated with the steel industry. These shipments primarily include hot-rolled steel coils, cold-rolled steel coils, iron ores, minerals, and other raw materials, including aluminum, used to produce steel.

Currently no containerized trade is carried out at the Port of Brownsville, although the port is making an effort to enter this field.

5.3.6 Trading Partners

In 2010, the most recent year for which annual statistics are available, the Port of Brownsville took in $711,392,717 worth of imports and shipped out $106,908,284 of exports. Virtually all of the cargo imported into the Port of Brownsville is re-exported to Mexican markets. Very little imported cargo remains in the US. Tables 5.1 and 5.2 present trading data.

Table 5.1: Trading Totals & Top Five Exporters by Ship to Brownsville

2010 - $711,392,717	2009 - $575,158,535	2008 - $899,553,222
1. Netherlands - $189,933,250	1. Netherlands - $225,578,755	1. Netherlands - $217,271,829
2. Italy - $189,933,250	2. Portugal - $64,309,576	2. Argentina - $186,532,032
3. Portugal - $134,389,122	3. Lithuania - $59,003,253	3. Spain - $93,808,972
4. Canada - $52,276,511	4. Italy - $31,884,777	4. France - $73,235,071
5. Sweden - $50,480,239	5. Spain - $27,079,910	5. Israel - $68,405,430

Source: World Port Source[4]

Table 5.2: Trading Totals & Top Five Importers by Ship to Brownsville

2010 - $106,908,284	2009 - $77,523,621	2008 - $72,856,893
1. Mexico - $39,579,654	1. Mexico - $36,879,370	1. Mexico - $32,876,293
2. Aruba - $12,764,690	2. United Kingdom - $24,241,409	2. Gibraltar - $13,849,623
3. United Kingdom - $11,644,810	3. Netherlands - $7,605,403	3. Ecuador - $5,291,893
4. Morocco - $10,936,738	4. Ecuador - $2,651,707	4. China - $3,978,295
5. Singapore - $9,462,446	5. Spain - $2,282,110	5. Nigeria - $3,038,100

Source: World Port Source[5]

5.3.7 Relationship with TxDOT

The Brownsville Port Authority has developed excellent relationships with all the TxDOT entities that relate to landside port transportation systems. It works closely with the TxDOT Pharr District on direct highway access to the port and with the Transportation, Planning and Programming (TPP) and Rail Divisions in Austin on marine and regional linkages. It has shared expansion plans and transportation links on all modes, and recently proposed a bridge that would link port property with an area across the Colorado in Tamaulipas. Port access to the new Brownsville ring road and other TxDOT highway infrastructure requires an ongoing, active relationship. It is worth noting that Brownsville has had, for over a decade, a direct link from the marine port terminals to the US-Matamoros land border port of entry for overweight trucks. Mexican trucks have higher size and weight limits than their U.S counterparts and these are allowed to access the port using a currently unique overweight corridor. A typical truck configuration using the corridor is a six-axle tridem operating at around 120,000 lb., or 1.5 times heavier than U.S trucks. Commodities include glass and rolled steel for automobile manufacture. It is funded by fees that have enabled the corridor to be maintained at a satisfactory level of service since it entered service over a decade ago.

5.3.8 Forecasts and Future of the Port

The Port of Brownsville has experienced substantial growth in shipping volumes over the past decade, with average growth of approximately one million metric tons per year since 2001. Although shipping substantially declined during the global economic slowdown in 2008 and

2009, the port's shipping volumes have been recovering. In this environment, the port is engaging in several development plans.

In order to gain a share of Gulf containerized trade, the Port of Brownsville is looking to acquire funds through the federal TIGER Grant (Transportation Investment Generating Economic Recovery) program in order to upgrade the port's infrastructure to better accommodate containerized trade. Results of the port's ongoing effort should be known in the near future.

The port is also looking to develop a new multimodal facility accessible by a planned highway connection with what will become Interstate 69, which will also provide a more direct route to maritime terminals. Groundbreaking for the facility is planned to occur within one year.

In order to increase the capacity for services by the port's major private employer, Keffel-amFELS, the port plans to widen and deepen particular sections of the port, so that bigger and deeper rigs can be serviced by the company. The port is currently in the last phase of planning with the Army Corps of Engineers to deepen the shipping channel, and hopes to begin dredging by 2013 or 2014.

To facilitate ship breaking operations, a permanent dry-dock facility will be privately constructed at the port in the next couple of years. This facility will reduce the need for repeated cuts in the shoreline of the port, and will both facilitate ship breaking and help protect the environment of the port area.

The port is also trying to revive a recent initiative that gave the port a foothold in containerized trade. In 2008, SeaBridge Freight, in partnership with the Port of Brownsville and Port Manatee, Florida, began to operate a short-distance coastal shipping operation called the Gulf Container Expansion Project. This operation could currently employ larger vessels than could operate on the Gulf Intracoastal Waterway, and primarily handle finished goods, such as tile, beer, and wire rods, shipped from Mexico via Brownsville. Once the containers reached Port Manatee, they were transported by land to distribution centers along the East Coast. Although the program was very productive and provided substantial revenues for SeaBridge and the two ports, financial difficulties for SeaBridge led to the program being shut down in early 2011. However, the success of the program has led the Port of Brownsville and Port Manatee to pursue a resumption of the coastal shipping program. Although they don't yet have an estimate as to when this program will resume, the Port of Brownsville is optimistic about the project's prospects.

Although the port hopes to acquire additional business as a result of the Panama Canal's expansion, the port is at a disadvantage compared to other Gulf ports since the Brownsville Ship Channel does not have sufficient depth to accommodate the larger vessels that will be allowed through the expanded Canal. However, if the port acquires the requested federal funding, the expansion may provide the port with opportunities to transship containerized cargo going to other Gulf ports, where it can be loaded onto larger ships. Irrespective of the results arising from the expansion of the Panama Canal, the port's strategic plan foresees substantial growth that is not related to the Canal's expansion.

5.4 Port of Corpus Christi

5.4.1 Introduction

Since its opening in 1926, the Port of Corpus Christi has become the fifth busiest port in the US in terms of tonnage.[6] While its primary cargo is petroleum-related products, the port is experiencing the payoffs from diversification, particularly in break-bulk and dry-bulk. Additionally, the Port of Corpus Christi finally began work in September 2011 on the long-awaited La Quinta Channel Improvement Project, which will deepen and widen the channel in preparation for post-Panamax ships and add a 250,000-TEU terminal.

Along with these improvements, Corpus Christi offers low congestion, connectivity to rail, highways, and waterways, and room to expand further. For these reasons, the Port of Corpus Christi will hopefully become a strategic port of call for shippers, especially in Asian markets. The accelerated passage time and increased shipment sizes that the Panama Canal offers will give shippers the opportunity to bypass West Coast ports.

5.4.2 History

The Army Corps of Engineers selected Corpus Christi as the ideal site for the Nueces County port in the early 1920s because of its reduced vulnerability to severe weather and its access to three rail lines, a feature it retains to this day. Upon its opening, its business was dominated by cotton and other agricultural products. However, its specialty changed abruptly upon the discovery of oil fields in surrounding areas, and since that time, petroleum has accounted for the vast majority of the port's cargo.[7] Table 5.3 presents tonnage data.

Table 5.3: The Port of Corpus Christi Tonnage Figures, 2002–2010

Year	Break-Bulk	Grain	Chemical	Dry-Bulk	Liquid-Bulk	Petroleum	Totals
2010	339,259	4,113,277	1,468,244	6,866,446	506,211	68,900,860	82,194,297
2009	317,993	3,951,347	1,410,028	6,443,658	131,100	64,265,522	76,519,648
2008	552,590	5,423,867	1,630,019	7,891,343	301,007	70,060,614	85,859,440
2007	445,204	3,377,386	1,848,875	8,241,554	513,036	74,893,638	89,319,693
2006	256,697	2,031,610	1,569,993	7,700,130	248,355	75,176,048	86,982,833
2005	444,982	2,098,829	1,795,329	8,396,055	518,403	73,532,352	86,785,950
2004	503,016	1,836,090	2,142,736	7,289,403	407,906	74,214,650	86,393,801
2003	361,246	1,666,579	2,004,086	6,833,913	243,135	74,022,165	85,131,124

Source: Port of Corpus Christi Authority[8]

5.4.3 Facilities

The Port of Corpus Christi's Inner Harbor is made up of the following four terminals:

- Northside General Cargo Terminal: This terminal accommodates break-bulk cargo, refrigerated cargo, and roll-on/roll-off (RO/RO) projects. It provides easy access to intermodal transport and storage, a grain elevator, and industrial facilities.
- Southside General Cargo Terminal: This terminal features the deepest draft of the port, making it marketable for heavy lift, RO/RO, and containers, though it has yet to be used for them. This terminal accesses highways and rail, and offers the additional features of transfer capabilities and cranes.
- Dry-Bulk Terminal: Two docks are equipped with rail connectivity and standard weighing and handling equipment. Currently the draft on both docks is inadequate for post-Panamax ships.
- Liquid-Bulk Terminal: In this terminal, 11 docks are publicly owned and operated, and 14 others are privately owned. The largest ship docks are designed to handle 100,000 DWT tankers.

As mentioned previously, the port is also constructing the La Quinta Terminal, which will add considerably to the port's capacity. These facilities will consist of the extension of the 45-feet-deep La Quinta Ship Channel, construction of a 3800-feet-long, three-berth ship dock with 9 ship-to-shore cranes, 180 acres of container/cargo storage yard, an intermodal rail yard, and over 400 acres for on-site distribution and warehouse centers.[9] This project was planned with the intent to attract container cargo, but a global economic slump in containerized shipping and development of other opportunities have led the port to re-envision it so that it can "be more things to more people."[10] Moreover, the port has set a 20-year rail expansion plan into motion with the support of TxDOT. Current facilities handle 12,000–14,000 rail cars a year; with the expansion complete, the port will handle up to 300,000 rail cars annually.

The Port of Corpus Christi was also a US Naval Base, but Naval Station Ingleside was closed as part of the Base Realignment and Closure Act of 2005. Flint Hills Resources is currently redeveloping Ingleside into a terminal handling Eagle Ford Shale products, to be completed in the summer of 2012.[11]

Another defining feature of the Port of Corpus Christi is Foreign Trade Zone (FTZ) #122, one of the largest FTZs in the nation. It stretches over 25,000 acres and consists of 14 subzones, including the nation's first continental oil refinery subzone. Today, around 70% of Corpus Christi's trade is foreign, no doubt due in large part to this feature. FTZ #122 also participates in the US Customs and Border Patrol's Customs-Trade Partnership Against Terrorism (C-TPAT) program, which both enhances and streamlines security and customs processes for partnering importers.[12] Tables 5.4 and 5.5 present the major port imports and exports for the port.

Table 5.4: Foreign Imports to Corpus Christi

Country	2010	2009	2008
World Total	$19,049,931,189	$14,738,700,227	$24,720,910,917
Venezuela	$3,582,289,607	$3,230,068,095	$6,260,191,959
Nigeria	$2,196,401,303	$2,212,459,281	$3,529,789,561
Saudi Arabia	$1,635,992,006	$670,757,961	$998,167,272
Algeria	$1,225,991,863	$841,304,165	$1,434,129,293
United Kingdom	$1,204,478,816	$888,333,501	$1,077,669,519
Mexico	$958,815,116	$365,003,515	$1,259,730,255
Singapore	$630,217,718	$338,007,329	$0
Kuwait	$591,199,789	$737,929,730	$1,396,040,628
Iraq	$536,078,581	$655,509,393	$1,050,430,007
Brazil	$453,046,764	$199,233,748	$182,602,176
Columbia	361,744,686	262,998,557	534,932,393

Source: World Port Source[13]

Table 5.5: US Exports from Corpus Christi

Country	2010	2009	2008
World Total	$5,968,924,611	$3,872,648,407	$4,964,545,034
Mexico	$1,994,800,859	$643,415,840	$590,946,815
China	$518,665,375	$457,698,898	$36,756,693
Nigeria	$382,730,938	$335,781,125	$541,930,163
Ecuador	$336,307,229	$0	$0
Netherlands	$319,853,928	$409,515,537	$423,165,126
Brazil	$265,661,041	$115,248,269	$137,733,602
Israel	$259,831,536	$426,649,000	$240,074,240
Colombia	$232,840,121	$109,665,718	$208,484,035
France	$194,383,110	$133,912,807	$151,144,028
Bahrain	$190,000,000	$0	$0
South Korea	$129,341,064	$100,360,779	$13,315,438

Source: World Port Source[14]

5.4.4 Relationship with TxDOT

The Port of Corpus Christi is a beneficiary of the Panama Canal expansion, especially in the area of bulk exports. Port staff reported to the research team that increasing rail service is a major issue in future port planning. UP is the sole Class 1 railroad that can access the La Quinta site where much of the deep-water expansion is slated. It did not have to enter into a trackage sharing agreement—with BNSF, for example—when it merged with Southern Pacific, which may result in higher rates for rail service at the port. In addition, the UP line needs to be moved

from a nearby small city if unit trains are to be scheduled multiple times during the day. The TxDOT Rail Division has been working with Corpus Christi planners on a number of rail-related plans. The port is regarded as a critical south Texas economic engine and Port Director John LaRue is a member of the newly created TxDOT Freight Advisory Committee (FAC).

5.4.5 Forecasts and Future of the Port

The future is bright for the Port of Corpus Christi. While the port still relies heavily on a single product for the vast majority of its revenue, the Panama Canal project and the port's own development and improvement plans will substantially support the port's long-pursued efforts to diversify, most immediately into dry-bulk and eventually into containerized cargo. Moreover, while the port is not currently dredging to the 52 feet needed to accommodate post-Panamax ships, it has all necessary permits.

One factor influencing the port's future is the explosive growth of Asian markets, especially in their demand for coal. Tables 5.6 and 5.7 document the Asian coal demand. While Asian nations are increasing their domestic production as well, the US has vast coal resources, the use of which is increasingly controversial as an environmental threat.

Table 5.6: Growth of Regional Coal Consumption by Short Tons

Region	% change 1980–2010
World	94%
Asia	403%
North America	50%
Europe	-32%
Former Soviet Union	-42%
Africa	92%
Oceania	96%
Central/South America	156%

Source: US Energy Information Administration[15]

Table 5.7: Share of Global Coal Consumption: Percent of Total World Consumption, 1980 and 2010 by Short Tons

Region	1980	2010
Asia	24.3%	63.1%
North America	18.2%	14.0%
Europe	34.2%	12.0%
Former Soviet Union	18.2%	5.5%
Africa	2.7%	2.7%
Oceania	1.8%	1.9%
Central/South America	0.5%	0.6%

Source: US Energy Information Administration[16]

Even today, without the larger shipments and shorter wait times offered by the expanded Panama Canal, shippers in Wyoming and Montana are finding it more cost-effective to bypass West Coast ports and use Gulf ports (including the Port of Corpus Christi) to transport coal to Asia, in spite of the additional overland transport it requires.

The Port of Corpus Christi has room to expand its coal processing, both spatially and in permitting. At present, the port's dry-bulk terminals are sold out, even with an increase from 2.5 million tons annually to 6 million. Long-term plans include additional increases in capacity to somewhere between 20 and 40 million, though there is not a clear consensus about which figure is more probable.

Also, the Port of Corpus Christi has cultivated a specialty in importing wind turbine blades, break-bulk cargo that is so large that it requires special adaptations at every stage of shipment. Corpus Christi imports more turbine components than any other Texas port, a significant metric considering that Texas is the national leader in wind energy production. However, the federal tax credits that have been driving wind farm growth are set to expire in 2012, and are unlikely to be renewed immediately. On the other hand, the Port of Corpus Christi is optimistic that off-shore wind power generation will become an increasingly cost-effective and deployable technology, and Corpus Christi will capture a large share of those projects.

Moreover, major developments—such as Martin Midstream's construction of a terminal at the port to move Eagle Ford Shale products and the steel mill that Tianjin Pipe Corporation is constructing in Gregory, TX—make the continuing expansion of the Port of Corpus Christi very likely. Within the shipping industry, word of mouth and reputation are powerful. Landing high-profile companies is crucial to attracting more business.

Finally, while the port is not currently dredging to the 52 feet needed to accommodate post-Panamax ships, it has all necessary permits in order to do so—a hurdle no other Texas port has cleared. The port is ready to capitalize on the opportunities that a larger Panama Canal, expanding Asian markets, and growth in Texas exports will bring.

