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# Globalized Supply Chains and U.S. Policy

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# Summary

In the globalized world of business, production is becoming fragmented into discrete activities and can be spread geographically within and across national borders while remaining integrated organizationally within a multinational company or network of companies. Such globalized production networks are called supply chains or value-added networks. This world of supply chains raises both challenges and opportunities for U.S. policymakers, firms, and workers.

The globalization of production networks has raised policy issues and has called into question certain long-held perceptions about the efficacy and effects of policy initiatives. Traditional trade and investment policy is based on national governments, national economies, and country-to-country relations, but much of trade today is between related companies spread across the globe. How does protecting or promoting one domestic industry affect other parts of its or other supply chains? How does the United States ensure the security and integrity of products assembled offshore from components that are procured from a variety of markets around the world? How does policy affect the competitiveness of U.S.-based businesses in the global marketplace?

Congressional interest in this issue stems from the essential American interests of economic well-being, security, and the projection of values as well as the constitutional mandate for Congress to regulate commerce with foreign nations. Congress also deals with a variety of policies related to investments and capital flows, market access, currency misalignment, intellectual property rights, product safety, shipping security, labor, and the environment. In a broader sweep, the globalization of business strikes directly at issues related to maintaining the U.S. industrial base, the education and training of the American labor force, immigration, health care, and myriad other factors that determine the well-being of Americans.

In international trade, traditional policies aimed at reducing border barriers still tend to increase economic efficiency, but global supply chains may affect the incidence or impact of those policies. Raising import barriers in the United States on products from China, for example, may increase costs for Chinese exporters, but they also have a parallel effect on U.S. multinational companies with manufacturing operations in China that ship to the United States. In fiscal policy, globalized supply chains affect the “multiplier effect” of government policies to stimulate the economy. In shipping security policies, a distinct trade-off exists between greater security and shipping costs. A variety of government policies, both at the national and state level, affect the ability of businesses to compete in the international marketplace and the incentive to locate in the U.S. market. These include tax, labor, environmental, infrastructure, and education policies.

A possible test for policy is to ask if the predominant effect is one of trade diversion or trade creation. Does a proposed policy divert production from the U.S. economy to a foreign location, draw production toward a U.S.-based location, or shift production between two foreign locations? Does the proposed policy create more production, or does it discourage productive activity? Does the policy encourage job creation in the United States or does it induce firms to shift jobs overseas? Does the policy disrupt or enhance supply chain operations and decrease or increase overall supply chain efficiency and profitability? And perhaps most fundamentally, how can policy be fashioned to encourage the retention of jobs in the United States while keeping U.S. firms internationally competitive in a complex and globalized world?

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The world financial crisis that erupted in 2008 demonstrated that the forces of globalization[1] have affected two major parts of the world economy: the international financial system and the global production system. These financial and real (goods-and-services producing) sectors are closely interconnected and synergistically intertwined. The financial crisis demonstrated that the combination of globalization, new technology, new financial instruments, and unrecognized risks, can cause major upheavals in markets that can spread from firm to firm and then from country to country.

In this globalized world, production is becoming more fragmented into discrete activities and can be spread geographically within and across national borders while remaining integrated organizationally within a multinational company or network of companies. This report begins with an overview of global supply chains, why they have developed, and how the variables in the chain (including government policy) relate to each other. It then examines the types of policies that affect different parts of the global supply network and concludes with a discussion of policy review mechanisms. In any global supply structure, there are trade-offs between border transaction costs (including tariffs), factor costs (including labor and capital), logistical costs (including shipping), costs of quality control, external business costs (ease of doing business, regulations, etc.), and various risks (including financial and political risk). Government economic policy often affects each of these tradeoffs in different ways.

Globalized manufacturing chains relate directly to the two essential national interests of the United States, security and economic well-being, and relate indirectly to the third—the projection of American values. On the security side, the constant flow of imports streaming into U.S. ports and through border crossings raises the potential for illicit or dangerous cargo, including possible terrorist devices, to enter the United States. On the economic well-being side, the globalized supply chains represent changes in crucial segments of the U.S. economy that ultimately affect the well being of Americans. They bring into play fundamental economic issues such as jobs, wage levels, income distribution, entrepreneurship, and the profitability of businesses. At a more basic level, U.S. manufacturers and providers of services form the foundation of the economy and generate the resources available to support the well-being of Americans, governmental activities, and the ability of the nation to pursue its security and other national interests.