5.5 Port of Beaumont

5.5.1 Introduction

The Port of Beaumont, which began trading in lumber and farm products from Southeast Texas in the late 19th century, began to experience rapid growth after the discovery of oil at Spindletop just south of the city. The petroleum industry that developed around that first commercial oil play justified the development of public and private port facilities that today make the Sabine-Neches Waterway the fourth busiest in the nation. The Port of Beaumont is the second-largest US military port in the world. Business Review USA indicated that about 49% of military cargo shipped overseas for operations in Afghanistan and Iraq passed through the port[17]. The port generated more than 1,860 jobs and $129 million in personal income in Southeast Texas. The port's business activity accounts for about $11.6 million in state and local taxes and $23.3 million in federal tax revenue.

5.5.2 History

The Port of Beaumont (as a deep-water port) dates to 1908, when a 9-foot-deep canal was dredged in the Neches River from Beaumont to the Port Arthur ship channel. In 1916, the channel was deepened to 25 feet and a turning basin was scooped out of the bend in the river. Local businessmen, meanwhile, had developed dock facilities on the waterfront. The port channel was deepened to 30 feet in 1922, increasing Beaumont's importance as a shipping center. In the 1940s, the port reached its current depth of 40 feet. The 51st Texas Legislature created the Port of Beaumont in 1949 as a political body and state governmental entity. The Port of Beaumont Navigation District covers an area of about 150 square miles, including the City of Beaumont. The port is governed by a six-member board of commissioners, elected by navigation district voters to 6-year terms, and they function as a board of directors for the port. Since its creation as a governmental entity, the port has steadily expanded and improved its facilities in furthering its role as a major partner in worldwide commerce.

5.5.3 Facilities

Situated 84 miles east of Houston and 270 miles west of New Orleans (Latitude 30°4'6"N, Longitude 94°5'4"W), the Port of Beaumont is accessible from the Gulf of Mexico and the Intracoastal Waterway via the federally maintained Sabine-Neches Ship Channel, 42 miles upstream from the Gulf. The Sabine-Neches Channel is a minimum of 400 feet wide and maintained at a depth of 40 feet. Air draft is 136 feet. Deepening and other channel improvements have been approved by the US Army Corps of Engineers, and await authorization by Congress. Following are some of the port's facilities.

Main Street Wharves: Wharves 2, 3, 4, 5, 6, and 7 have a combined 2,811 feet of berthing space, with rail access along their front. The wharves are served by two modern transit sheds offering 266,290 sq. ft. of covered storage and 121,000 sq. ft. of open storage as well as "Big Clyde," the port's 60-ton gantry crane.

*Harbor Island Marine Terminal***:** With 345,000 sq. ft. of covered and open storage and 1,880 ft. of berthing space, this terminal also has access to 27 acres of open storage and is convenient for break-bulk ships, heavy lifters, and side loaders.

*Military office building***:** This building houses the US Surface Deployment and Distribution Command's 842nd Transportation Battalion.

*Carroll Street Wharf***:** The wharf provides 1,435 ft. of harbor front and two sheds offering 108,900 sq. ft. of covered storage.

Bulk terminal: Kinder Morgan operates the port's bulk cargo terminal. The facility can handle the simultaneous discharge of two railcars and has a loading capacity of 10,000 tons per day. The terminal is served by BNSF, UP, and Kansas City Southern (KCS) rail lines.

*Grain elevator***:** With one berth and three loading spouts, the Port of Beaumont's grain elevator can accommodate 3.5 million bushels and has a loading capacity of 80,000 bushels per hour. Louis Dreyfus Corporation leases and operates the elevator.

*RO/RO ramp***:** This roll-on/roll-off ramp with a roadway 40 ft. wide can handle large pieces of cargo.

*Orange County Facilities***:** The Port of Beaumont began using hundreds of acres it owns on the east bank of the Sabine-Neches Waterway for open storage in 2007. A new 650-foot cargo wharf handles oceangoing ships and both inland and ocean barges. Improvements under way on the Orange County Terminal include a 25,000-foot rail loop with direct connections to three major railroads and an access road.

5.5.4 Access to Infrastructure

More than 70 businesses, agencies, and organizations provide services for Port of Beaumont customers, including freight forwarding, labor, ship waste disposal, vessel services, and trucking lines.

Rail Access: BNSF connects the Port of Beaumont with the US, primarily west of the Mississippi River. KCS links the port with the American Midwest and Mexico. UP offers rail links through the Mississippi Valley, Great Plains, and the western US.

Waterways: The Sabine-Neches Waterway runs from the Port of Beaumont southward through Sabine Lake to the Gulf of Mexico. The Sabine-Neches Navigation District governs the waterway and acts as the local sponsor for the federal navigation project. The Gulf Intracoastal Waterway links the Port of Beaumont with cities between Brownsville, Texas and Florida, and intersects with major inland waterways such as the Mississippi River and the Tennessee-Tombigbee Waterway. The Gulf Intracoastal Canal Association advocates for the canal's interests.

Highways: The Port of Beaumont has direct access to Interstate Highway (IH) 10, a major east-west highway that links Beaumont with major cities such as Los Angeles, Phoenix, San Antonio, Houston, New Orleans, and Jacksonville. Connections in those cities reach all corners of the US. Beaumont is connected to US 90, which offers an east-west route that follows IH 10 closely and provides alternate routes to Houston and points westward, and Louisiana's coastal chemical and industrial corridor to the east. US 69 links Beaumont with Lufkin, Tyler, and Dallas-Ft. Worth. This highway reaches up to Minnesota. US 96 connects the port northward toward Shreveport and connects with US 59 in Northeast Texas. US 87 provides access to Dallas-Ft. Worth and continues through Amarillo and Denver, Colorado and into the Rocky Mountain region.

5.5.5 Commodities

Table 5.8 lists the Port of Beaumont's primary commodities.

Table 5.8: Cargo Details of Beaumont 2010

Commodity	Short tons
General Cargo	
Military	120,564
Forest Products	59,827
Metal Articles	53,172
Project Cargo	32,910
Other	57,289
Dry-Bulk	
Aggregate	739,946
Potash	391,104
Bulk Grain	2,098,042
Grand Total	3,552,854

Source: Interview with John Roby, Director of Customer Service: Port of Beaumont[18]

5.5.6 Trading Partners

Tables 5.9 and 5.10 present the Port of Beaumont's primary exports and imports by country.

Table 5.9: US Exports from Beaumont

Country	2010	2009	2008
Mexico	$3,258,548,625	$2,514,916,911	$2,847,202,426
Brazil	$1,693,409,966	$1,202,842,945	$1,527,125,800
Netherlands	$109,245,085	$69,038,687	$46,767,934
Panama	$98,907,660	$36,200,260	$20,821,813
Nigeria	$85,820,165	$122,423,662	$83,289,783

Source: World Port Source[19]

Table 5.10: Foreign Imports to Beaumont

Country	2010	2009	2008
Algeria	$10,904,173,516	$9,735,482,466	18,490,359,652
Mexico	$2,610,650,555	$1,534,255,635	$1,825,339,746
Venezuela	$2,113,868,952	$1,526,049,354	$1,708,532,277
Angola	$1,028,725,854	$254,714,480	$1,246,098,709
Denmark	$336,765,538	$48,907,220	$266,038,321

Source: World Port Source[20]

5.5.7 Relationship with TxDOT

Beaumont works closely with the TxDOT Beaumont District on both highway and rail plans, studies, and partnerships. It is an enthusiastic supporter of the FAC and played a part in its formulation by encouraging TxDOT to promote the importance of freight at the state level, and to help protect the interests of Texas ports so they can compete with other US and global ports. Although unlikely to feel much immediate impact from the large Panama Canal locks, this port's

exports to and from Latin America, particularly Brazil, reflect the major growth areas for Gulf ports in the next 5 years.

5.5.8 Forecasts and Future of the Port

State of the Port: The port is in a time of transition. The traditional cargo, which includes dry bulk, military bulk, steel products, and forest products, is stable. The port is expanding with new shipping routes to China that are expected to become regular monthly routes—mainly break-bulk wood products. The port is planning on expanding its land-based facilities to attract new non-traditional products such as crude oil, wood pellets, and dry-bulk coal. Most of the new business will be classified as bulk.

Panama Canal: The expansion of the canal will allow wider, deeper, and bigger ships to carry the commodities mentioned above—specifically, transporting coal and grain to the Far East. Beaumont may also handle containers destined for Houston in the containerized market, which is currently minimal. Container-on-barge service, using America's Marine Highways, is a business model the port is working to develop.

5.6 Port of Houston

The Port of Houston is one of the largest ports in the US. It comprises 9 public and more than 150 private terminals, and is capable of handling a variety of cargo types, including containerized, bulk, and break-bulk cargo. In 2010, the port handled approximately 220 million tons of cargo and 1,812,268 TEUs.[21]

The Port of Houston Authority (PHA) operates and maintains the nine public terminals in the port complex. PHA also acts as the sponsor of the Houston Ship Channel, working with the US Army Corps of Engineers to coordinate and secure funding for dredging projects.

5.6.1 History

Historically, the Port of Houston has been known for its petrochemical industry. Several major energy companies, including ConocoPhillips, Exxon-Mobil, Shell Oil, and BP, have headquarters at or near the Port of Houston.[22] Consequently, the port has expanded and contracted with the booms and busts of the energy industry.

In 1870, the Port of Houston was designated a port of entry by the US Congress; however, it wasn't until 1927 that the Texas Legislature granted Harris County the authority to develop the Houston Ship Channel and improve the terminals, docks, rail, and other components of the port. The port expanded quickly, especially in the post-war period, and in the late 1950s underwent major expansions, including improvement of the railroad, construction of the Bulk Materials Handling Plant, and deepening the Channel to 40 feet.[23]

In 1970, construction began on Barbours Cut Container Terminal, one of the port's two container terminals. Barbours Cut served as PHA's sole container terminal for two decades. In the late 1990s, the PHA determined that more container space was necessary, so in 1999—after Harris County voters approved a $387 million bond issue—construction on the Bayport Container

Terminal began. Bayport became operational in 2007, though it is currently only about halfway completed.[24]

Today, the Port of Houston remains one of the major petrochemical ports in the US, but also handles many other commodities such as steel and grains. Moreover, it handles more than 70% of all containerized cargo in the US Gulf Coast.[25]

5.6.2 Facilities

When discussing the facilities at the Port of Houston, it is important to note that PHA has detailed traffic and facility information only for the public terminals for which it is responsible. About 85% of the terminals along the Houston Ship Channel are privately owned. PHA has limited information about types of cargo, traffic, and business strategies at these terminals. The following section provides detailed information about the public facilities at the Port of Houston.

Barbours Cut & Bayport Container Terminals

The Barbours Cut terminal has six container berths equipped with nine cranes for efficient handling, one RO/RO platform, and one lighter aboard ship (LASH) berth. The terminal also has a computerized data inventory system to track the status and location of individual containers. Additionally, the terminal features 255,000 square feet of covered storage.[26]

As mentioned, the Bayport terminal became operational in 2007, but construction is only about halfway complete. When fully developed, Bayport will have seven container berths capable of handling 2.3 million TEUs per year, which effectively triples PHA's current container capacity.[27]

Fourteen major shipping lines make up the bulk of customers at the Barbours Cut and Bayport terminals: Alianca, Atlantic Container Line, CMA-CGM, Compania Chilena, Compania Libra Lines, CSAV, Hamburg Süd, Hapag-Lloyd, Maersk, Mediterranean Shipping Company, NYK Line, OOCL, Shipping Company of Saudi Arabia, and ZIM-America.[28]

Most of the container cargo in the Port of Houston traffics these two terminals; little containerized shipping is handled by private terminals.

Turning Basin Terminal

Turning Basin is a multipurpose terminal capable of handling a diverse array of cargo types, including grain and other dry bulk, project and heavy-lift cargo, break-bulk, and RO/RO vessels. Turning Basin is specifically equipped to handle break-bulk cargo and is the nation's largest break-bulk facility.[29] Operating revenue from Turning Basin typically accounts for about 20% of PHA's operating revenues.[30]

Specifically, Turning Basin is made up of 34 general-cargo wharves, 2 liquid-cargo wharves, and Wharf 32, a project and heavy-lift cargo wharf. Turning Basin is equipped with one 40-ton container crane and mobile truck cranes for up to 300 tons. The terminal also has 1.15 million square feet of covered storage on site.[31]

Each wharf, except Wharves 1–4, are accessible by BNSF and UP. Additionally, Turning Basin facilities are located within 5 miles of two major US highways: IH 10 and IH 45.[32]

Woodhouse Terminal

The Woodhouse Terminal, which is leased to GP Terminals, is capable of handling all general cargo at its three wharves, with RO/RO capacity at Wharf 3. The terminal has 235,000 square feet of covered storage and approximately 10 acres of open storage.[33]

Its primary feature is the Houston Public Grain Elevator #2, which is leased by Louis Dreyfus. The grain elevator can load 120,000 bushels per hour and store 6.2 million bushels.[34]

UP serves the Woodhouse Terminal.

Bulk Materials Terminal

The Bulk Materials Terminal, which is leased by Kinder-Morgan, has two wharves that can handle a wide range of dry-bulk products and processes commodities at a rate of 1,800 tons per hour.[35]

The terminal is served by both Union-Pacific and BNSF and directly accesses IH 10 and IH 45.

Jacintoport

Jacintoport, which is leased by Jacintoport International, is a bagged commodities handling facility. It has three wharves that are serviced by the "Spiralveyor," which can quickly load bulk cargo onto ships. Jacintoport also has an onsite bagging facility that can bag corns, oats, rice, soybeans, wheat, and other food products.

The terminal has 519,500 square feet of covered storage, 7.5 acres of open storage, and 200,000 square feet of refrigerated storage.[36]

Jacintoport is served by BNSF and UP railroads. Additionally, it has access to IH 10.

5.6.3 Foreign Trade Zone

The Port of Houston manages an FTZ that includes multiple private and publicly owned sites in Harris County. Merchandise may be brought into the FTZ without formal customs entry, import quotas, and other important restrictions. The FTZ at the Port of Houston offers the following services:[37]

- General purpose warehousing
- Liquid bulk storage and blending
- Steel and pipe storage
- Pipe end finishing and heat treating

Commodities

The Port of Houston is one of the largest importers and exporters of petroleum and petroleum products in the US. In 2011, 48% of imports and 28% of exports at the Port of Houston were related to the petrochemical industry. Many major oil refiners and energy companies have

private terminals along the Houston Ship Channel, including Exxon Mobil, operator of the world's largest refinery.[38]

Additionally, the Port of Houston has recently experienced an increase in steel imports, which in 2011 made up about 16% of all general cargo imports. This is due to an increase in steel pipes needed for hydraulic fracturing of natural gas at the Eagle Ford Shale and Barnett Shale formations.[39]

The Port of Houston is one of the biggest containerized ports in the Gulf Coast. The Port of Houston sees 70% of all containerized cargo in the Gulf Coast and 96% of containerized cargo in Texas.[40] Though the Port of Houston is a major player in containerized cargo, especially in the Gulf of Mexico, the port is not a hub for any specific type of import or export commodities. The biggest containerized import commodity is toys, making up 4.5% of all containerized imports, and the biggest export is synthetic resins, making up 11% of all containerized exports.

A breakdown of commodities follows in Tables 5.11 through 5.14.

Table 5.11: Import Commodities: Port of Houston 2010

Rank	Commodity	Tons	%
-	Total	138,175,457	-
1	Petroleum/Crude & Fuel Oil	66,512,810	48.1%
2	Steel or Iron Pipes & Tubes	22,592,096	16.4%
3	Steel Bars	4,831,337	3.5%
4	Glycol Derivatives, Polyols	3,422,824	2.5%
5	Aliphatic Hydrocarbons	3,112,017	2.3%
-	Others	37,704,373	27.3%

Table 5.12: Export Commodities: Port of Houston 2010

Rank	Commodity	Tons	%
-	Total	80,142,388	-
1	Petroleum/Crude & Fuel Oil	22,532,609	28.1%
2	Gasoline & Aviation Fuel	6,866,951	8.6%
3	Coal & Coke	6,819,406	8.5%
4	Grains & Flour Products	6,639,127	8.3%
5	Petroleum Gas, LPG, Ethane Etc.	4,673,668	5.8%
-	Others	32,610,627	40.7%

Table 5.13: Containerized Import Commodities: Port of Houston 2010

Rank	Commodity	TEUs	%
1	Food and Drink	97,087	18.4
2	Retail Consumer Goods	65,517	12.4
3	Hardware & Construction	57,141	10.8
4	Machinery, Appliances	48,299	9.1
5	Steel & Metals	45,713	8.6
	Others	212,818	40.4
Total		526,575	

Table 5.14: Containerized Export Commodities: Port of Houston 2010

Rank	Commodity	TEUs	%
1	Resins & Plastics	303,709	36.0
2	Chemicals/Minerals	122,300	14.5
3	Machinery, Appliances	79,957	9.4
4	Food & Drink	75,759	8.9
5	Automotive	54,157	6.4
	Others	206,193	24.5
Total		842,075	

5.6.4 Trading Partners

In terms of general cargo, Mexico is one of the Port of Houston's largest trading partners, making up 13.2% of imports and 16.3% of exports.

South Korea, Taiwan, and China are also strong trading partners, with 28.9% of general cargo trade coming from these three countries. Additionally, almost 20% of containerized cargo is imported from China.

A detailed break-down of trading partners follows in Tables 5.15 through 5.18.

Table 5.15: Importers to Houston 2010

Rank	Country	Tons	%
-	Total	138,175,457	-
1	South Korea	19,061,890	13.8%
2	Mexico	18,214,744	13.2%
-	Gulf of Mexico	17,023,509	12.3%
3	Peoples Rep of China	11,535,691	8.3%
4	Taiwan	9,361,578	6.8%
5	Venezuela	8,047,976	5.8%
-	Others	54,930,069	39.8%

Table 5.16: Exporters from Houston 2010

Rank	Country	Tons	%
-	Total	80,142,388	-
1	Mexico	13,076,744	16.3%
2	Brazil	6,009,700	7.5%
3	Netherlands	4,108,444	5.1%
4	Panama	2,868,933	3.6%
5	Turkey	2,592,823	3.2%
-	Others	51,485,744	64.2%

Table 5.17: Containerized Importers to Houston 2010

Rank	Country	TEUs	%
-	Total	562,832	-
1	Peoples Rep of China	111,312	19.8%
2	Germany	49,755	8.8%
3	Brazil	39,142	7.0%
4	India	36,372	6.5%
5	Italy	31,319	5.6%
-	Others	294,932	52.4%

Table 5.18: Containerized Exporters from Houston 2010

Rank	Country	TEUs	%
-	Total	878,735	-
1	Brazil	76,255	8.7%
2	Belgium	63,168	7.2%
3	Turkey	44,822	5.1%
4	Netherlands	37,629	4.3%
5	Colombia	37,222	4.2%
-	Others	619,639	70.5%

5.6.5 Relationship with TxDOT

The Port of Houston is the largest Gulf port and the main channel serves a wide variety of private terminals, many related to the petrochemical industry. Its excellent relationship with TxDOT has been strengthened by TxDOT's creation of a Marine Division and the Department's new focus on freight. The port has a large economic impact on indirect benefits—particularly job creation—which results in the port being consulted on all marine-related freight transportation investments at the metropolitan and state levels. This extends into all TxDOT District transportation, planning, and programming activities, together with those proposed by the Houston-Galveston Area Council, a 13-county Gulf coast planning group. Houston is recognized as the leading deep-water port in the Gulf, responsible for imports and exports of a wide variety of goods, including containerized commodities. It is also the major Gulf beneficiary of an

enhanced Panama Canal and the Houston Port Director was a member of the recent TxDOT Panama Canal Stakeholders Committee.

5.6.6 Forecasts and Future of the Port

The Port of Houston is optimistic that the expansion of the Panama Canal will have a positive effect on the port. They predict that the expansion will lead to better economies of scale as larger ships travel between Asia and the US Gulf Coast.[41] Moreover, they predict that the expansion will lead to reduced waiting times for all other ships as more traffic can move more quickly through the Canal.[42]

Already, about 20% of containerized cargo at the Port of Houston is imported from China. The infrastructure, trade lanes, and logistic supply lanes between China and the Port of Houston are already in place; if China decides to export more goods on larger ships, the Port of Houston may be in a position to take advantage of this.

In 2011, the Port of Houston docked a post-Panamax 8,000 TEU vessel. However, the Houston Ship Channel is not currently deep enough to handle the largest of the super-post-Panamax ships, which can reach up to 12,500 TEUs.

Moreover, because of a lack of federal funds, the port is not currently able to maintain the authorized depth of the Houston Ship Channel.[43] In 2008, 82% of the channel was not at its designated depth, and since 2005, the channel has lost an average of 8% of useable depth per year.[44] Recently, the US Army Corps of Engineers identified $83 million worth of channel improvements needed to make minimum depth requirements; however, PHA was allocated only $23 million by the federal government to make these repairs.[45]

PHA plans to develop a container facility on Galveston Island that could accommodate post-Panamax ships; however, construction will not begin until after 2015, after the Panama Canal expansion is expected to be completed.[46]

5.7 Conclusion

Although the effects of the Panama Canal expansion will vary considerably across Texas ports, the ports are poised to substantially improve their competitive positions with additional help from the state's relatively buoyant economy and existing room for expansion, as well as ongoing difficulties with ports on the West Coast. However, the ports as a whole will have to overcome significant challenges regarding accessibility, particularly with regard to port depth, capacity of intermodal transportation lines, and the lack of container-handling capacity at any port besides the Port of Houston. Nevertheless, the outlook for Texas ports in the near future remains very positive.

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Appendix: Regional and Country Profiles

This appendix contains country profiles of major trading partners: Brazil, Chile, Colombia, Peru, and Venezuela in Latin America; and China, India, Japan, South Korea, and the Association of Southeast Asian Nations (ASEAN) in Asia. The respective profiles contain information on general macroeconomic trends, governmental structures and institutions, trends in trade, transportation infrastructure, and looming challenges to growing trade.

Brazil

Introduction

With a population of 190.7 million and a geographical area of 3.3 million square miles, Brazil is the largest country in Latin America. Although a middle-income country, Brazil's economy is the seventh largest in the world. According to a World Bank report,[1] Brazil and five other emerging nations will account for more than half of all the growth in the world by 2025. This makes Brazil a major player in international trade—one whose importance will only continue to rise.

Brazil's long history of economic instability, inflation, and debt was finally overturned in the 1990s by successful reform initiatives. The last two decades have witnessed Brazil's dramatic economic growth. Boosted by sturdy fundamentals, a rich natural resource base, and industrial development, the country was able to weather the financial crisis of 2008 relatively successfully. According to latest reports, the economy is expected to return to pre-crisis levels in 2012.

With its emerging-country economic status, Brazil has assumed a higher international profile on issues such as climate change, agricultural technology, trade, biofuels, and foreign aid. However, despite its many successes at home and abroad, Brazil continues to struggle with social policy issues such as income inequality, access to education, and infant mortality, which may tether its future growth.

Economic Overview: Trends, Growth, Imports, and Exports

General Macroeconomic Trends

Over the last few years, Brazil has experienced a steady growth in its economy. In 2010, the gross domestic product (GDP) in terms of purchasing power parity was $2.087 billion, up from $1.365 billion in 2007. Between these same years, per capita income grew from $7,197 to $10,710. As the financial crisis of 2008 wreaked havoc in world economies, Brazil suffered a period of negative 0.6% growth in 2009. However, it soon recovered and the economy grew 7.5% in 2010; a trend that is likely to continue in the upcoming years.

As the size of the economy has grown, the world's confidence in Brazil's markets has grown equally. The country is the largest recipient of foreign direct investment (FDI) in all of Latin America, with the US as its top investor. Total FDI grew from $34 to $48 billion from 2007 to 2010. This has been coupled with large-scale infrastructure improvements in the country, gross capital formation (which is 19% of the GDP according to 2010 figures), and an expansion in trade. According to the World Port Source, there are currently 81 ports in the country, such as the ports of Salvador, Pecem, and Paranagua.[2] Of these, 18 ports operate a container liner service.

Further, Brazil's container port traffic (measured in twenty-foo-equivalent units [TEUs]) rose from 35 million in 2002 to 62 million in 2009. However, the overall ease of doing business (as measured by the World Bank's 2012 report) remains low. Brazil is ranked 126th in the world, with poor rankings in 5 of the 10 indicators used to make these cross-country comparisons. [3]

Export and Import Trends

Trade has been an important component of Brazil's growth. With a volume of $387.4 billion in 2010, trade accounted for 23% of the country's total GDP. Exports in goods and services have grown in value from $182 billion in 2007 to $232 billion in 2010. In the latter year alone, the export growth rate was 11.5%, which was a contribution of 11% to the overall GDP of the country.

Similarly, imports have also seen a surge due to the country's expanding economy and consumptive demands of the increasingly affluent population. The value of import trade grew from $161 billion to $253 billion between the years 2007 to 2010. Imports grew at the rate of 36.2% in 2010 (significantly higher than the exports) and accounted for 12% of the GDP in 2010. This imbalance between export and import volume resulted in a current account deficit of $47 billion in 2010.

The Economy Watch, reporting on Brazil's trade statistics in 2010, identified transport equipment, iron ore, soybeans, footwear, and coffee as the country's primary export commodities. Major trading partners include China, the US, Argentina, Netherlands, and Germany.[4]

The US is the biggest supplier to Brazil with a share of 16.12% of the country's total import market. Other significant suppliers include China, Argentina, Germany, and Japan. Some of the major commodities Brazil imports include machinery, electrical and transport equipment, chemical products, oil, and automotive parts.

The same report also states that "as Brazil's economy expects to expand in the next 5 years, experts say that the appreciation of the country's currency, the *real*, will impede the increasing demand of Brazil's exports, thus reducing Brazil's total exports. A strong *real* may also increase demand for imports of foreign goods, thus resulting in a trade deficit and widening of Brazil's current account deficit." [5]

According to World Bank data, export costs in Brazil for a 20-foot container were $1,790 per container in 2010 while the import costs were $1,975 per container. Both types of costs have steadily increased over the years, which is a discouraging trend. The World Economic Forum's 2012 Global Competitiveness Index ranks Brazil 53 among all countries.[6] Although this is an improvement from the previous year in which the country was ranked at number 58, it is still a notably weak trade position for Brazil.

Despite some of these constraints, waterborne trade between the US and Brazil has experienced a positive growth trend in recent years. The World Port Source records the volume of waterborne trade between the two countries. In 2010, the value of Brazilian waterborne exports to the US was $20 billion and the value of imports was $18 billion.

Trade Agreements

Brazil also made efforts towards diversifying its trade agreement portfolio. The country is a member of numerous multilateral economic organizations, including the World Trade Organization (WTO) and Group of 20. Recently, Brazil has turned towards expanding relations with its South American neighbors. It is a founding member of the Latin American Integration Association (ALADI), the Union of South American Nations (UNASUL), and the Southern Common Market (Mercado Común del Sur, or MERCOSUR). In addition, Brazil has signed several bilateral trade agreements with countries such as Denmark, France, Germany, Portugal, and the United Kingdom. [7]

Government and Societal Trends

During the regime of Brazil's former president, Lula de Silva, the successful combination of surging exports, economic growth, and social programs helped lift tens of millions of Brazilians out of poverty. Today, a majority of Brazilians live in the middle-income bracket. Domestic consumption has become an important driver of this growth. The current president, Dilma Rousseff, who took office in January 2011, has expressed her intention to continue the former President's economic policies, which include sound fiscal management, inflation control, and a floating exchange rate.

Poverty, measured by purchasing power parity, is $2 per day, which has fallen markedly in Brazil. In 2003, 21.7% of the population was living in poverty. In 2009, this figure dropped to 9.9%. Extreme poverty (less than $1.25 per day) has also dropped dramatically, from 10% in 2004 to 4% in 2009. Between 2001 and 2009, the income growth rate of the poorest 10% of the population was 7% annually, while that of the richest 10% was 1.7%. This decrease in income inequality allowed Brazil to experience a 50-year low in its Gini index with a score of 0.53 in 2010. Experts contend that the instrumental drivers of this change have been the consistent economic growth, well-focused social programs, and minimum wage increases introduced by the country's government.[8]

Moreover, Brazil has maintained control over its consumer inflation, which stood at an annual rate of 5% in 2010. However, the unemployment rate of 8.3% continues to be cause for concern for the Brazilian government.

Brazil is often recognized for its strong legal framework aimed at curbing corruption, and the country is sometimes used as a role model when establishing legal anti-corruption frameworks in developing countries. Although the fight against corruption faces obstacles in terms of implementation and lack of political support, anti-corruption initiatives in Brazil are formally strong and well developed. However, effective enforcement of laws and strengthening of legal institutions remains a problem. This has an impact on property rights, which in turn influences economic outcomes in the country.[9]

Infrastructure

As the host country of the 2014 World Cup and the 2016 Olympic games, Brazil is facing a massive infrastructure challenge. Recognizing the impending need to support the influx of visitors that these events will attract, the government has mapped out the requirements for extensive investment into Brazil's urban areas, sporting facilities, and tourism sector.

Consequently, many of the world's investment funds and financial institutions are preparing for a boom in financing opportunities.

Under Brazil's Accelerated Growth Program (Programa de Aceleração de Crescimento), $800 billion is budgeted to upgrade the country's infrastructure between 2008 and 2013. Numerous projects are currently in the pipeline. For instance, up to $18 billion has been allocated for the construction of a high-speed train linking Sao Paulo and Rio de Janeiro. The line should be operational by the time of the World Cup, simplifying transport options for visitors traveling between the cities.[10]

Aside from the needs posed by these mega-sporting events, Brazil also faces larger infrastructural deficiencies, whose fault lines have become apparent in the aftermath of the pressure exerted by the burgeoning economy. Infrastructure development in the country lags far behind that of the Asian Tigers (a term used for the highly developed economies of Hong Kong, South Korea, Singapore, and Taiwan). This lag explains why Brazil scored low on the Economist Intelligence Unit's business environment rankings, which placed Brazil at number 40 among 82 countries. An article in the *Latin Business Chronicle* cites "low standard or costly infrastructure including telephones, transport networks and utilities as the main operational obstacle, far more than selected corruption, poor governance or skills shortages…In spite of some improvement in logistics, freight depends on costly road haulage; there are few railroads; the potential for waterways remains largely unexplored; and ports and airports are congested. This can add one quarter or more to the cost of getting goods to market, say investors."[11] Another article reports that Brazil's port infrastructure is among the worst in Latin America.[12]

The Brazilian government has recognized the crucial link between infrastructure development, trade, and competitiveness. Plans such as the Growth Acceleration Program are aimed at improving the coverage and quality of infrastructure, as well as the provision of water, sanitation, housing, electricity, transport, and energy. Greater private investment in infrastructure is expected to aid this effort. The Infrastructure Private Investment Attractiveness Index (IPIAI) developed by the World Economic Forum, which ranks 12 Latin American economies based on their friendliness to private investment in infrastructure, ranked Brazil second in the sample. This is an encouraging sign for the future growth of this sector, which will have spillover effects on port facilities and container trade services.

Chile

Introduction

Chile is one of the most politically stable and economically prosperous countries in South America. This upper middle-income country, which has a population of 17.3 million and a geographical area of almost 292,000 square miles is situated on the southern tip of the South American continent. The length of the country's western border is open to the wide expanse of the Pacific Ocean. On the eastern side, Chile is nestled by Peru, Bolivia, and Argentina.

Since the end of the 17-year military rule by General Augusto Pinochet in 1990, Chile has increasingly embraced free market principles. In the last three decades, the country has reaped the fruit of this policy reform. The country has experienced a fast upward growth in its economy

and a reduction in its domestic poverty rates. Chile is, in addition, endowed with an immensely diverse topography and vast mineral resources. Further, the majority of the population (approximately 85%) lives in urban areas. These factors contribute towards a healthy forecast for the country's future. The current Chilean regime is committed to maintaining this strong growth trend as well as further enhancing the country's international role. However, two big domestic challenges may impede this progress: low productivity levels and lack of equal opportunity for the Chilean citizens.

Economic Overview: Trends, Growth, Imports, and Exports

General Macroeconomic Trends

Chile's sound macroeconomic policies have yielded an average annual per capita growth rate of 4.1% over the last 15 years. Although 2009 and 2010 were poorly performing years for the country because of the global financial crisis and the February 2010 earthquake, the economy was able to weather the rough patch and remedy the negative 1.7% GDP growth rate in 2009 with a 5.2% growth rate in 2010. In the same year, the size of the Chilean economy stood at over $212 billion with per capita income of $12,431.

In 2010, the net inflow of FDI, which was only $4 billion in 2001, totaled a little over $15 billion in Chile. The business climate in the country has been very conducive for foreign investment. Foreign investors receive the same treatment as Chilean residents, registration is simple and transparent, and foreign investors are guaranteed access to the official foreign exchange market to repatriate their profits and capital. This positive trend was substantiated by the World Bank's 2012 Ease of Doing Business Rankings, which placed Chile at number 39 (up from 41 in the previous year) in the world.[13] The country particularly improved in the areas of starting a business and providing credit. Further, the World Economic Forum's 2012 Global Competitiveness Index ranks Chile 31st, which is a strong position for the country.[14] Successive governments are likely to maintain this investment-friendly policy stance.