As for the projection of American values, globalization and the economic opportunities it generates can raise standards of living in countries, such as China or Vietnam, and thereby can potentially create alternative centers of power and channels of communication that may challenge repressive governments or help in resolving problems with democracy, the rule of law, and human rights. However, globalized supply chains also may provide resources for certain repressive governments or, in the case of China, help in providing a rationale for the ruling party to continue its dominance. The presence of U.S. or other international corporations in countries may provide a mechanism for U.S. business and labor practices, as well as language, culture, and values to be spread to parts of the local populations. Foreign investors, however, may be attracted to authoritarian governments because they tend to create stability even though that stability may be at the sacrifice of certain freedoms or human rights. The globalization of manufacturing also is

[1] Globalization refers to the development of an increasingly integrated and interconnected world economy marked by liberalized trade flows, high mobility of capital, transnational businesses, and greater interdependence among national economies.

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creating dependency and interaction among trading partners, such as China and Japan or China and Taiwan. These seem to be ameliorating historical friction points and promoting stability in regions. For China, the nation's increased economic influence, generated partly from its crucial role in global supply chains, has provided Beijing with greater voice in international fora and arguably some leverage in negotiations with the United States.

The globalization of production networks and supply chains also has raised policy issues and has called into question certain long-held perceptions about the efficacy and effects of policy initiatives. For example, a large proportion of international trade is conducted within production networks and chains that cross international borders. How does this affect traditional trade and investment policy that is based on national governments, national economies, and country-to-country relations? How have global supply chains affected American jobs? How does the United States ensure the security and integrity of products assembled offshore from components that are procured from a variety of markets around the world? Other policy issues include how to target fiscal policy to generate the largest possible beneficial effects, the degree to which the government should act to retain industries and related job opportunities in the United States, the extent to which American jobs are being "outsourced" overseas, the role of U.S. policy in promoting overseas investment, competition by governments (including state governments) to attract foreign investment, and the arguably declining manufacturing base in the United States.

Congressional interest in this issue stems from the aforementioned national interests as well as its constitutional mandate to regulate commerce with foreign nations. Congress also deals with the variety of policies that arise with respect to international trade, import competition, investments and capital flows, market access, currency misalignment, intellectual property rights, product safety, shipping security, labor, and the environment. In a broader sweep, the globalization of business strikes directly at issues related to maintaining the U.S. industrial base, the education and training of the American labor force, health care, and the myriad other factors that determine the level of competitiveness of U.S.-based business in international commerce.

U.S. public policies combine with business costs and other factors to affect the shape, geographical location, and operation of supply chains. Conversely, the existence of supply chains may affect U.S. policymaking. Trade policy aimed at curbing imports from China, for example, would likely affect Chinese exporters and ancillary sectors, but it also may hit subsidiaries of U.S. companies and manufacturers whose supply chains stretch there. It is not surprising, therefore, that some of the strongest voices both for and against trade protectionism come from American-based manufacturers and service providers.

A crucial issue for U.S. policymakers is how to create conditions that make the U.S. economy more attractive as a location for both U.S. parented supply chains and for segments of supply chains of foreign companies. This directly affects job creation for Americans. A possible test for policy is to ask if the predominant effect is trade diversion or trade creation. Does the policy divert production from the U.S. economy to a foreign location, draw production toward a U.S.-based location, or shift production between two foreign locations? Does the proposed policy create more production? Does it induce foreign businesses to locate segments of their supply chains here? Does it create jobs in the United States or merely shift them from one foreign country to another? What effect does the policy have on supply chain operations, efficiency, profitability and the distribution of benefits between labor and management?

As the 111$^{th}$ Congress and the Obama Administration consider changes to economic policy, the basic issues raised by global supply chains may come into play, particularly considerations of the

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incidence of policies. For example, is the goal of a policy to support business to promote the overall efficiency and profitability of U.S. parented supply chains even if significant segments of those chains are located abroad, or is the goal to induce companies to move production or other business activity to the United States even if such action reduces supply chain efficiency and the ability of the U.S.-parented supply chain to compete in the global marketplace? In international trade and investment policies, does the incidence of the policy fall on overseas segments of American parented supply chains? If the policy is to reduce imports into the United States, what effect will that have on global supply chain operations? Is there a balance between trade policies designed to increase U.S. exports (e.g., by reducing tariffs abroad) and those that may induce U.S. companies to move production overseas (e.g., easing foreign country limits on direct investments)? As global supply chains attempt to maximize their efficiency and profitability, they face trade-offs between border transaction costs (including tariffs), factor costs (including labor and capital), logistical costs (including shipping), external business costs (ease of doing business, regulations, etc.), and various risks (including security,[2] financial, and political risk). How does government economic policy influence these factors and trade-offs in ways that are in accord with, rather than counter to U.S. national goals? What about the perception that U.S. businesses are sending jobs overseas?[3]