Chile also enjoys a healthy sea trade, aided by its proximity to the Pacific Ocean. According to World Bank data, Chile's container port traffic (measured in TEUs) rose from 1.2 million in 2000 to 2.8 million in 2009. The World Port Source reports that Chile has 46 ports, 15 of which operate a container line service.[15] Puerto San Antonio is Chile's largest port as well as South America's busiest western coastal port. The port of Talcahuano is another significant port as well as the country's main naval station. According to World Bank data,[16] 2011 export and import costs for a 20-foot container were $795 in the country. Both types of costs have remained relatively steady over the years.

Export and Import Trends

Trade has long been the mainstay of the Chilean economy, with a contribution of 71% to the GDP. According to the US State Department, the overall trade profile of Chile traditionally has depended upon copper exports. The state-owned firm CODELCO is the world's largest copper-producing company. In addition, several large Chilean and international private copper companies also operate in Chile.[17]

In 2010, the total value of exported goods and services consisted of $81 billion—a significant increase from the total export value of $23 billion in 2000. Chile's exports represented 39% of its

GDP in 2010. The value of import trade has also grown in the country. In 2010, the total value of imported goods and services equaled $67 billion, indicating an annual growth rate of 26.3%. These imports accounted for 32% of the country's GDP.

According to the 2010 figures reported by Economy Watch[18], Chile's primary export commodities include copper, fruit, fish products, paper and pulp, wine, and chemicals. Major trading partners (and their percentage export market share) include China (14.2%), the US (11.3%), Japan (10.4%), and Brazil (5.9%).

The US is Chile's biggest import partner with a share of 19.1%. Other significant import partners include China (11.9%), Brazil (9.3%), and Argentina (8.8%). The primary import commodities to Chile include petroleum, chemicals, electronics and telecom equipment, vehicles, natural gas, and industrial machinery. [19]

Waterborne trade between the US and Chile has experienced a positive growth trend in recent years, according to the World Port Source. In 2010, the value of Chilean waterborne exports to the US was almost $6 billion and the value of the imports almost $8 billion.

Trade Agreements

Chile has trade agreements with 60 countries, including China, Australia, Peru, and India. It joined the WTO in 1995 and in late 2009 became the first South American country to join the Organisation for Economic Co-operation and Development (OECD).

Chile's free trade agreement (FTA) with the US was signed in 2003 and implemented in January 2004. According to the office of the US Trade Representative, "the United States-Chile FTA eliminates tariffs and opens markets, reduces barriers for trade in services, provides protection for intellectual property, ensures regulatory transparency, guarantees nondiscrimination in the trade of digital products, commits the Parties to maintain competition laws that prohibit anticompetitive business conduct, and requires effective labor and environmental enforcement."[20] The US and Chile are also participating in trade negotiations in the Trans-Pacific Partnership, along with seven other nations.

Government and Societal Trends

Since the establishment of democratic rule in 1990, Chile has embarked on a wide range of socio-economic reforms while maintaining a stable and transparent government. These efforts were strengthened in 2011 when the government of Sebastian Piñera announced deep structural reforms in education, health, poverty, and crime reduction, as well as the state, political, and environmental systems.

Another component of these reforms is the government's agenda to support the country's achievement of high-income development status by 2018. The government plans to emphasize three strategic areas during 2010–2014 in order to achieve this goal: a) achieving greater competitiveness, including the modernization of the state; b) increasing job creation and improving job quality; and c) promoting investment.

Despite the government's continued efforts in this regard, the vast majority of the Chilean population lives without adequate infrastructure and supporting public services. Poverty and income inequality are crippling forces in the country, which may dampen any larger policy endeavors by the government. In 2009, 15% of the Chilean population lived under the poverty line. Moreover, the average income of the richest 20% of Chileans was 12 times that of the poorest 20% in the same year. This has given the country a poor Gini coefficient of 0.52.

Chile's poverty is compounded by its high unemployment rate of 8% (in 2010 figures). However, this is an improvement from the high rate reached during 2009 of 11%. The Central Bank of Chile has been able to keep the inflation rate within its target range of 2 to 2.7%, which is a positive trend.

Infrastructure

The quality of port infrastructure in Chile was given a score of 5.5 in 2010 (on a scale of 1 to 7), according to a World Bank report[21] released in 2011. Although the country's port infrastructure is sound by regional standards, more investment is needed to streamline the facilities to meet the growing needs of economic trade as well the burgeoning consumer base. The Chilean government, recognizing the need for improvements in its infrastructure sector, announced a $400 million investment for port infrastructure (to be upgraded during 2010 to 2013) that would complement the private-sector investments of $340 million completed in 2008.[22] According to the *Business Monitor International's* "Chile Shipping Report of 2011," if Chile does not improve efficiency and capacity, the ports could begin to reach the limits of their capacity by 2014, risking the loss of business as importers look elsewhere for their supplies.[23]

Colombia

Introduction

With a population of just over 45 million people, the Republic of Colombia is bordered by Brazil, Ecuador, Peru, Venezuela, the Caribbean Sea, and the Pacific Ocean, giving it a unique position in international trade.[24] Along with its advantageous location, Colombia possesses a vast amount of highly demanded mineral and fuel resources, especially oil and gas, which make up approximately 60% of all exports from Colombia.[25]

However, Colombia has long suffered from severe internal conflicts, crime, corruption, and inefficient infrastructure, which have all hindered international trade and foreign investments in the past. On a positive note, the current administration of President Juan Manuel Santos has decreased the crime and violence rate, initiated infrastructure improvements and expansions, and implemented new trade agreements, all leading to a stronger Colombian economy.

General Economic Overview: Trends, Growth, Imports, and Exports

General Macroeconomic Trends

Colombia's strong macroeconomic performance over the past decade has been tied to its increase of internal security as well as increased foreign investments and reforms related to its oil and gas industries.[26] In 2011, real GDP growth was approximately 6% with inflation falling under a

target rate of 4%.[27] Such growth is expected to continue as internal stability remains, infrastructure improve, and additional free-trade agreements are implemented.

However, despite a strong macroeconomic performance and a positive outlook, Colombia does face some economic challenges. Since Colombia's exports are not especially diversified and rely heavily on oil, it is subject to price fluctuations in international markets, which can severely hinder economic growth. Furthermore, unemployment in 2011 was at 9.2%—one of the highest unemployment rates among Latin American countries.[28] Finally, its infrastructure is severely deficient. While many new projects are being undertaken, much improvement is needed to accommodate existing and future trade.

All things considered, Colombia is in a strong economic position, much more so than it was just a decade ago.

Export and Import Trends

Colombia's major merchandise imports and exports can be divided into three different categories: agricultural products, fuels and mining products, and manufactures. In 2010, as indicated in Table A.1, the top five countries from which it imports were the US ($25.9 billion), the European Union ($14.0 billion), China ($13.5 billion), Mexico ($9.5 billion), and Brazil ($5.8 billion).[29]

Table A.1: Colombia's Top Five Importers, 2010 (in billions)

US	$25.9
European Union	$14.0
China	$13.5
Mexico	$9.5
Brazil	$5.8

Source: World Trade Organization

In addition, as Table A.2 indicates, Colombia's top five export destinations in 2010 were the US ($43.1 billion), the European Union ($12.6 billion), China ($4.9 billion), Ecuador ($4.6 billion), and Venezuela ($3.6 billion), with oil and gas exports accounting for a large percentage of those exports.[30]

Table A.2: Colombia's Top Five Export Destinations, 2010 (in billions)

US	$43.1
European Union	$12.6
China	$4.9
Ecuador	$4.6
Bolivarian Rep. of Venezuela	$3.6

Source: World Trade Organization

Trade Agreements

Colombia is currently a member of a number of trade organizations: the Andean Community, the Group of Three (G-3), the Caribbean Community (CARCOM) Agreement, and the WTO.

Beginning in 1990, Colombia began to aggressively pursue a free-market path. The Santos administration has pursued a number of free trade agreements with Canada and the US as well as a number of countries in Asia and South America.[31] Colombia implemented a trade accord with MERCOSUR in 2009 and an agreement with Canada in 2011, and is in the process of completing negotiations with the European Union and South Korea.[32]

Most recently, Colombia and the US have agreed to the US-Colombia Trade Promotion Agreement (CTPA). Under this agreement, trade tariffs and other barriers will be reduced or eliminated to spur greater economic activity between the two countries. For example, 80% of all trade tariffs will be eliminated, with the remaining tariffs set to expire within a 10-year period.[33] Note that while President Barack Obama signed the agreement in October 2011, the agreement will not go into effect until Colombia can demonstrate its compliance with each of its obligations.[34]

Through all of its recent agreements, Colombia has indicated its commitment to greater international trade. Assuming greater government stability and improved infrastructure, Colombia should be in a position to capitalize on each of its free-trade agreements.

Government and Societal Trends

After four decades of tumult and violence related to drug trafficking, as well as violence between government forces and insurgent groups (namely the Revolutionary Armed Forces of Colombia [FARC]), the turmoil began to gradually subside in 2002.[35] While insurgent groups have slowly begun to disband, the Colombian government has reasserted its control in municipalities throughout the country, leading to greater stability. However, insurgent attacks against citizens remain a concern.[36]

President Santos was elected president in August 2010.[37] Under the Santos administration, initiatives improving security, expanding human and labor rights, combatting corruption, and promoting trade have all been implemented.[38] President Santos has continued all positive trends related to violence, with paramilitary participation dropping 50%, kidnappings dropping 90%, and homicides dropping 46% over the past decade.[39]

The Santos administration has remained committed to creating a culture of internal stability that could provide a firm domestic foundation for expanded international trade.

Infrastructure

Colombia's infrastructure is severely deficient. In 2011, Colombia's infrastructure network was ranked 79th out of 139 countries by the World Economic Forum.[40] Because of its poor transportation network, the shipping of goods has been highly inefficient and thus quite expensive. The high costs of exporting shipping containers are a result of Colombia's deficient infrastructure. For example, a standard shipping container from Colombia costs $1,770 to export, but a shipping container with a similar distance from Argentina costs only $1,480.[41] In order to be competitive, Colombia must address the costs caused by its poor infrastructure.

Under President Santos, Colombia has begun that process. The Santos administration has undertaken an ambitious agenda to address many of Colombia's most immediate infrastructure needs, with $2.2 billion being allocated for immediate repairs.[42]

However, simple repairs cannot address the overall flaws in Colombia's transportation infrastructure. Cognizant of this fact, President Santos has enacted a new government infrastructure agency and a new 10-year, $55 billion infrastructure plan, financed by a public-private partnership.[43] Under this plan, roads will be repaired and expanded, with priority being given to roads linking Colombia's second largest city, Medellin, to both Caribbean and Pacific ports.[44] Additionally, high priority has been placed on the improvement and expansion of Colombia's waterways. Dredging on the Magdalena River and various port access channels to expand shipping capacity is currently underway in consultation with HydroChina.[45] Each of these projects is intended to improve and increase the flow of imports and exports in Colombia.

Although Colombia's infrastructure is currently hampered by deficiencies, recent initiatives indicate that Colombia is headed in the right direction. With improved roads and waterways, Colombia will be in prime position to take full advantage of trade with new agreements, its vast fuel and mineral resources, and its unique position on both the Pacific Ocean and Caribbean Sea.

Peru

Introduction

With a population of nearly 30 million people, the Republic of Peru is located in northwestern South America, bordered by Brazil, Bolivia, Chile, Colombia, Ecuador, and the Pacific Ocean. Peru possesses an expansive geographical diversity, reflected in its tradable commodities: mineral resources, metals, fossil fuels, and a variety of agricultural products, especially fish.

Through trade of its resources, Peru has experienced significant economic growth in recent years, but also many challenges. Since 2006, it has greatly increased both imports and exports, and lowered its national poverty rate. However, to date, Peru is still plagued by high levels of unemployment and underemployment, poor infrastructure development, crime, corruption, and fluctuations in global commodity prices. Without properly addressing its various internal issues, future economic growth may be limited.

General Economic Overview: Trends, Growth, Imports, and Exports

General Macroeconomic Trends

Historically, Peru has maintained a strong macroeconomic performance due to its exports, allowing it to both make external debt payments and finance its purchase of imports. Generally, the Peruvian government has maintained high levels of spending, including its conditional cash transfer program, which has helped to greatly reduce the national poverty rate. In addition, inflation in 2010 was within the Central Bank's 1–3% target range. Despite this progress, Peru's significant dependence on the global prices of a variety of its exports has hindered a stronger macroeconomic performance.[46]

Until 2010, Peru experienced a strong period of economic growth, with average growth at 7% each year for 7 years.[47] However, due to the global financial crisis, real GDP growth was reduced to 0.9% in 2009, but quickly rebounded to 8.8% in 2010. For 2011, Peru's GDP growth rate is estimated to be $168.5 billion, which equates to a slightly reduced growth rate of 6.2%.[48] With investments in infrastructure, newly implemented trade agreements, and a variety of social initiatives pursued by the current administration, it is safe to assume a similar macroeconomic performance by Peru in the near future.

Export and Import Trends

Peru's economic growth throughout the 2000s can be directly attributed to its increased foreign trade and investment as well as increased international prices for its resources. In 2010, with the further implementation of prior trade agreements and increasing mineral prices, Peru's exports were estimated at $35.1 billion. Over the same time period, its imports were estimated at $28.82 billion. Internationally, Peru ranked 59th in both merchandise exports and imports, 73rd in commercial services exports, and 64th in commercial services imports.[49]

Peru's major merchandise imports and exports can be divided into three different categories: agricultural products, fuels and mining products, and manufactured goods. As Table A.3 indicates, Peru's 2010 top five importers, in order of greatest to least, were the US ($19.5 billion), China ($17.1 billion), the European Union ($10.6 billion), Brazil ($7.3 billion), and Ecuador ($4.8 billion).[50]

Table A.3: Peru's Top Importers, 2010 (in billions)

US	$19.5
China	$17.1
European Union	$10.6
Brazil	$7.3
Ecuador	$4.8

Source: World Trade Organization

In addition, as Table A.4 indicates, Peru's top five export destinations in 2010 were the European Union ($17.8 billion), the US ($16.4 billion), China ($15.5 billion), Switzerland ($11.0 billion), and Canada ($9.5 billion).[51]

Table A.4: Peru's Top Five Export Destinations, 2010 (in billions)

European Union	$17.8
US	$16.4
China	$15.5
Switzerland	$11.0
Canada	$9.5

Source: World Trade Organization

With both imports and exports, Peru experienced growth from 2009 to 2010.[52] Early estimates for 2011 place Peru's exports at $43.83 billion and its imports at $36.85 billion.[53] Both estimates

are significant increases from 2010 and are clearly indicative of the effects of new free-trade agreements.

Trade Agreements

Peru's current administration has indicated a strong commitment to free trade through a variety of policies and agreements. In the past 6 years, Peru has signed trade agreements with each of the following countries: Canada, China, Japan, Mexico, Singapore, South Korea, and the US. Additionally, in order to further increase foreign trade and investment, Peru has completed negotiations with the European Free Trade Association (EFTA) and implemented the US-Peru Trade Promotion Agreement (PTPA).[54]

Despite the aforementioned policy actions for increased foreign trade and investment, internal disputes with foreign investors over natural resources, namely from Peru's indigenous population, may complicate future trade, especially in regards to mineral and fuel resources.[55]

Government and Societal Trends

After serving a previous presidential term plagued with economic hyperinflation and terrorism from 1985 to 1990, Alan Garcia Perez was elected to a more successful second term in 2006. Under the new Garcia administration, Peru witnessed its strongest macroeconomic performance ever, with real GDP growing at an average of 7% each year and an overall 5% decline of the poverty rate.[56]

Despite these successes, Garcia still faced several crises reflecting the complexity of Peru's newfound economic growth and poor social situation. In June 2009, indigenous protestors rallied against Garcia's plan to expand oil exploration, mining, and agriculture. The demonstration soon turned violent and led to the death of 10 protestors and 24 police officers.[57] Such an incident, while unfortunate, underscores Peru's delicate balancing act between economic growth through foreign investment and the rights of its citizens.

In June 2011, Peru elected Ollanta Humala Tasso president in the midst of rising crime rates. Since his election, Humala's focus has been largely devoted to social improvement, by combating crime and corruption. Under Humala, the Anti-Corruption High Commission has been created along with reform efforts within the Peruvian judicial system.[58] Such reform efforts have been met with approval and praise, particularly from the European Union, which could lead to further stability and foreign investment in the future.

Infrastructure

Though Peru has been notoriously plagued with poor infrastructure, Peru's Transport and Communications Ministry (MTC) has recently made upgrading transport infrastructure a significant priority. From 2011 through 2016, investment in Peru's road, rail, airport, and port infrastructure is expected to exceed $20 billion with the majority of investments going towards road expansions and improvements.[59]

Under the current plan, $11 billion from public-private partnerships will go directly towards road expansions and improvements. By 2016, 7,270 kilometers (4,517 miles) of roads are expected to

be paved, with 85% of the national highway and 53% of national roads expected to be completed.[60]

In addition to road expansions and improvements, Peru is also aiming to improve its rail infrastructure. Specific investments in two of Peru's most important rail lines, Sur-Medio and Nor-Andino, are expected to top $8.3 billion.[61]

Furthermore, most pertinent to this report are the expected investments in port infrastructure improvements. By 2015, $300 million is expected to be invested in expanding and improving Peru's international port infrastructure. Additionally, $46 million will be allocated towards improving river transportation infrastructure within the Amazon region.[62]

Through the aforementioned investments in its road, rail, airport, and port infrastructure, Peru will be in an even stronger position to secure economic growth with the infrastructure to attract and accommodate increased foreign trade and investment.

Venezuela

Introduction

With a population of just over 28 million people, the Bolivarian Republic of Venezuela is located in northern South America, bordered by Brazil, Colombia, Guyana, and the Pacific Ocean. Unlike some other South American countries like Peru, Venezuela's economy is heavily dependent on one export: fuel resources.

Though oil and gas are constantly in demand in international markets, Venezuela, under President Hugo Chavez, has not always been a reliable supplier. Under Chavez, Venezuela has withdrawn from a number of international trade agreements and organizations and has nationalized several industries including private oil projects. These actions, coupled with Venezuela's deteriorating transport infrastructure, have made Venezuela a somewhat unreliable trading partner. However, with international demand for oil continuing to rise, many trading partners, including the US, have been unwilling and unable to cut trade relations with Venezuela and the Chavez administration.

General Economic Overview: Trends, Growth, Imports, and Exports

General Macroeconomic Trends

Historically, Venezuela's macroeconomic performance has depended heavily on the trade of its oil and gas resources. Oil exports account for approximately 60% of all government revenues and 95% of Venezuela's overall exports.[63] Though highly dependent on oil, Venezuela has enjoyed significant economic growth from rising oil prices. Before the financial crisis, average annual GDP growth was approximately 8%, with a significant influx of government spending on a variety of initiatives, including a minimum wage increase.[64]

Despite this growth, Venezuela has suffered from high inflation, which was approximately 27% in 2011, and a shortage of household goods.[65] To date, the Venezuelan government has attempted to combat high inflation and shortages with a series of price controls and nationalizations of industries, for which the effects are still being gauged.

Exports and Imports Trends

Venezuela's major merchandise imports and exports can be divided into three different categories: agricultural products, fuels and mining products, and manufactured goods. As previously mentioned, Venezuela has heavily relied upon its oil and gas resources in trade. Its heavy dependence on oil exports is highlighted by the fact that 95.3% of Venezuelan exports in 2010 were made up of fuel resources.[66] In turn, most of Venezuela's imports are made up of manufactured goods, which accounted for 81.1% of all Venezuelan imports in 2010.[67]

In 2010, as indicated in Table A.5, Venezuela's top five importers, in order of greatest to least were the US ($27.3 billion), the European Union ($13.3 billion), Colombia ($11.4 billion), China ($10.4 billion), and Brazil ($8.8 billion).[68]

Table A.5: Venezuela's Top Five Importers, 2010 (in billions)

US	$27.3
European Union	$13.3
Colombia	$11.4
China	$10.4
Brazil	$8.8

Source: World Trade Organization

In addition, as Table A.6 indicates, Venezuela's top five export destinations in 2010 were the US ($0.9 billion), Colombia ($0.7 billion), European Union ($0.6 billion), China ($0.5 billion), and Mexico ($0.4 billion).[69]

Table A.6: Venezuela's Top Five Export Destinations, 2010 (in billions)

US	$0.9
Colombia	$0.7
European Union	$0.6
China	$0.5
Mexico	$0.4

Source: World Trade Organization

Trade Agreements

As a matter of policy, President Hugo Chavez and the Venezuelan government have been opposed to most free-trade agreements, especially any agreements linked to the US. In addition, it has had a history of withdrawing from a number of different international agreements.

In 2006, Venezuela provided notification that it would withdraw from the Andean Community of Nations (CAN) after Colombia, Ecuador, and Peru engaged in agreements or negotiations with the US.[70] Most recently, Venezuela provided notice of its pending withdrawal from the World Bank's International Centre for Settlement of Investment Disputes (ICSID) in 2012, arguing that international proceedings regarding oil and gas disputes are a direct violation of its constitution.[71]

Despite these withdrawals, Venezuela still remains a WTO member and is on the verge of becoming a full member of MERCOSUR, contingent upon approval from Paraguay.

Furthermore, despite significant differences with the US, Venezuela and the US still remain close trading partners, with bilateral trade near $40 billion in 2009.[72]

Regardless of incendiary rhetoric and withdrawal from international agreements, Venezuela is heavily dependent on oil and gas trade, and thus will continue to engage other countries in trade. However, due to its past instability and unreliability, trading partners may be wary to engage and may turn to more reliable sources of oil and gas.

Government and Societal Trends

Much of Venezuela's political and economic future rests on the health of President Hugo Chavez. As of March 2012, Chavez was recovering in Cuba after a second surgery to remove a tumor in his pelvic region.[73] Neither the doctors nor the Chavez administration have disclosed whether the tumor is benign or malignant.

Chavez, who has been president since 1999, is currently facing a reelection challenge from rival Henrique Capriles Radonski, the Unity Table candidate, for the presidential election in October 2012.[74] Though Chavez is generally viewed as a heavy favorite in this election, his health may prevent him from campaigning, which could give Radonski an electoral advantage.

Much of Chavez's vision, entitled "21st Century Socialism," has been used in his past and current political campaigns. Under this plan, Chavez has promised to remedy social problems by combating corrupt capitalism and globalization.[75] From the adaptation of his plan, Chavez has pursued a policy of nationalization, which has included telecommunications, electricity, and many oil projects.[76] In addition, the Chavez administration passed new laws that extended government control over all facets of transportation, including airports, ports, and roads.[77]

Under Chavez, government control of industries and services has greatly expanded, which has in turn increased the government's control over the economy.

Infrastructure

Venezuela's infrastructure has been in a crumbling state of disrepair over the past few years, most notably in relation to aviation, train, and road transportation.

In September 2011, arguably Venezuela's most disastrous month in regards to transportation, 33 aviation incidents occurred, including a terrifying incident in Puerto Ordaz where a plane's engines dismounted upon landing.[78] Days after the Puerto Ordaz incident, three commuter trains in Caracas collided, killing one conductor and injuring many passengers.[79] The frequency and level of these incidents immediately raises concerns about the state of Venezuela's infrastructure.

Equally concerning is the present state of Venezuela's highways and roads. Also in September 2011, a 5-mile bridge in Venezuela's second largest city, Maracaibo, lost a significant piece of structural support, which caused significant traffic delays and safety concerns.[80] Aside from bridge concerns, Venezuela has also been plagued by large potholes on its roads and highways. One mega-sized pothole, which could be more appropriately termed a sinkhole, was the size of a swimming pool and claimed the life of one driver while creating days of traffic delays.[81]

Obvious safety concerns aside, the lack of fluidity in Venezuela's air, rail, and road transportation infrastructure raises significant doubts about the efficiency of its ability to transport goods and services as well as its ability to address infrastructure issues in a timely manner.

Despite these concerns, the Chavez administration has not focused on addressing the immediate needs of its infrastructure, and has instead elected to pool resources toward a new high-speed train network, which is being financed and administered by the Chinese government.[82] The plan is part of an attempt by the Chavez administration to entice Venezuelans to relocate from its heavily populated coasts to the plains, but is viewed by many as unwarranted and poorly analyzed.

With a combination of deteriorating infrastructure and poor government planning and response, Venezuela's transportation system has devolved into a hindrance to international trade. The state of Venezuela's infrastructure, along with the tendency of its government to withdraw from international agreements and proceedings, directly calls into question the dependability of Venezuela as a trading partner.

India

Introduction

India is one of the US's fastest growing economic partners, both in terms of overall numbers and the rate of increased interdependency. As of 2010, trade with India constitutes the 12th largest bilateral partnership for the US. Trade with India has more than doubled over the past 5 years, going from $7.9 billion in 2005 to over $19 billion presently.[83] This trend should continue into the next decade as US and global demand for Indian exports continues to rise; however, domestic challenges could obstruct economic development and its competitiveness regionally and globally.

The largest constraint on the Indian economic and trade development is the poor condition of Indian infrastructure, but the country has shown a commitment to improving the clear burden for Indian economic growth. An additional challenge is the Indian government's inability to rein in bureaucratic inefficiencies, domestic political conflict, and delays in implementing or overseeing infrastructure and development projects. Over time, India will continue to experience economic growth and trading expansion as it has good trading relations with most global states and as its development domestically should contribute to increases in economic activity. However, given that India must contend with domestic challenges and with competitors that are growing quicker and more dynamically than India (such as China), many experts warn that India will need to show marked improvement before this country becomes a robust Asian trading regime or a major US trading partner.

Macroeconomic Trends

The rapid growth of the Indian economy, averaging 8.9% of GDP over the last 5 years, has been tempered by accompanying uncontrollable levels of inflation.[84] Averaging at around 9% annually over recent years, the high rate has significant implications for Indian trade growth. During a period in which many central banks, including Indonesia, China, and Brazil, are

enacting expansionary monetary measures, the Reserve Bank of India is unlikely to reduce interest rates and cause further depreciations of the rupee. Such an action would jeopardize foreign capital inflows that are essential to continued infrastructure development within India. Moreover, the Indian parliament is gridlocked over investment appropriations that would contribute to offsetting the increasing current account deficit.

At the end of 2012, India's economy appeared to avoid a collapse in GDP, as key economic indicators in manufacturing and purchasing have shown a rebound from mid to late 2011. However, many Indian macroeconomic indicators remain negative and portend negative outlooks. For example, industrial production sharply contracted from 2010 through 2011, and credit to commercial enterprises had dropped to levels not seen since late 2009. Inflation decreased to around 9.1% year-to-year in November 2011 from 9.7% year-to-year in October 2011.[85] Inflation at these levels will continue to weaken consumer confidence figures and consumer spending as high inflation levels have reduced Indian purchasing power.

Credit costs have increased drastically in the last few years. While reducing consumption, its larger effects have been found in reduced investment activity. For example, capital goods industrial production dropped by a whopping 25.5% from October 2010 to October 2011, the largest drop since 2004–05.[86] This drop has contributed to a reduction in consumer confidence and investor faith in the Indian economy. In addition, the current national account deficit will continue to increase over the next few years to over $65 billion per year on average. In 2006 India's current account deficit was only $9.6 billion but it has continued to swell.[87]

Import/Export Trends

India ran a trade deficit of nearly $120 billion in FY2010, and FY2011 was on pace to exceed it at over $150 billion. However, export growth figures for the end of 2011 dropped 3.9% year-to-year from a 2011 high in July.[88] One effect is reduced global demand in which global GDP growth will slow to around 2.8% this year from 3.1% in 2011.[89] This leads many experts to project that Indian exports likely reflect the global slump more in late 2012 into 2013.[90]

India imports a significant amount of oil and refined petroleum products, which makes up much of its import costs. Oil imports have grown from 14.6% year-to-year growth in September 2011 to 32.3% year-to-year growth in November 2011.[91] Other imports also have grown from 17.2% year-to-year in September 2011 to 24.5% year-to-year in November.[92] The growth in Indian imports is a sign of a bolstering of domestic demand, while increasing exports could present opportunities for US firms wishing to increase their presence in India. In order to take advantage fully of these apparent opportunities, India's trading relationships, including in the realm of free-trade agreements, will likely need to rise to the level of India's relations with many of its Asian neighbors and other global partners.

India actively pursues expanding free trade agreements in conjunction with the overarching strategy of export promotion. The government recently finalized Comprehensive Economic Partnership Agreements (CEPA) and Comprehensive Economic Cooperation Agreements (CECA) with ASEAN, Japan, and Malaysia. Non-Tariff Measures (NTMs) in developed countries pose a particular challenge to expansion of Indian trade. India has initiated efforts to enhance the regulations governing Sanitary and Phytosanitary (SPS) imports.[93] This move is

viewed internally as a method for strengthening exports indirectly by leveling productive competition. The Department of Commerce will continue to seek specialized treatment from the WTO on SPSs that suit their interests as a developing country.

In addition, India has signed agreements with its South Asian neighbors, including the Agreement on South Asian Free Trade Area (SAFTA) among the members of the South Asian Association for Regional Cooperation (SAARC) in 2004, including Afghanistan, Pakistan, and Bangladesh.[94] Also in 2004, India entered into an agreement with the South American trade bloc MERCOSUR, which includes Brazil, Argentina, Uruguay, and Paraguay. This preferential trade agreement (PTA) aims to expand trade between the two parties by permitting "reciprocal fixed tariff preferences" that will ultimately result in a complete free trade regime.[95] India also has agreements and good general trading relations with its Asian neighbors; however, the US and China each have yet to agree on a free-trade agreement with India, even though China is India's largest trading partner and the US has looked to India as a check to a rising China. India's attitudes towards its trading relations with China and the US will likely shape the country's future trade policies and trends as well as its competitiveness with its Asian neighbors.

Political Background

Over 65% of India's one billion citizens are registered to vote, making it the largest democracy in the world. For several decades, the Indian political system was single-party dominated by the Congress Party, but since the early 1990s political power has become increasingly decentralized.[96] Although coalition-led government has resulted in less unilateral policy-making in India, expansion of international trade continues to be a unifying goal. Home to nearly a third of the world's poor, expansion of productive capacity and domestic consumption remain overarching aims of economic growth.[97]

The United Progressive Alliance (UPA), a multi-party coalition led by the center-left Indian National Congress, currently holds a majority in Indian parliament and has control of parliament's agenda and of the implementation of new laws and regulations. Recently, the UPA had promised a major program to combat corruption, to reform markets, to develop infrastructure and rural areas and to promote economic growth to all citizens.[98] Most of these initiatives have fallen short of expectations due to political squabbling and internecine battles within the UPA coalition.

One example is the controversy and ultimate disaster in failing to pass an anticorruption bill in Indian parliament in 2011. Indian parliament failed to pass the bill by its year-end deadline despite a national uproar, high-profile protests, a hunger strike by high-profile anticorruption activist Anna Hazare, and public support from Indian Prime Minister Manmohan Singh. The bill would have established an anticorruption bureau when it became law.[99] The failure to pass this bill led many observers to speculate that Indian corruption is chronic and a standard practice for political business in India. Due to both this loss and the government's inability to rein in high levels of spending, the ruling coalition has lost much of its national support.

One other embarrassing corruption scandal, spanning around 5 years, concerns a series of illicit deals involving mobile-telephone contracts between the telecommunications ministry and mobile-phone operators. This scandal has led to the resignation of many government officials,

court orders to sever the contracts, the likely collapse of many Indian mobile-phone operators, and more discredit to the Indian government and its prime minister.[100]

Since the start of 2012, the UPA has continued to suffer from high levels of corruption, inability to promote infrastructure and general economic development, and the failure to rein in inefficient and irrational practices that have scared off foreign investment. If the Indian economy were to slow drastically, observers expect the national government to play a larger role in directing stimulus and other recovery measures. However, with ongoing problems with the national government and with local resistance within regional politics and with regional unrest, including a Naxalite-separatist movement, implementing such recovery programs may prove quite challenging given the current political environment.