One approach that addressed this issue in part is to focus on manufacturing. In September 2009, the White House named Ron Bloom to be the Administration's Senior Counselor for Manufacturing Policy to coordinate policy with the Departments of Commerce, Treasury, Energy, and Labor. In December 2009, the Executive Office of the President released a report entitled "A Framework for Revitalizing American Manufacturing." This report examined the manufacturing process, the supply chain, and laid out a simplified model of the manufacturing process, identified each cost driver in this process, and attempted to determine the influence of government on each cost. The relevant costs identified were labor, technology and business practices, equipment, location, transportation, regulation, and taxation.[4]

Some of the legislation related to global supply chains in the 111th Congress include a bill condemning the People's Republic of China for its socially unacceptable business practices, including the manufacturing and exportation of unsafe products, casual disregard for the environment, and exploitative employment practices (H.Res. 44 [Poe]); Retooling America's Workers for a Green Economy Act (S. 269[Murray]); Achievement Through Technology and Innovation Act of 2009 (H.R. 558 [Roybal-Allard]); Trade Enforcement Act of 2009 (H.R. 496 [Rangel]); 10,000 Trained by 2010 Act (H.R. 461 [Wu]); Food Safety Enhancement Act of 2009 (H.R. 2749 [Dingell]); Strengthening Our Economy Through Small Business Innovation Act of 2009 (S. 177 [Feingold]); SECTORS Act of 2009 (S. 777[Brown, S.]); Business Incubator Promotion Act (S. 1662 [Brown,S.]); Reciprocal Market Access Act of 2009 (S. 1766. [Brown, S.]).

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[2] See CRS Report RL33512, *Transportation Security: Issues for the 111th Congress*, by David Randall Peterman, Bart Elias, and John Frittelli.

[3] See CRS Report RL32292, *Offshoring (a.k.a. Offshore Outsourcing) and Job Insecurity Among U.S. Workers*, by Linda Levine.

[4] Executive Office of the President, *A Framework for Revitalizing American Manufacturing*, December 2009, http://www.shopfloor.org/wp-content/uploads/20091216-manufacturing-framework-final_embargoed.pdf.

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The 110th Congressed passed the Consumer Product Safety Improvement Act of 2008 that reformed the Consumer Product Safety Commission and strengthened enforcement of consumer product safety standards (H.R. 4040 [Rush, P.L. 110-314])[5] and the America Competes Act that promotes investment in science and engineering research and in science, technology, engineering, and mathematics education (H.Res. 602/H.R. 2272 [Sutton, P.L. 110-69]).

# A New Paradigm

The globalized American economy poses challenges for U.S. trade and regulatory policy. The traditional paradigm for policy was that the American economy consisted of U.S. businesses that operated primarily in the domestic market, hired U.S. workers, and sold to U.S. consumers, but some production was either imported or exported. International trade took place between countries according to each nation's competitive and comparative advantage. A trade policy aimed at a particular country had impact on businesses in that country. Only indirectly would adverse effects rebound to harm U.S. business interests such as when foreign governments retaliated in kind. U.S. import restrictions assisted competing industries in the U.S. market even though those restrictions also generally raised prices for American consumers.

The world now has changed. Like a child's neural network, the global economy is constantly organizing and reorganizing itself with new linkages, supply networks, manufacturing chains, and marketing channels that rise in response to market forces and government policies.

This integrated world economy raises both challenges and opportunities for U.S. policymakers. How U.S. policy responds to this new reality directly affects the well-being of Americans. The existing paradigm based on geographical boundaries, country-to-country trade, vertical integration of manufacturing, and retailers acting as market takers rather than as market makers seems to be in need of updating. A new policy paradigm should account for the evolving world of business in which large U.S. manufacturers and providers of services have become part of increasingly complex international chains in which parts and components are made in multiple locations and assembled in others. In the delivery of services, some still require face-to-face contact (e.g., airline passenger travel or food services) but other business services can be delivered through high speed Internet connections (e.g., computer programming, data analysis, customer relations, or ticket sales).

International trade now is less between countries than it is within a global supply network that may include headquarters, design, branding, and engineering in the United States but manufacturing in China with parts from Singapore, Japan, and the European Union and call center services in India. For example, a U.S. company may make a computer in Shanghai, but it could have been assembled from chips designed in Texas with a motherboard from Taiwan and manufactured according to specifications by the U.S. brand-name holder in California with software from Washington state and shipped through Hong Kong directly to a retailer either in the American market or abroad. The product service department might be located partly in India or the Philippines. Such supply chain relations tend to be long-term with "upstream" processes directly connected to "downstream" activities and both pitfalls and opportunities for policy at

[5] CRS Report RL34684, *Consumer Product Safety Improvement Act of 2008: P.L. 110-314*, by Margaret Mikyung Lee.

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various junctures in the supply chain. Some supply chain relationships are cemented through ownership ties, but others are contractual. In either case, the relationships tend to be long-term in which product development, design, and manufacturing tends to be a collaborative process.