Domestic Economic Strategy

India utilizes a centrally planned strategy for economic growth based on successive 5-year plans. The current Eleventh Five Year Plan (EFYP), 2007–2012, includes goals across a broad spectrum of economic and general welfare issues, including transportation and specifically port infrastructure.[101] A subset of this plan is the Foreign Trade Policy (FTP). The goal of the FTP is to double India's exports of goods and services by 2014 with the long term aim of doubling India's proportion of global trade by 2020.[102]

As domestic consumption and investment remain stagnant, many experts recommend that the Reserve Bank of India (RBI) adopt a looser monetary policy, which would include reducing interest rates, in spite of high inflation.[103] The RBI would be unlikely to implement a relaxed monetary policy since the rupee has weakened by nearly 20% since July, reducing the purchasing power of Indian households.[104]

Government spending has considerably decreased from levels of 26.7% growth from levels seen after the 2008 financial crisis to only 3.2% year-to-year growth with some of it a result of inflation.[105] With tax receipts and other revenues to the government decreasing, along with increasing government spending, India is unlikely to implement a broad stimulus program to help its economy. In the Twelfth Five Year Plan (spanning FY2012–13 to FY2017–18), the government plans to double its investments, much of it in infrastructure, to $1 trillion through the plan.[106] Much of their plans are heavily reliant on private-sector funding, which will account for at least 50%.[107] In order to achieve these targets, the economy would need to grow at around 10% per year through the life of this plan. However, as previously stated, the Indian economy has been growing at an average of 9% in the last few years, which is an already high rate of growth.[108] Many observers project that increasing GDP levels to 10% will be very difficult to achieve; in addition, adding to the inefficiency in tax collection and corruption, the government's $1 trillion investment initiative will likely not be covered revenue from GDP growth alone.[109]

Infrastructure

Infrastructure constraints remain the single biggest deterrent to accelerated trade growth. The mid-term appraisal of the EFYP identified "major shortfalls in power generation, roads, railways, and ports."[110] Moreover, it is anticipated that port bottlenecks will post greater logistical costs in the future as capacity is only projected to reach 55% of the initial EFYP goal.[111] Indian ports already face relative disadvantages compared to their regional competitors. In 2009–2010, vessel

turn-around time averaged 4.4 days in India compared to about 6 hours in Hong Kong and Singapore.[112] Inefficiency costs are not solely found in the port system. According to the latest 'ease of doing business' report by the World Bank, India ranks 134th.[113] Estimates suggest that as much as $18 billion in unwarranted transactions costs exist in India per year.[114]

As mentioned, the government plans to double its investments in infrastructure to $1 trillion in the context of the Twelfth 5-Year Plan.[115] Though the full scope of the plan has yet to be realized, India will have many pressing projects on land, on water, and in the air that are critical to the country's economic development. India has invested over $100 billion on road paving, on road widening and on new roads throughout the country. India has less overall vehicle traffic than the other BRIC states (Brazil, Russia, and China) but much of its traffic is centered in industrial and population hubs, which has caused heavy congestion on much of India's roads.[116] As a result of this congestion, the average truck speeds are around 30 to 40 km/h (18 to 24 mph), which is half of normal speeds in developed states.[117]

Many Indian roads are two-lane (with each lane running in a different direction), narrow, and often unsafe, and dotted with many redundant checkpoints. In fact, only one road joins two cities and the number of connections between ports, cities, and inland areas is alarmingly limited. The pace of construction has been lacking with most projects behind schedule; however, with new approaches to awarding contracts and to oversee progress, the Indian government hopes that these much needed road improvements will be online in the near future (BMI India Infrastructure)[118].

Rail in India is the fourth largest in the world but one of the oldest, least renovated networks. For example, 6,500 miles of track are over 50 years old. New initiatives to renovate old lines or develop new lines are mostly delayed. Nonetheless, the country has been engaged in a bidding process for the eastern and western dedicated freight corridors (DFC), worth around $2.3 billion of contracts for the state.[119] In order to help these public-private partnerships finance these projects, the government has shown support for "Infrastructure Debt Funds" that would generate financing via pension and insurance funds, government tax revenue, and private investment.[120] When completed, the eastern and western DFCs will connect the major port and other trade centers with industrial and agricultural hubs and greatly improve logistics throughout the country.

Ports in India are expected to experience substantial growth in the future as economic growth has created congestion and stress among India's ports. Without greatly needed expansion, Indian firms will be less competitive than their Asian counterparts, especially China and Southeast Asia. To add to these problems, bureaucratic inefficiencies and red tape have weakened the port sector's appeal to international firms. With the many documents, applications, permits, and clearances a firm needs to build or to operate a port in India, at least 12 port projects have been delayed since 2011 because of these processes.[121]

For example, an Indian court denied an appeal from port firm DP World to review its rejected offer to build a new container terminal outside Mumbai, Nhava Sheva.[122] This original tender was offered in July 2008, and has been delayed from that point due to delays in certification and

lack of wide interest in the 2008 offer; the government would likely prefer to expunge the previous sale and make way for newer, more lucrative offers.

To add to the challenges, Indian shipping firms are only allowed to operate among the coastline port system, similar to the US Jones Act of 1920 relating to cabotage regulation. This rule has prevented banks, firms, and other sources of funds from investing significantly in Indian ports, as feeder lines are the preferred option.[123] In order for Indian ports to generate the necessary global investment and demand for its planned port expansion and development, many experts believe that bureaucratic inefficiencies, must be reduced and regulations that prevent non-Indian tankers to operate in Indian coastline ports must be changed or repealed.

Airports in India have undergone much renovation and expansion not only for cargo but also for increasing passenger traffic. Though expansion in India's largest cities is ongoing, such as the improvements at Navi Mumbai International Airport, much of the demand for air infrastructure has come from smaller cities that have seen an increase in wealth and economic activity.[124] In spite of this demand, as financing has been reserved primarily for roads, rail, and ports, air traffic expansion is unlikely to grow in the near future.

Conclusion

India's economy and trade will continue to grow throughout the next decade and beyond; however, the growth rates from year to year are likely to decline in the same period. Inflation, at over 9%, can become a problem for consumer confidence and domestic economic development. This and other factors have led to decreases in industrial output and to increases in credit costs throughout the economy, especially as domestic demand increases. Indian growth in imports and exports show many opportunities for economic development domestically and for increasing trade cooperation with India; however, currently, the US has no free-trade agreement with India. India faces many political and regulatory challenges, including overwhelming red tape and an infamous reputation for corruption, that have hampered many development projects and spread doubt and skepticism domestically and globally about India's commitment to its economic and trading futures. Infrastructure projects have started throughout the country, but undue delays and red tape have slowed the commissioning of these projects into the broader Indian logistical network. Despite these challenges, India remains an area of opportunity and growth for the US and Texas. India will need to create a much more ambitious culture of governmental reform and infrastructure development than other Asian states in order to compete in the Asian economy.

Southeast Asia

Introduction

The Association of Southeast Asian Nations (ASEAN) is made up of 10 member-countries: Indonesia, Malaysia, the Philippines, Singapore, Brunei, Burma (Myanmar), Cambodia, Laos, and Vietnam. Despite the many differences in import/export markets, resources, and societal priorities, the governments of each of the ASEAN countries have agreed to several overarching best practices of enhancing trade in the region and with global partners. In addition, common regulations among port authorities create consistent operating procedures across the region congruous. The advanced economies of ASEAN boast a total population of about 600 million people. US trade with the region continued to grow in 2010 as ASEAN moved from the fifth

largest trading partner with the US in 2009 to the fourth largest in 2010. In addition, FDI from the US has been pivotal to the region's continued economic success.

All ASEAN members agreed in 2003 to begin the process of establishing an ASEAN Economic Community (AEC) to create a robust economic region that can compete with the rest of the world and to improve relations among ASEAN states. The states within ASEAN that will have the most impact on future US and Texan trade are Vietnam, the Philippines, Malaysia, Thailand, Indonesia, and Singapore.

Macroeconomic Trends

Despite depressed growth rates following the global financial crisis in 2008, average rates in ASEAN rebounded in 2009 and 2010, returning to the previous levels of greater than 6% increases in GDP.[125] Outside of Vietnam, inflation has not been an issue of concern for any member-nations. Additionally, ASEAN governments are in a prime fiscal position to increase investments in infrastructure, given that many have run surpluses and deficits among others are negligible.

Vietnam GDP growth has hovered around 6% to 7% a year since 2008, and experts believe that future GDP growth will remain at these levels for the next few years. Manufacturing spending and activity makes up a significant part of Vietnamese GDP at 19.4% and formed over a third of Vietnam's GDP growth in 2011.[126] Furthermore, Vietnam's consumer price index increased to over 10% in the fourth quarter of 2010, fueled primarily by increases in transportation costs, education, and food.[127] In fact, inflation has been a problem in Vietnam, often hovering over 10% with a height of 23% in 2008[128] and 13.9% increase in March 2011.[129] Experts warn that Vietnam will experience a decrease in access to foreign credit and investment in the future, which will likely reduce manufacturing levels in the country and consumer and state spending on various projects. Recently, the State Bank of Vietnam dropped its interest rates as inflation has dropped and the government is determined to increase investment and development, which will help to offset national economic challenges and will likely keep the country at GDP levels consistent of the past few years.[130]

The Philippines experienced GDP growth of 3.7% in 2011, which came short of the government's 4.5 to 5.5% target; however, state officials remain hopeful of 2012 GDP growth to surpass 7%, citing an increase in Chinese, Japanese and other foreign investment to the country.[131] Indonesia experienced a GDP growth rate of 6.46% in 2011; and experts believe that domestic demand will drive most of the country's growth.[132] Malaysia GDP growth was at 4.5% in 2011 and decrease in future years.[133]

Thailand had been hit with major flooding and an unpredictable plunge in manufacturing in the country caused 2011 GDP to fall to 0.1% with fourth-quarter rate of -9.0% year-to-year.[134] However, experts forecast Thai GDP will grow more than previously projected at 5.5 to 6.5%, as manufacturing will rebound near previous levels and investment will eventually recover, contributing to GDP growth.[135]

As briefly noted in previous sections, ASEAN views continued trade liberalization as a key to the region's continued economic development and future prosperity. FTA's exist with the fellow

Asian countries of India, China, Korea, and Japan, along with Australia and New Zealand. Members of the US Congress continue to push negotiations to establish a FTA between the US and ASEAN, fearing that the proliferation of ASEAN FTA's with other countries undermine US competitiveness in foreign markets.[136]

One main trend that Southeastern Asian states share is their dependence on Chinese investment and economic activity as well as European and American demand for its exports. The states in this region, except Singapore, Indonesia, and Malaysia, have few effective ways to protect their economies from reductions in demand for exports or investment that contribute to GDP growth.

Import/Export Trends

Trade in goods with ASEAN and the US totaled more than $178 billion in 2010, an increase of about 31% from the previous year. Both imports and exports increased over the period US goods imports from ASEAN were $ 107.8 billion in 2010, up 17% since 2009. [137]

Here are the significant changes, documented by the Office of the United States Trade Representative (USTR):

> U.S. exports of agricultural products to ASEAN countries totaled $7.6 billion in 2010, up 22.1 percent from 2009. U.S. imports of agricultural products from ASEAN countries totaled $8.6 billion in 2010, up 38.8 percent since 2009.
>
> The top five ASEAN export markets in 2010 were Singapore ($29.1 billion), Malaysia ($14 billion), Thailand ($9 billion), Philippines ($7.4 billion), and Indonesia ($6.9 billion). The top 5 ASEAN import suppliers in 2010 were Malaysia ($25.9 billion), Thailand ($22.7 billion), Singapore ($17.5 billion), Indonesia ($16.5 billion), and Vietnam ($14.9 billion).[138]

Approximately 10% of total ASEAN trade is conducted bilaterally with the US. US FDI has been a major contributor to ASEAN growth—nearly $122.9 billion was invested from the US in 2009.[139] The majority of this FDI can be attributed to holding companies, manufacturing, and finance sectors. [140]

Political Background

The main seaborne trading countries of Southeast Asia have governments that are more stable than the global average, especially given their pasts. Thailand, which was the center of massive political protests years ago, has improved its political situation; in fact, Thai Prime Minister Yingluck Shinawatra's approval ratings improved due to her response to the recent devastating floods, although the country still suffers from other internal problems, like price increases.[141] In the last 8 years, Indonesia has completed two peaceful parliamentary elections with little violence and saw a decrease in religious or separatist violence. With the exception of Singapore, the political systems in this region have only recent histories with democracy and elections. Islamic radicalism, poverty, inequality, and possible economic downturns leave these states vulnerable to future political unrest that could affect global trade.

The political values and economic priorities of the ASEAN countries are embodied in the ASEAN Charter, a binding international agreement. The agreement, ratified in 2008, harmonized political commitments and economic goals, and created a new, mutually agreed-on legal

framework. In addition, one of the accord's bylaws mandates that member-states take any necessary domestic action to comply with the commitments.[142] These commitments target broad issue areas such as agreement on democratic principles and continued economic integration, but ASEAN is also granted legal responsibility to enforce its liberalizing agenda as an inter-governmental organization.[143]

ASEAN generally remains united in the face of one political challenge: China's disputed claims to the Spratly Islands and surrounding sea access. Primarily involving the Philippines and Vietnam, this conflict revolves around the mineral and energy resources in the seas around the Islands. The Philippines has claimed that the UN Law of the Sea Treaty affords the country the right to control energy and mineral rights throughout the Spratly Islands, of which both states clearly want and need. Both Indonesia and China have ratified the treaty. Recently, the Philippines declared the start of energy exploration to which China protested. China has used more abstract claims to justify its access to those resources, and has protested the Philippines' exploratory actions.[144]

If ASEAN states and the international community accept China's claims to the Spratly Islands, then China will have closer geographic proximity to southern Vietnam, Malaysia, Indonesia, and the Philippines. In addition, China will be closer to global trading lanes from Southeast Asia to the Americas and to the Indian Ocean.[145] Although the tension concerning the Spratly Islands is not likely to erupt into a full crisis in the future, this conflict will persist in the future and will likely shape much of the overall development of Southeast Asia's political and trading relationship with the world.

Economic Strategy

In April 2009, ASEAN unveiled a 6-year strategic plan for the region in the creation of an ASEAN Economic Community (AEC) in 2015. According to its website, the AEC will establish "a single market and production base, a highly competitive economic region, a region of equitable economic development, and a region fully integrated into the global economy."[146] The plan prioritizes the areas of increased trade liberalization and infrastructure investment. It also enumerates specific prescriptions in areas ranging from customs integration to enhanced rules of origin regulations which aim to protect against barriers to trade such as quotas and dumping practices.

According to the ASEAN Economic Community Blueprint, the pan-regional policies that will be adopted among ASEAN members include such policy changes as the elimination of tariffs on intra-ASEAN goods, removal of all non-tariff barriers, and establishment of standardized trade and customs procedures.[147] The AEC will strive to achieve an economic environment in which FDI increases, members become globally competitive, investments regimes are more transparent and liberalized, "greater capital mobility" is promoted, and freedom of labor movement is expanded.[148]

Infrastructure

The ASEAN Transport Action Plan (ATAP) identifies 48 specific measures the region is undertaking to remedy infrastructure deficiencies and advance plans to become a world leader in logistical capabilities. Among the major projects are the completion of the Singapore-Kunming

rail link and the implementation of the ASEAN "single shipping market" plan. Both information and power infrastructure are also crucial to ASEAN's continued development. The ASEAN road network is composed over 26,000 km of road of which slightly over 24,000 constitutes Class III grade or above. The largest constraint to efficient reception and transport of goods remains adequate internal road systems. The ASEAN Highway Network is the flagship project within the region, as updating internal roadways will remain the infrastructure priority for years to come.

In the AEC framework, ASEAN plans to develop an "integrated transport network" throughout the ASEAN states in order to afford the benefits of development and prosperity equally to all ASEAN states. The bloc believes this would allow the region to accelerate its planned integration more quickly and to become a regional bridge between far-east Asia and south Asia.[149] Infrastructure projects include roads, rail, air, sea, and high-speed data infrastructure and energy cooperation, among others.[150]

These plans for pan-regional infrastructure are in addition to the national infrastructure projects being carried out by respective ASEAN states; however, without full integration, progress has been unbalanced as more developed, prosperous states usually having more headway than their counterparts. Even if full regional economic integration is completed, infrastructure development will likely remain unbalanced as other economic factors, especially manufacturing, will reduce demand for new infrastructure projects in lower performing states. For the future, ASEAN states and the future AEC will continue to reliy on the global economy and global investment for infrastructure projects in the region.

Conclusion

The Southeastern Asian region is undergoing great changes in its intraregional relations as ASEAN is becoming an integrated economic community, the ASEAN Economic Community (AEC). ASEAN hopes that when the AEC is fully established in 2015, it will transform the region from a series of states with separate economic and development policies into a region that is united "with free movement of goods, services, investment, skilled labor, and freer flow of capital."[151] The region has greatly advanced economically, politically, and socially from many decades ago. Most of these states have sustained effective democracies for years, and ASEAN states have mainly maintained national stability in the wake of political conflict and the threat of religious violence. The Chinese-SE Asian row over the Spratly Islands remains the region's most formidable challenge, one that could greatly affect Asian stability and seaborne trade. ASEAN states have maintained growth rates in spite of the global financial crisis, but all states, which are mostly reliant on China and global trade for GDP growth and manufacturing, are vulnerable to slowdowns in Chinese and global economic activity and reductions in foreign investment. With the emergence of AEC, the region will most likely become more integrated and more competitive in global trade, but the world will wait much longer to witness full regional integration and to collaborate with a formidable factor in Asian and global trade relations.

Japan

Introduction

The success of post WWII Japan serves as an economic success story and a model for export-led economic growth throughout the world. The Japanese economy of the 1990s onward has faced

slower growth and even economic decline at times. With an aging population and industries that have saturated the Japanese domestic economy, they are almost victims of their own success. Growth has slowed largely because of the formerly increasing of economies of scale simply cannot increase as they once did.

Carl Mosk of the University of Victoria attributes Japan's rapid "miracle growth" to Japan's import and export ability, its domestic fixed capital formation, and the rise in domestic investment. He also attributes the ability of Japanese companies to import and employ US technology during the Cold War period. However, Mosk is quick to point out that the Japanese growth that occurred during the Cold War period was actually just the culmination of the process of Japanese economic industrialization beginning in the 1880s. Thus, it seems that while the US does play a role in supporting Japanese economic development in the post-war period, the Japanese industrial spirit and domestic policy are also key factors.[152]

Japanese economic data does portray a rapid period of growth in the 1970s and 1980s followed by stagnation and periods of economic decline from 1990 into this century. Outside of an outlier year in 1974, Japan experienced sustained economic growth at 3.3% a year. Japanese per capita GDP (in constant year-2000 dollars) rose from 17,462 in 1971 to 39,310 in 2010.[153] Therefore, even though Japan currently faces economic troubles, their per capita GDP rivals the US and far outstrips that of China. In comparison, even though China's growth rate far exceeds Japan's, China is simply late to the economic growth party as it continues to increase efficiency and economies of scale; China's growth rate may decrease in the same manner that Japan's did.

General Macroeconomic Trends

Business Monitor International predicts Japan's influence to continue to decline in the future. The publication cites the following three reasons for its assertion: high public debt, limited military expenditures, and increased risk aversion as the country continues to age. Just as damaging to Japanese pride, the publication ultimately predicts that Japan could play the role of Canada for China—the rich peaceful neighbor ultimately dependent on others for its security.[154]

In short, most economic indicators indicate that the Japanese economy was largely stagnant throughout the 1990s and the first decade of the 21st century. The global economic crises caused downward movement in 2008–2009 with a modest recovery in 2010. However, some of the recovery was erased partly due to the tsunami and ensuing Fukushima crises. Most macroeconomic indicators indicate improvement in 2010 and 2011 as the global economy bounces back from previous lows. The Japanese unemployment rate rose to a high of around 5.5% before falling back to 4.5%. In 2008, Japan experienced a 9% drop in national GDP from 2007. Even though the country experienced approximately 5–6% growth in 2009 and 2010, the tsunami and Fukushima incidents caused the Japanese economy to decline at 3% in 2011. Therefore, although the Japanese economy did partially recover from the global economic slowdown, the tsunami definitely hindered this effort. Japanese capacity utilization also denotes the sharp economic decline in 2008. Japanese capacity fell to almost 60% of what it was in 2005.[155]

One major flashpoint and a potential hindrance to the economy's continued recovery is the overall amount of debt that the Japanese government currently carries. Japanese economic debt is

currently valued at 200% of its national GDP—currently the highest debt-to-GDP ratio in the world. The *Christian Science Monitor* claims that 60% of Japanese tax revenues goes to servicing its national debt. As the Japanese population continues to fall while those retiring desires to cash in Japanese Government Bonds the country may face a serious economic disaster should bond prices crash and interest rates increase as the credit worthiness of the Japanese economy declines. While this may be the worst-case scenario, the enormous Japanese debt level certainly weighs on investor's minds.[156]

While not exactly financial data, the potential effects that Japanese societal aging has on its political economy cannot be underestimated. Japan currently has the oldest population in the world. Only 13.2 % of the Japanese population is 0–14 years old and this number is projected to decline to 8.6% by the year 2050. Currently, 63.7% of its population is between 15 and 65 and 23.1% is 65 and over. This is starkly different from the US demographic age structure where 20.1% of the population is 0–14, 66.9% is 15–64 and 13.1% is 65 and over.[157] Thus, an aging Japanese population, coupled with the tradition of taking care of one's elders, places a heavier burden on those that can produce economically. In fact, the Japanese population reached the threshold where it is actually declining.

Export and Import Trends

Japan currently possesses a slim export surplus as it exported $800.8 billion in products and services and imported $794.7 billion in goods and services. The slim export margin has to do primarily with Japan's lack of internal raw materials and cultivable land for foodstuff. Japan's primary exports include transport equipment, motor vehicles, semiconductors, and electrical machinery.[158] Its primary imports are machinery, fuels, food, chemicals, and raw materials. Intra-regional trade actually makes up 48% of Japan's total trade while North America and Western Europe comprise 14% and 11% respectively.[159] The surplus this year is largely attributed to diminished domestic consumption along with an increased demand for Japanese exports. However, after recording surpluses Japan alarmingly recorded a monthly trade balance deficit. *Business Monitor International* claims that this is due to a collapse in exports to Europe.[160]

In the immediate future the export surplus is expected to continue to rise as long as the global economy continues to improve. One hindrance that could hurt the export surplus is the latest trend of Japanese automakers shifting auto production overseas—a trend that has already been underway in the US auto market for many years.

Another factor that hinders Japanese export demand is competition with South Korean companies. Unfortunately for Japan, Korean exports such as high-tech computer products and automobiles largely compete in the same markets. Thus, as the demand for Korean products increases and the Korean trade surplus increases, we can expect an impact on overall international demand for Japanese products and a decline in Japanese exports. This impact recently made itself felt as Korean exports rose following the 2011 tsunami in Japan.

With that said, the long-term expectation for Japanese balance of payments may in fact be negative in spite of recent improvements. As stated in the previous section, the Japanese labor force is declining in number and overall production capacity may decline with it. Thus, the dual

challenges of a declining population and increased national debt may force the overall level of exports down with the overall economy in the long term.

Government and Society

The Japanese Constitution passed on November 3, 1946 relegated the role of the Emperor of Japan to a national symbol and established a government made up of executive, judicial, and legislative branches. The constitution established the Diet, Japan's legislative body, and split it into the House of Representatives and the House of Councilors. Both sides of the legislative body are popularly elected and are representatives of the Japanese people.

The executive body of the Japanese government is the Cabinet headed by the Prime Minister. The Prime Minister is appointed by the Diet and the Prime Minister appoints the other members of the Cabinet.

The judiciary branch consists of the Supreme Court; the Cabinet appoints its members. The Cabinet also appoints the judges that serve in the lower Japanese courts. They go through a process of legislative review as judges do in the US.

As new prime ministers take the reins of the Japanese government, they tend to quickly slide in approval ratings. *Business Insider* contributor Wolf Richter recognizes this trend and contends that Prime Minister Yoshihiko Noda will be no different. He believes that Japanese fiscal issues, continued fallout from Fukushima incident, and the pending consumption tax increase that Noda has to pass will put more pressure on his approval ratings. This raises the question of whether anyone can politically handle the unpopular business of governing the currently sinking ship.[161]

Infrastructure

According to World Bank data, the quality of Japan's overall port infrastructure is currently a five out of a possible seven based on international standards of development and efficiency[162]. Japan's largest container ports include Tokyo, Yokohama, Nagoya, and Kobe. All 4 are among the top 50 ports in the world in container traffic. In 2011, Tokyo port handled 4.28 million TEUs, while Yokohoma, Nagoya, and Kobe handled 3.26 TEUs, 2.55 TEUs, and 2.54 TEUs respectively.[163] Japan, as an island nation, has 22 ports in all.

The rest of Japan's import data indicates that the country is highly developed. As of 2010, over 77% of Japanese people are Internet users. Eighty percent of all Japanese roads are paved and they boast over 20,000 km/12,427 miles of railroad tracks to move products and people. Therefore, getting products to the international market is not expensive or difficult in Japan.[164]

Japan and Texas

According to US census data, 2.2% of all imports from Japan come through Texas ports. This represents a value of $5,834,000,000 in imports coming to Texas. Therefore, Japanese exports do represent value to the Texas economy and we should see impact should domestic Japanese factors restrict exports to the US. [165]

Japan also has a large impact on the Texas economy through FDI projects. In all Japan is the number four country overall that invests directly in the Texas economy. They represent 9% of all

FDI in Texas. In the communication sector, Fujitsu Network Communications has laboratory facilities in Richmond, Texas; they focus on long-term R&D projects and employ over 1,000 people. Toshiba, 7 Eleven, and Toyota also have large FDI projects in Texas.

South Korea

Introduction

The Republic of Korea is located south of the Democratic People's Republic of Korea and to the east of Japan. Following the Korean War, South Korea attempted to implement an Imports Substitution model to encourage economic growth. However, former president Park Chung Hee altered the strategy once he came to power through military coup in 1961 and established the export promotion model that most Asian Tigers employ to this day. [166]

The two largest ports in South Korea are the port of Inchon, located adjacent to Seoul off of the Yellow Sea, and the port of Busan, located on the southwest tip of the peninsula on the Sea of Japan. The Busan port is listed by several Texas ports as being one of the top five ports that deal with ports in Texas.

With the recent passing of the US-Korea Free Trade Agreement (USKOR FTA), Texas can expect to see a graduated increase in Korea-related export/import traffic. While current data already demonstrates that Korea has a sizable impact on the US economy and the Texas economy, we can reasonably expect Korea's importance to increase due to the USKOR FTA.

General Economic Trends

In spite of the ongoing global economic slowdown, the Korean economy remained relatively strong. From 2004 to 2010, Korea's per capita GDP (fixed on year 2000 dollar value) grew from $13,304 to $16,372. While Korea's overall GDP grew from $639,102,209,101 to $800,205,926,791, this includes year-to-year growth throughout the economic crises.[167] The current period in Korean economic history is marked by increased global economic integration. Korea recently completed Free Trade Agreements with both the US and the European Union. The two Free Trade Agreements are also coupled with an expected increasing of the Korea-China economic partnership. According to Cheong Young-rok and Lee Chang-kyu from the Korean Economic Institute, the Korea-China economic relationship is reaching a new phase that portends a larger intraregional dependency on the Chinese market and Chinese domestic consumption.

The Korean Economic Research Institute forecasts lower growth for the Korean economy in the year 2012. They are currently projecting 3.5% growth for 2012 following 3.8% growth in 2011. Indeed, they cite deeper economic repercussions for China due to the current global slowdown as the primary reason for their lower projections.

Dr. Bergstren from the Korean Economic Institute cites three issues that bode well for the Korea's immediate future. He correctly intimates that global economic growth is currently 4 to 4.5%; therefore, export-dependent Korea will likely not see a sharp economic downturn in the coming year. This, of course, is coupled with the challenge of a weak import markets in the US and Japan. The second issue is the undervaluation of regional currencies, especially China's.

Korea, however, currently maintains a healthy trade surplus vis-à-vis China that negates some of the effects of currency undervaluation within the Korean economy. Finally, he mentions the liberalization of the global economy through Korea's negotiation of Free Trade Agreements.[168]

Export and Import Trends

In 2009, South Korea posted its first trade deficit since 2001. However, in 2011 it posted a healthy trade surplus. As noted previously, Korea's economy is highly export-dependent and its future depends greatly on the strength of foreign markets. While Korea does have a trade surplus vis-à-vis most of its trading partners, Korea's reliance on Japanese exports to bolster manufacturing have historically caused a trade deficit vis-à-vis Japan. However, according to Park Giim, research fellow at the Korean Institute of Trade, this trend has been broken. Giim believes that the export of capital goods and consumer demand for Korea made products will outstrip the importation of factors of production from Japan in the future. Thus, he believes that a current government attitude that attempts to decrease imports from Japan would turn into an attitude that encourages exports to Japan.[169]

The USKOR FTA may completely alter export and import trends between South Korea and the US. The USTR contends that the USKOR FTA will make 95% of bilateral trade between the US and Korea duty free within 5 years.[170] The office also claims that two-thirds of all agricultural products from the US will enter the Korean market duty free immediately upon implementation of the agreement.

Many believe that the USKOR FTA will benefit Texas exports in particular. According to the Business Roundtable Network, Korea is currently the fifth largest export market for Texas-based products.[171] Therefore, given that 80% of Texas exports will enter the Korean market duty free, in a stable economy we could expect an increase in Texas jobs and exports to South Korea. The Business Roundtable Network believes that the removal of import tariffs vis-a-vis Korea will give Texas manufacturers a $50 million cost advantage over countries that have not completed a Free Trade Agreement with South Korea. The website claims that production of products like synthetic rubber, raw cotton, and forage products in Texas stand to benefit immediately from the USKOR FTA.

In 2009, during the height of the economic slowdown, Korea-US trade equaled $87 billion with exports to Korea equaling $87 billion and imports coming out to be $46 billion. This leaves a trade deficit of around $4 billion.[172] We can safely expect an upward trend in the overall volume of trade between the two countries due to the FTA. The primary products that the US currently exports to Korea include machinery, electrical machinery, optic and medical instruments, aircraft, and organic chemicals.[173] The primary products that we import from Korea include electrical machinery, machinery, vehicles, mineral fuel and oil, and rubber.

Government and Society

South Korea's government is divided into executive, legislative, and judicial branches. The executive branch consists of the offices of the President and the Prime Minister. The current Korean President, Lee Myong-Bak, is the former mayor of Seoul and is from the Korean Grand National Party. The legislative branch is unicameral and consists of 245 elected members and 54 members that are elected by proportional representation.[174]

The internal Korean debate surrounding the USKOR FTA illuminates some of the deep divisions within Korean society and the Korean government. President Lee Myong-Bak's party currently holds 169 seats out of the 299 seats that make up the Korean National Assembly. The opposition vowed to block voting on the USKOR FTA. However, the Grand National Party called a snap vote and passed the legislation.[175]

Opposition to the legislation largely stems from ever widening economic disparity within Korean society. Upon the establishment of the Korean economic system, the government provided special treatment to a small collection of firms that ultimately acquired a government induced competitive advantage vis-à-vis other firms. At the end of Japanese colonization, the Korean government owned all national banks. When privatizing the industrial remnants that the Japanese constructed, the government provided favorable loans to handful of merchants.[176] They ultimately created the dynastic corporate system known as the chaebol system in Korea.

Transparency International currently rates Korean public corruption at 5.4 out of 10 with 10 being the cleanest. Therefore, as related to other highly developed countries Korea is relatively more corrupt. Transparency International currently rates the US as having a corruption rating of 7.1 and the United Kingdom has a rating of 7.6.[177] Another study of corruption conducted by the Anti-Corruption and Human Rights Commission found that 56.7% of South Koreans view their public officials as being corrupt and 65.4% of South Koreans view their own society as being corrupt.[178]

Lee Myong-Bak still concedes that Korea has a problem with illicit favors being offered by banks on behalf of conglomerates or the other way around and he states that the problem is not isolated to financial institution but is rampant in the public sector as well. He believes that corruption exists in the judiciary, tax authorities, and both the military and civil services. Even though Lee Myong-Bak vowed to stem corruption in the country, he is faced with regulators tipping off bankers about ongoing investigations and leaders of big business often being pardoned.[179]

Internal Infrastructure

World Bank data suggests that Korea boasts a relatively robust internal infrastructure. Korea achieved a rating of five out of seven when it comes to port quality. As of 2009, Korea shipped over 16,000,000 TEUs in container port traffic. However, because this was at the height of the financial slowdown, Korea presumably ships many more TEUs than that as it reached over 17,000,000 in 2007. As far as other infrastructure indicators are concerned, as of 2009, 34 out of 100 individuals have fixed broadband Internet subscriptions and South Korea's liner shipping connectivity index was 87 out of a possible 100 in 2010. This index suggests that the ports are accessible and connected to the world shipping network.

The two most important ports in South Korea are the ports of Pusan and Inchon. The port in Busan recently joined the ports in Shanghai, Singapore, Hong Kong, and Shenzhen as the world's newest super hub port. In order to earn this designation a port has to handle with more than 15 million TEUs in a year. In actuality, the port handled 16.14 million TEUs in 2011 and plans on increasing capacity in order to handle 17.5 million TEUs in 2012.[180] The port of Busan is the fifth largest port in the world per TEU throughput, and it handles 73% of container

throughput in Korea.[181] Data suggests that Port of Busan has grown rapidly in the past several years. Some growth may be due to rapid Korean economic recovery following the economic slowdown. However, this does not account for the entirety of the port's growth story. In 2010 the port grew 18.5% to report 14,194,334 TEUs passing through. Even though 2009 numbers reflect a 10.9% drop from 2008, the amount of TEUs that passed through Busan outstrip the 2006 total of 12,038,786 TEUs. This reflects a growth of 16% over Busan's pre-slowdown data. When comparing container vs. non-container throughput in 2010, Busan put through 236,636,000 tons of product while only putting through 25,434,000 tons of product of non-containerized material.