One indicator of the extent to which international trade increasingly is being conducted within companies can be seen in data on exports and imports by U.S. non-bank multinational companies (MNCs) with affiliated and non-affiliated companies. Note that many non-affiliated companies may belong to a company's supply chain. As shown in **Figure 1**, in 2007, U.S. MNCs exported $214 billion to their foreign affiliated companies and $344 billion to non-affiliated companies. These exports accounted for 44% of all U.S. exports of goods in that year. U.S. MNCs also imported $272 billion from their foreign affiliated companies and $456 from non-affiliates. This accounted for 34% of all U.S. imports. In 2007, U.S. parent non-bank MNCs employed 22.0 million people in the United States and 11.7 million abroad in affiliated companies.

Not shown in **Figure 1** are exports by multinational companies of foreign parentage located in the U.S. market. These include companies such as Toyota, Nokia, Seagram, or Bayer. These American subsidiaries comprise key components of foreign supply chains. In 2007, they employed 5.5 million people in the U.S. economy (4.6% of total employment), exported $216 billion and imported $533 billion in goods.[6] Their U.S. operations often are part of a far flung global network. For example, in 2007, the operations of Hitachi of Japan included 16,242 employees in 75 companies in North America, 56,305 employees in China, 49,340 in other Asian nations, 9,468 in Europe, and 251,702 employees in Japan.[7]

In a survey on the future of manufacturing undertaken by *Industry Week* magazine in 2008, the U.S. manufacturers that responded indicated that 18% of their products in 2008 were manufactured or directly sourced from outside the United States and that by 2011, they expected 25% would be foreign-sourced. The manufacturers also indicated that 16% of their products in 2008 were being sold outside the United States and that by 2011, they expected 22% would be sold abroad. Of the major regions of the world where companies were sourcing product in 2008, 54% said China, 30% said the European Union, 27% Mexico/Latin America, 22% Southeast Asia, 21% Canada, and 17% said India. Foreign sourcing was expected to increase by 2011 from China, Mexico/Latin America, Southeast Asia, and India but decrease from the European Union and Canada.[8]

[6] Thomas Anderson and William J. Zeile, "Operations of U.S. Affiliates of Foreign Companies, Preliminary Results from the 2007 Benchmark Survey," *Survey of Current Business*, November 2009, pp. 43, 55.

[7] Masao Hisada, "Hitachi's Globalization," a PowerPoint presentation, July 18, 2008.

[8] Crowe Horwath LLP and IW Custom Research, "The Future of Manufacturing," *Industry Week*, November 2008, pp. S3, S4.

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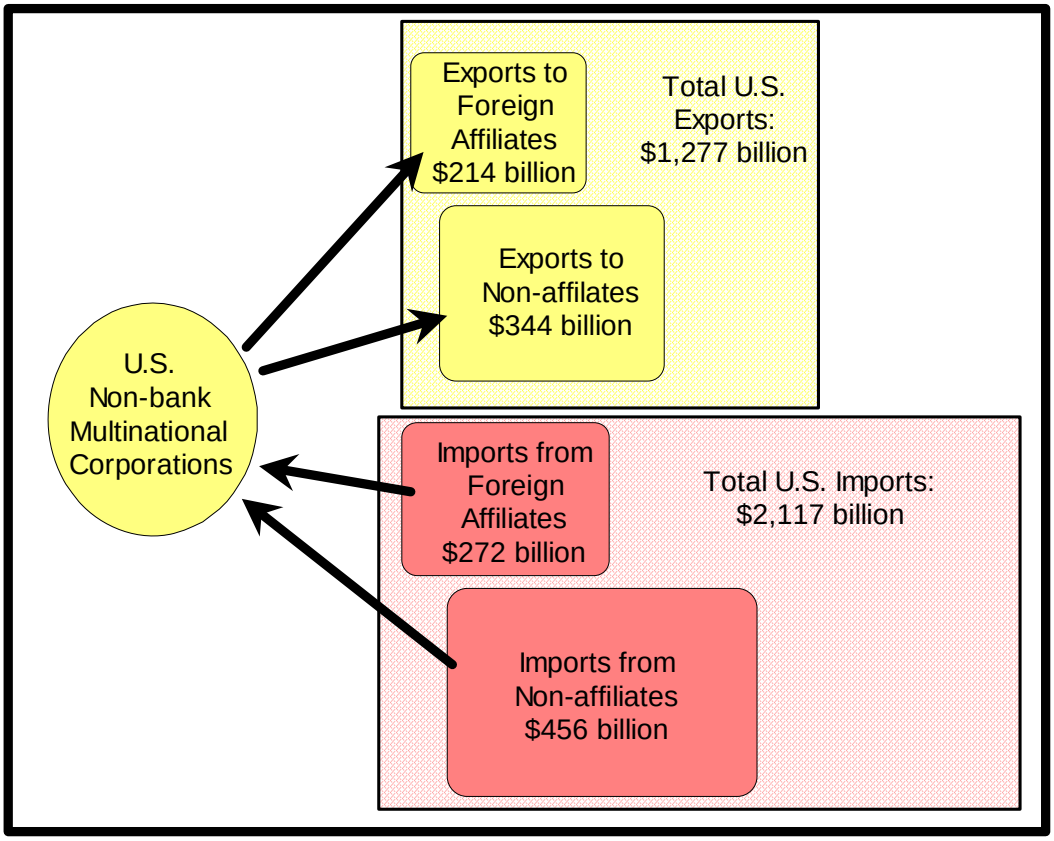
**Figure 1. International Trade by U.S. Parent Non-Bank Multinational Companies, 2007**

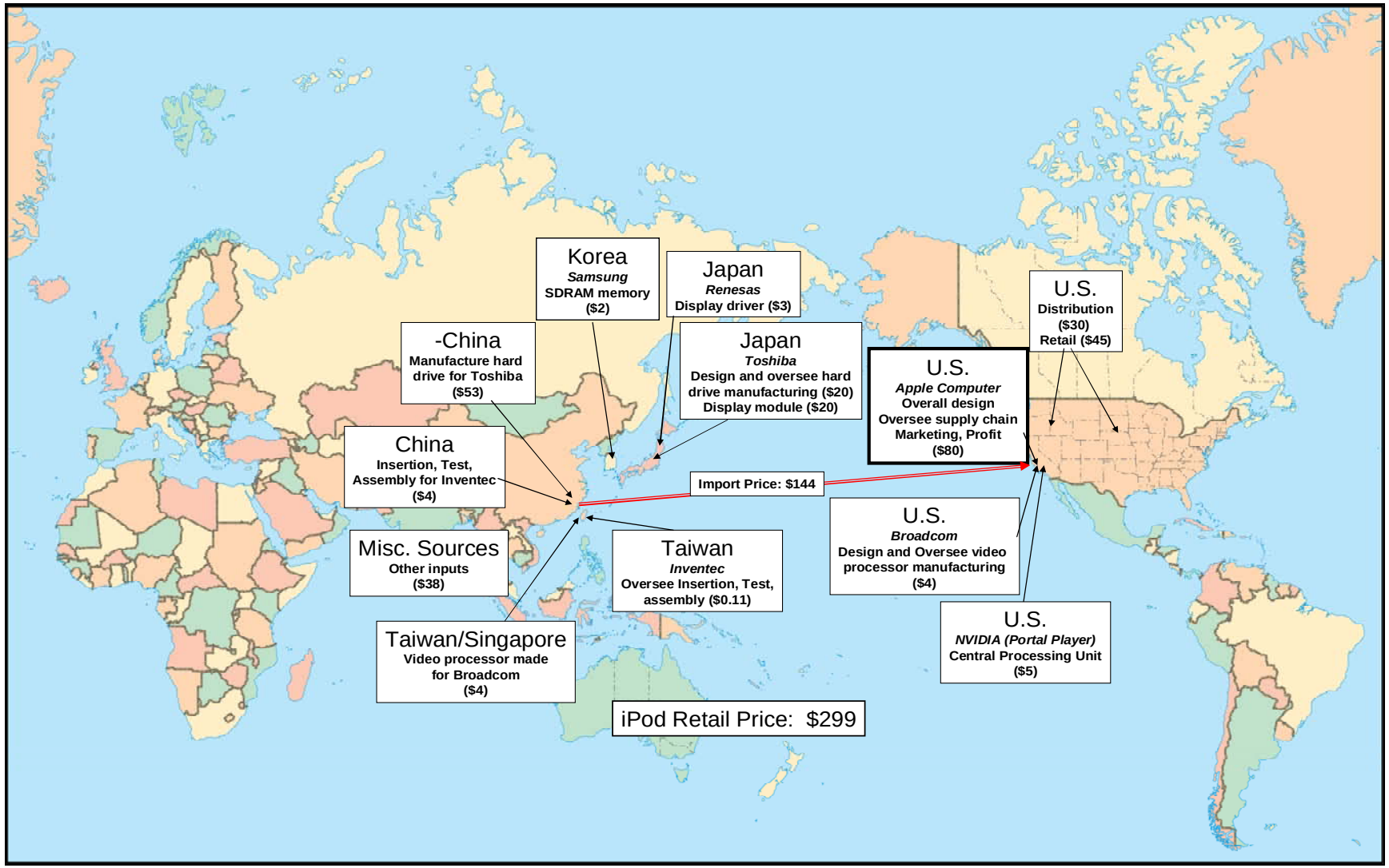



**Source:** Congressional Research Service. **Data from:** Raymond J. Mataloni, Jr., "U.S. Multinational Companies, Operations in 2007," *Survey of Current Business*, August 2009, p. 68.