Other primary ports within Korea include the Gwangyang port and the Inchon port. Although they handle considerably less volume than the port in Busan, their growth percentages mirror the port of Busan and help establish a general nationwide increase in shipping volume. Since 2006 the port of Inchon boasts a 38% growth of tonnage shipped, from 1,377,050 tons to 1,902,733 tons, and the port of Gwangyang recorded an 18.9% increase.[182] Thus, Asia seems to have fared better than other regions throughout the economic slowdown and as of right now largely recovered and improved on pre-slow down data as far as port data is concerned.

Korea and Texas

As noted previously, the USKOR FTA is considered to have a positive effect on the Texas economy and possibly add a considerable amount of jobs. The US-Korea business council believes that the FTA could generate as many as 27,000 jobs in Texas alone. Since exports account for nearly 7% of all private industry in the state of Texas improving terms of trade between the US and Korea makes Texas products far more competitive in Korea and add value to the Texas economy.[183]

Former mayor of Dallas and US Trade Representative Ron Kirk acknowledges that the Texas economy stands to expand due to the FTA with Korea, particularly in agriculture. However, he does note that some areas of the economy may actually be hurt. Ultimately, however, the Texas economy will realize a net benefit as a result of the USKOR FTA.[184]

Korean firms also open facilities within Texas and directly provide positions to Texans. In 2007, Samsung Corporation opened a $3.6 billion manufacturing complex in central Texas and recent news suggests that the firm is ramping up production at the Austin facility. They currently employ more than 2,400 employees at their Austin facility. The facility primarily produces flash drives used in Apple and Samsung products. Although a Samsung representative maintains that they expect employment to remain steady at 2,400, the firm's investment in Texas represents a trend of larger Asian-based companies manufacturing within the US with US domestic consumption in mind.[185]

China

Introduction

Continuing its unprecedented growth of the last decade, China is expected to continue trending upward in exports and port activity. Chinese ports are expected to remain the most active in the world; the Port of Shanghai will likely retain its title as the world's largest container terminal

through 2013. With this positive outlook for the immediate future, longer-term scenarios point at a more modest direction for Chinese trade and the Chinese economy.

Chinese GDP growth is expected to decrease gradually over the next decade through declining stimulus, drop-offs in construction and industrial growth, and likely weakening consumer confidence. The Chinese Communist Party has maintained political and social stability, in spite of some disturbances in the central and western portions of the country. The party's chairman and country's president Hu Jintao will cede his titles in 2012 and 2013, respectively, in a transition that will maintain one-party control of the country's economic and trade regimes for the foreseeable future. Systemic problems like corruption, red tape, and vague regulation remain serious challenges for foreign firms that conduct business in China, but the government has shown some signs of progress in fighting impediments to the domestic trading environment.

General Macroeconomic Trends

From 2000 to 2010, Chinese GDP in current US dollars has skyrocketed from $1.19 trillion in 2000 to $2.26 trillion in 2005 to $5.93 trillion in 2010. Annual growth rates have ranged from 8% from early last decade to as high as 14.2% in 2007. The financial crisis dropped growth rates to just over 9% in 2008 and 2009, and have risen to 10.4% in 2010. GDP has grown in every year since 2000 in spite of the recent financial crisis.[186]

China continues to enjoy significant advantages in Asian and global trade due to its industrial strength and growing consumer market. The country is situated next to other Asian markets, like Japan and South Korea, making China a trading hub for markets throughout Asia and allowing access to major trading routes throughout the region and the world, including new trade routes with South America.[187] Furthermore, China's handling of growing urbanization and internal migration to population centers will have a critical impact on the economic, employment, and trading trends throughout this century.[188]

Chinese ports continue to serve as the main ports of call for global shipping leaders, and though the country will likely reduce overall spending in infrastructure, China will continue investing funds to improve its ports nationwide to meet trade demand. In addition, the country will expand its ability to accommodate containerized shipping, liquid bulk, and liquefied natural gas (LNG) shipping from increased domestic energy demand. While coastal ports are expanding, China is building many inland river ports as wealth expands beyond China's eastern coast.[189]

China risks being overly reliant on containerized shipping throughout its ports, which leaves it susceptible to major drop-offs in consumer demand in the US or the Eurozone that would affect China's port and shipping activity. Despite commitments to expanding port volumes, they are still vulnerable to congestion, especially during times of high demand for raw materials. Monitoring China's shipping trends require monitoring global economic and consumer trends in their major export partners. With continued dependence on foreign consumers to sustain much of China's shipping and economic growth, international developments are likely to impact China beyond the country's real or imagined ability to mitigate these foreign influences.[190]

Export and Import Trends

Chinese exports have remained a critical part of the Chinese economy and will continue to have a similar impact even if export growth were to decrease. Though trade has decreased in its share of annual Chinese GDP from 39% in 2006 to 29.6% in 2010, export value has increased over five times its 2000 levels and volume has increased by nearly five times its 2000 levels, according to the World Bank.[191]

Imports have also increased considerably since 2000 with 2010 import volumes quadrupling from 2000 levels and 2010 values of imports increasing far beyond volumes by over six times its 2000 figures, suggesting possibly that higher quality, more expensive goods are entering the Chinese consumer, industrial, and military realms. Overall trade has remained the most important part of the Chinese economy, comprising at least the majority of China's GDP since 2000 with a height of over 70% in 2006. Today, it only makes up 55% of China's GDP, hinting that domestic growth, or possibly a bubble, is contributing more to GDP than before.[192]

The future of the export sector of the Chinese economy remains a mystery. China's largest export markets, like the US, will still experience increase in imports from China but will experience drops in import growth in the coming years. Annual export growth in China is expected to be 8% in 2011 and will likely fall to 5% in 2012, according to *Business Monitor Online*.[193]

General Economic Overview: Trends and Growth

China is experiencing a steady but visible slowdown in economic growth as of 2009. In fact, real GDP growth is projected to decline steadily from 10% in 2010 to below 8% in 2013.[194] Much of the reason for this decline is that the national government has failed to curb excesses in credit and stimulus, and in government spending that has helped to create a property-market glut. This is expected to contribute to declines in domestic consumption. Although current Chinese industrial production data remains strong, it is expected to decline over the next few years.[195]

China, however, is not experiencing any reductions in exports, continuing to increase from previous years despite impending domestic economic troubles. Exports to the US have reached an all-time high in 2011 as export growth increased to 24.5% in August 2011 from the same time last year. At the same time, outbound shipments from China have recorded their second highest amount ever. In spite of these encouraging numbers, the impending economic slowdown will hamper future export growth.

China's investment boom, which has lasted for around a decade, has lasted longer and become larger than most experts had predicted, but the government is expected to wind down its spending as its available reserves are depleting and that the nature of the economy has rendered further investment inefficient. Examples of ill-fated projects sponsored by the government include high-speed rail, "financing problems facing local governments," and the declining housing market, which includes the emergence of "ghost cities."[196]

Construction will see major declines in activity from the overall economic decline. Accounting for much of the country's steel usage, cement production, and the use of construction and power-generation equipment, decreasing construction will have profound effects on many other

industries. Since 2008, manufacturing in China has also declined, and manufacturing figures, like the Purchasing Managers' Index (PMI), have remained around the 50–54 range since 2010.[197] As of February 2012, PMI has reached a figure of 51 and has risen for the last few months with expectations of further growth.[198]

Consumer spending is also expected to drop alongside state spending even while many observers have anticipated consumer spending to supplant government investment. Similar to the US prior to 2008, the real estate boom in China, which has been integral to state planning and to domestic infrastructure booms, is itself a consumer boom. Today, with a glut of real estate properties in China, Chinese consumers have become owners of assets that will decrease in value. This real-estate decline will likely result in lower consumer confidence levels and, eventually, lower consumer spending. According to *Business Monitor International*, growth in Chinese private consumption will fall from a projected 9% in 2011 to 8.5% in 2012 and decrease further in subsequent years. Nonetheless, consumer spending will outperform other economic sectors in the coming years.[199]

In light of the daunting economic circumstances facing China, the government is unlikely to implement a subsequent stimulus to spur economic activity. China proposed a stimulus in November 2008 in the wake of the global financial crisis. That stimulus program has helped to produce economic growth, including export growth, for the last few years. However, unlike in 2008, the Chinese economy is not experiencing a collapse in export demand, making further aggressive stimulus unnecessary. Furthermore, if exports were to drop sharply, China would be unable to initiate a stimulus for export growth due to fears of a bank crisis based on poor accounting of bank debts and to high rates of inflation, which will discourage cuts in interest rates.

One other effect from cutbacks in exports is increased unemployment among Chinese workers in industries, like export-processing and construction, which are the top employers in China. The expected retrenchment in exports and construction will lead to lower purchasing power for many consumers, including those who are unemployed, and to decreased consumer confidence throughout the country. If economic troubles continue in China's export markets and in China's domestic economy, the Chinese consumer is unlikely to buttress China's expected economic struggles.

China will likely be unable to continue its policies of generous government subsidies, which have been used to stimulate industrial activity, consumer spending, and export growth. China also has kept the cost of capital low, including low interest rates and an underinflated currency, to promote investment and economic activity. These practices are most likely unsustainable and will undergo major corrections in the near future. If this scenario happens, Chinese banks will experience serious deteriorations in asset quality, which will likely spur government action in the form of bail outs and perhaps in reductions in consumer purchasing power through higher taxes and inflation. In order to avoid the most costly scenarios and to stabilize China's long-term economic outlook, major economic reforms are needed to achieve long-term and stable economic growth.

Despite many of these scenarios, China is expected to maintain current account surplus, though smaller than in past years. In addition, with all the problems with domestic banking, reduced investment and stimulus, consumer confidence and the global economy, China is unlikely to have financial outflows that would endanger in balancing its current accounts.[200]

Government and Society

Unlike the vast majority of global export leaders, China's political system has remained under a one-party rule led by the Communist Party. Despite many instances of unrest, the Communist Party has maintained its legitimacy through unprecedented economic growth rates that have benefited much of China's population, mostly in the east. Despite economic growth and prosperity, the country still suffers from much income and economic disparities, gender inequality, intraregional conflicts among ethnic and religious groups and demographic challenges. The next few years will be those of transition in which current Chinese president Hu Jintao will step down from his role as general secretary of the party in 2012 and president in 2013 to make way for new leadership.

The party is unlikely to cede its control of the country, including industry, economics, trade, courts, and regulatory regime by allowing multiple parties or other individuals not under the control of the Communist Party. In fact, China's state-owned enterprises are often criticized for their secretive leadership structure, decision-making processes, and close relationship with government leaders.[201] Despite some publicized initiatives to promote privatization in capital markets and society, businesses and individuals conducting trade with China should expect the Communist Party to remain a dominant force in international political, economic, regulatory and business affairs for the foreseeable future.

China still suffers from rampant corruption and poor rule of law that has hampered economic development and trade, especially among foreign firms engaging with the country. Today, people are not allowed to own land or to consider it as their private property, as land is considered to be owned by "the public." However, businesses or individuals can own buildings or other structures on land and retain personal, private property that is not land. Intellectual property rights (IPR) remains a significant challenge for Chinese authorities as piracy and poor IPR enforcement are rampant. China has declared its commitment to adapting to the WTO Agreement on Trade-Related Aspects of Intellectual Property Rights (TRIPS), but Chinese regulatory agencies remain uncoordinated and unprepared to achieve these objectives, and China is unlikely to improve its problems with IPR in the foreseeable future.[202]

Corruption is still widespread without sufficient means to monitor or to curtail them. Embezzlement and financial mismanagement remain the most egregious forms of corruption, and the Chinese culture of *guanxi* is a standard part of business, which has been used to help senior businessmen from avoiding prosecution. The state has provided some reforms to fight corruption and to investigate officials suspected of participating in illegal activity. Prominent investigations include one against the former head of oil giant Sinopec, the former Communist Party boss and the former head of the country's food and drug regulator, which resulted in his execution. Regulatory inefficiency remains a critical challenge for businesses and individuals conducting trade in the country and has exacerbated corruption since regulations are vague and leave regulators with much liberty to interpret regulations to their convenience.[203]

Meanwhile, China has signed many new trading agreements with its Asian neighbors, most notably Taiwan and the ASEAN region. China and Taiwan signed a trade agreement, known as the Economic Co-operation Framework Agreement (ECFA) in early 2010, that went into effect in September 2010.[204] Observers call the pact the most momentous pact since their civil war over 60 years ago. China has viewed this pact, which would lower taxes and tariffs on each side, as a step towards possible complete reunification with Taipei. Though China has fewer exports to Taiwan than Taiwan has exports to China, future trends could give China the advantage in this trading relationship, which has many worried that China could flood Taiwanese markets with cheap goods.[205]

China also signed an agreement with ASEAN, which went into effect January 1, 2010. This agreement covers 1.9 billion people in China and within China's southeastern neighbors, making it the third largest treaty in economic value behind the EU and NAFTA. The deal will allow China easier access to ASEAN markets through reduced tariffs and taxes, although ASEAN members still have some leeway in applying restrictions in select industries, spurred in part by fears of Chinese competition. Nonetheless, Chinese cooperation in the regional trade is an encouraging trend for Chinese influence on the regional and global economy.[206]

Infrastructure

From 2001 through 2005, China's spending on infrastructure, including on roads and rail, was more than the first 50 years of the current government combined.[207] In fact, before the financial crisis and global economic slowdown, China was planning for even more ambitious infrastructure projects far beyond what was spent in the early part of last decade. According to the World Bank, China's railway-expansion project was one of the most ambitious since the 19th century.[208]

The Chinese government, with its twelfth 5-Year Plan (2011–2015), is planning to reduce its spending growth on domestic infrastructure. As part of its overall initiatives of tightening its monetary policies and its domestic investments, the construction sector will necessarily see a reduction of demand for its services and, therefore, a decline in new projects. Many of these deferred projects will delay or cancel improvements that would improve logistics among ports, points of production and points of consumption. Texas ports should be advised that existing difficulties in logistics are projected to continue for the foreseeable future and that reductions in state spending over a long period may prevent much-needed maintenance to existing infrastructure.[209]

Despite these investment reductions, China is slated to remain one of the largest infrastructure markets in the world for many years and will surpass the US in construction by 2015. In addition, as China continues to deregulate some of its infrastructure industry to cater to foreign expertise, American manufacturers may find more opportunities in the Chinese construction sector, especially in landlocked areas. Nevertheless, this sector will remain heavily state-controlled and still suffer from rampant corruption, fraud, nationalism, lax intellectual-property protection, and a poor regulatory environment.[210]

Future Chinese infrastructure spending will focus on energy-efficient sectors in order to fulfill its goal of a 17% reduction in carbon intensity, as outlined in the 2012 5-Year Plan.[211] This includes

increased investment in 40,000 km (24,855 miles) of new railroads, 95,000 km (59,030 miles) of new roads, and investment in ports located closer to areas of Chinese economic production and consumption.[212]

One area in which China has made significant steps in developing its trading potential is in China's inland parts, accessible by rivers as wealth and industrial might move more inland and shipping volumes have increased by over 300% in a decade. One major project is in the inland parts of the Yangtze River where the Yangluo Port is scheduled to be completed in the next 5 years. When completed, it will be the only natural deepwater port in the inland Yangtze region. In the Jiangxi province on the Yangtze River, a port terminal is under construction that would accommodate 1,000 metric ton vessels. With the construction of these inland ports and increasing trade in inland China, Chinese focus on infrastructure in the inland areas containing river access will continue.[213]

Conclusion

In spite of slower growth from pre-crisis levels, China remains one of the fastest growing economies and one of the global trading centers hubs that will have a profound impact on global shipping trends throughout this century. China will remain reliant on exports for much of its GDP growth, in spite of domestic-spending initiatives and export growth among other Asian countries. Private firms and foreign governments will have to continue to work with the current government, with its advantages and liabilities, to generate optimal conditions for doing business with China. Despite decreasing stimulus programs and other spending programs, China appears committed to keep developing infrastructure that makes shipping and logistics more efficient in the cities and better accessible in rural and inland locations. For the shipping industry, Texas ports, and American firms that depend on China for much of their activity need to follow developments in this country quite closely as it will become a stronger influence in global trade than ever before.

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