One example of a typical supply chain may be that for Apple Computer's iPod music playing device. This is made by a manufacturing chain that stretches across several countries in the Pacific basin. As shown in **Figure 2**, the value of $144 for an iPod imported from China in 2005 had its major parts and services originate from China, the United States, Japan, South Korea, Taiwan, and Singapore.[9] Each of these major components, moreover, may have involved parts from various countries of the world. The iPod supply chain included design, supply chain management, parts production, assembly, shipping, distribution, and retail. Note that less than

[9] Greg Linden, Kenneth L. Kraemer, Jason Dedrick, "Who Captures Value in a Global Innovation System? The Case of Apple's iPod," Personal Computing Industry Center, June 2007. 10 p.

**Figure 2. Manufacturing Supply Chain and Input Costs for the Apple Computer iPod© in 2005**




**Source:** Congressional Research Service. Data from Greg Linden, Kenneth L. Kraemer, Jason Dedrick, "Who Captures Value in a Global Innovation System? The Case of Apple's iPod," Personal Computing Industry Center, June 2007. 10 p. and various other sources.

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half of the $299 retail cost is accounted for by the $144 import price. The largest share of the retail price arises from Apple Computer's profit and other activities and in U.S. distribution and retail. Some of the parts also originate from U.S. companies. The supply chain also includes transportation and logistics management, financing, risk management, and quality control. Many of these services may be provided by an American company. Apple Computer also sells iPods in the global marketplace. Although, these may be shipped directly from China, they contain U.S. parts and generate profits for Apple.

In this globalized business world, products may be pushed through the international supply network by an American holder of the brand name, or they may be pulled through the network by a major U.S. retailer. In either case, relevant U.S. policies include those affecting international trade, exchange rates, product safety, shipping security, as well as costs of fuel and raw materials, labor quality and price, and the existence of production infrastructure. These combine to affect the shape, geographical location, and operation of the supply chain. Conversely, the existence of the supply chain may affect U.S. policymaking. Trade policy aimed at curbing imports from China, for example, would likely affect Chinese exporters and ancillary sectors, but it also may hit subsidiaries of U.S. companies and manufacturers whose supply chains stretch there. It is not surprising, therefore, that some of the strongest voices both for and against trade protectionism come from American-based manufacturers and service providers.

The manufacturing sector, moreover, can operate only if it is supported by a robust and capable financial sector. Manufacturing managers tend to focus their energies on producing goods and use financial services companies to handle most financial activities. Many companies rely heavily on banks, brokerage houses, investment funds, and insurance companies to raise capital, finance transactions, insure against risks, and issue stock. When the financial sector is in crisis, the manufacturing sector is usually not far behind. For manufactures, such as General Motors, with in-house financial services, the current financial crisis may have hit them with a dual punch. It may have clobbered both their financial subsidiaries and their sales of product.[10] Trade transactions, moreover, rely heavily on trust and credit. In 2008, thinly capitalized suppliers in other countries were finding it increasingly difficult to obtain new letters of credit. Available loans, moreover, were at higher rates of interest. This was threatening to disrupt the intricate supply chains that reached into China and emerging markets in eastern Europe.[11]

[10] For example, in the third quarter of 2008, GMAC, GM's financing arm, reported a loss of $2.5 billion (of which $294 million was related to auto financing and most of the rest from mortgage financing). In 2006, a consortium of banks and Cerberus Capital Management bought 51% of GMAC from General Motors leaving 49% still in-house. Peter Valdes-Dapena, "GM Dealers Feel Squeeze from GMAC," *CNNMoney.com*, November 6, 2008.

[11] Peter T. Leach, "Weak link: Trade suffers as suppliers struggle to obtain financing," *The Journal of Commerce Online*, December 24, 2008.

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# Global Supply Chains: Manufacturing in the 21st Century

The commerce clause of the U.S. Constitution ensured that the various state economies would unite into a vast American market allowing for the free movement of goods, capital, and labor anywhere within the nation. As the economy developed, the government intervened to subsidize the building of a transportation infrastructure (roads, railways, ports, and airports) and communication facilities, to regulate business, and to protect intellectual property. This huge, unified market gave U.S. businesses a distinct advantage in global markets because they could spread their operations across multiple state markets and take advantage of concentrations of consumers, natural resource endowments, and different labor skills and wages but still operate under a common federal regulatory system.

Over the past half century, three revolutionary changes have redefined business production methods and spawned the development of globalized supply chains. The first has been the development of low-cost shipping along with fast and cheap communications. The second has been the rise of business management strategies that call for a focus on core competencies,[12] just-in-time production,[13] steady improvement in product quality, risk minimization, flexibility in meeting consumer demand, and profit maximization over a supply chain rather than for each entity within that chain. The third has been the reduction in international trade and investment barriers worldwide through both multilateral and bilateral trade agreements. Underlying these three revolutionary changes has been a period of relative stability in the world and the absence of global warfare that would have threatened international shipping. These changes have encouraged the globalization of business, but this globalization also may either coincide with or conflict with national goals of full employment, economic growth, balance in international trade accounts, and national security.

## Typical Supply Chains

In the world today, a supply chain exists for almost all products traded in the international marketplace. **Figure 3** illustrates a typical supply chain for furniture companies with headquarters in either the United States or China but with most of the manufacturing done in China with some inputs from the United States. This could be a brand-name furniture chain with headquarters in the United States, or it could be a major retailer that pulls product through its network of suppliers. In 2007, the United States exported $593 million in wood (for all uses) to China and imported $20 billion in furniture. The United States also provided furniture design and branding, distribution, some upholstery fabric, certain machinery and tools, some chemicals, quality control

[12] The idea of core competencies is that they represent the true sources of competitive advantage and that such competencies should be the focus of firm effort. All other activities could be outsourced. See G. Hamel and C.K. Prahalad. "The Core Competence of the Corporation," *Harvard Business Review*, Vol. 68, No. 3, 1990. Pp. 243-244.

[13] A just-in-time production system is the coordinated manufacture of components or products so that materials are received or produced at the precise time and in the exact quantity to meet the demand of the customer or the next operation in an assembly process. This reduces costs by eliminating the need to hold large inventories of parts and product and allows for defects in parts to be corrected before being incorporated into a product.

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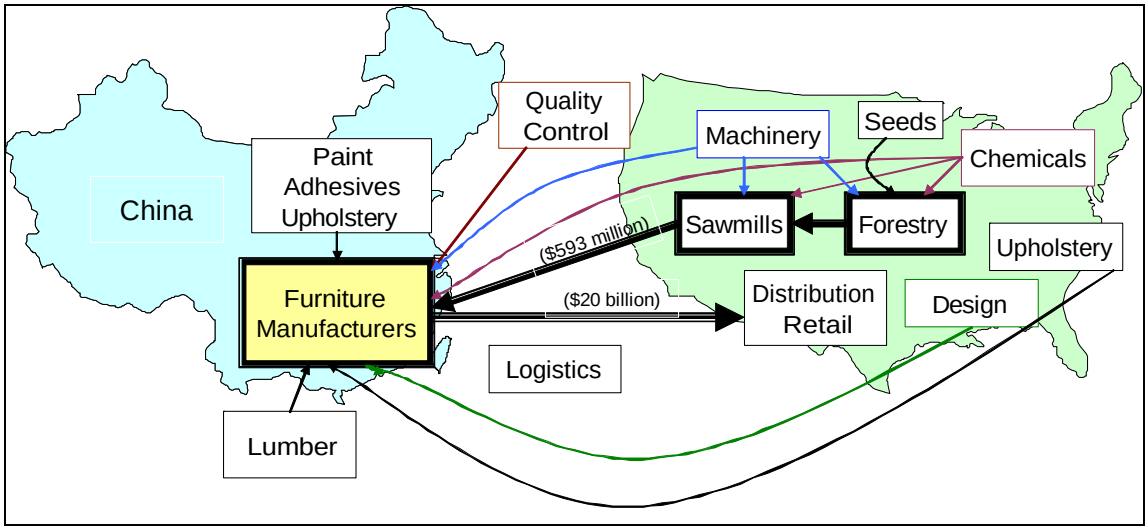
to a certain extent, and some shipping and other logistics as well as U.S. distribution and retail operations.

**Figure 3. Typical Manufacturing Supply Chain for Wood Furniture from China in 2007**




**Source:** Congressional Research Service

Where in this supply chain does the United States have an advantage? American companies specialize in high-value added activities such as chemicals, seeds, upholstery design, machinery manufacturing, and the design and advertising of the final product. Abundant natural forests and land also allow the United States to specialize in production of lumber, some of which goes to China. China also procures lumber, particularly hardwoods, from Southeast Asia and Russia. High end furniture that requires customization, skilled woodworking, and is bulky also tends to be manufactured closer to the customer in the United States, and custom cabinetry and wood countertops usually require local manufacture. Still, about half of the mass marketed wood furniture (non-upholstered) market is supplied by imports, and U.S. employment in this sector has fallen by almost half over the 2000-2005 period. The shift to foreign manufacturing by wood furniture manufacturers and the focus on retail and distribution is highlighted by the change in the name of the "American Furniture Manufacturers Association" to the "American Home Furnishings Alliance."[14] It should be noted, however, that some furniture manufacturing is returning to or being located in the United States. The Swedish firm Ikea has established a production plant in Virginia, and certain high-end brands either are expanding operations in the United States (such as Stickley[15]) or are relocating some production back from overseas to North Carolina (such as La-Z-Boy).[16]

[14] See CRS Report RL34001, *U.S. Furniture Manufacturing: Overview and Prospects*, by Stephen Cooney.

[15] L. & J.G. Stickley, Inc., *Our History*, accessed January 7, 2009. http://www.stickley.com/OurStickleyStory.cfm?SubPgName=OurHistory&BodyTxt=On.

[16] Larry Rohter, "Shipping costs start to crimp globalization," *International Herald Tribune*, August 2, 2008, Internet version.

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## Business Decisions and the Public Interest

In this world of global supply chains, corporate and national interests may coincide with or conflict with each other. For example, a business seeks to minimize costs of production and may turn to lower cost assembly plants abroad while a nation seeks to provide full employment for its citizens. A business seeks continual improvement in the technology and quality embodied in its products and may turn to a foreign manufacturer of a component, while a nation seeks to generate technological change at home. A business seeks to maximize profits and satisfy consumer demand by using a combination of domestic and imported products, while a nation seeks to balance its international trade accounts and to generate economic growth at home.

A fundamental issue is whether the claim still holds that what is good for business is good for the country, and vice versa (this was originally phrased as what is good for General Motors is good for the country.[17]) In an alternative way of stating the problem, Adam Smith postulated in 1776 that individuals seeking their economic self-interest, as if guided by an "invisible hand," actually benefit society more than they would if they tried to benefit society directly.[18] In short, the issue is whether efficiency and profitability for businesses also translate into efficiency and economic well-being for the country as a whole. Do the benefits of greater business efficiency and profitability trickle down to society in general in the form of higher pay and more jobs created?

Supply chains have added complexity to this issue. In the case of Adam Smith's invisible hand or in the statement in 1953 about General Motors, U.S. business referred to companies located in the United States and doing most of their business here. With supply chains, business headquarters may be located in the United States, but production networks may be global. The company usually will attempt to maximize profits and efficiency across the entire supply chain and not just for the domestic part of it. Profits may accrue to the U.S. parent company, but many of the supplier and assembly jobs may be overseas. Whether a policy that is good for business is also good for the United States, therefore, depends on how the profits of business are distributed, how much of the value generated by the business supply chain is created in the United States, and what effect the supply chain has on the U.S. balance of trade and other international accounts.

In establishing a global supply chain, a corporation faces three basic issues. First, what are the core competencies of the company? What part of the manufacturing chain should the company do in-house and what should be contracted out? Second, where should the product be assembled and packaged? Should it be done in the United States, in China, or elsewhere? Third, should the company invest in manufacturing facilities and own the process or rely on suppliers? The outcome of these decisions determine the shape, location, and interconnections within the supply chain.

For example, the new Boeing 787 Dreamliner passenger aircraft (first deliveries scheduled for 2010) is based on a supply chain that incorporates many business and policy decisions involved in making a complex product. Although final assembly is done near Seattle, Boeing outsources

[17] The actual quotation in 1953 by Charles Erwin Wilson (former President of General Motors) in his confirmation hearing to become Secretary of Defense was, "For years I thought what was good for our country was good for General Motors, and vice versa."

[18] Adam Smith. *An Inquiry into the Nature and Causes of the Wealth of Nations*. (Dublin, Whitestone, 1776).

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about 70% of the total content of the aircraft (up from about 50% in previous planes) with about 30% of the content outsourced from foreign suppliers.[19] As shown in **Figure 4**, many components and parts of the airplane come from Europe and Asia as well as from the United States. France makes passenger doors; the U.K. provides Rolls Royce engines, Italy the center fuselage and horizontal stabilizers, Sweden cargo doors, Germany the main cabin lighting, Japan wings and the central wing box as well as carbon fiber jointly developed with Boeing, China the rudder and other parts; and Australia provides the trailing wing edge. Since passenger airplanes are purchased by airlines that often are owned by or have close relationships with governments, part of Boeing's marketing strategy is to get major customer nations involved in production to provide them a vested interest in the financial success of the aircraft. Boeing is a leading U.S. exporter, but it does so partly because it also cooperates with potential customer countries in the development and production of aircraft. The U.S. Export-Import Bank also plays a role in funding exports of aircraft.[20]

[19] Boeing, *787 Dreamliner, Program Fact Sheet*, accessed January 6, 2009. http://www.boeing.com/commercial/787family/programfacts.html.

[20] CRS Report 98-568, *Export-Import Bank: Background and Legislative Issues*, by Shayerah Ilias.

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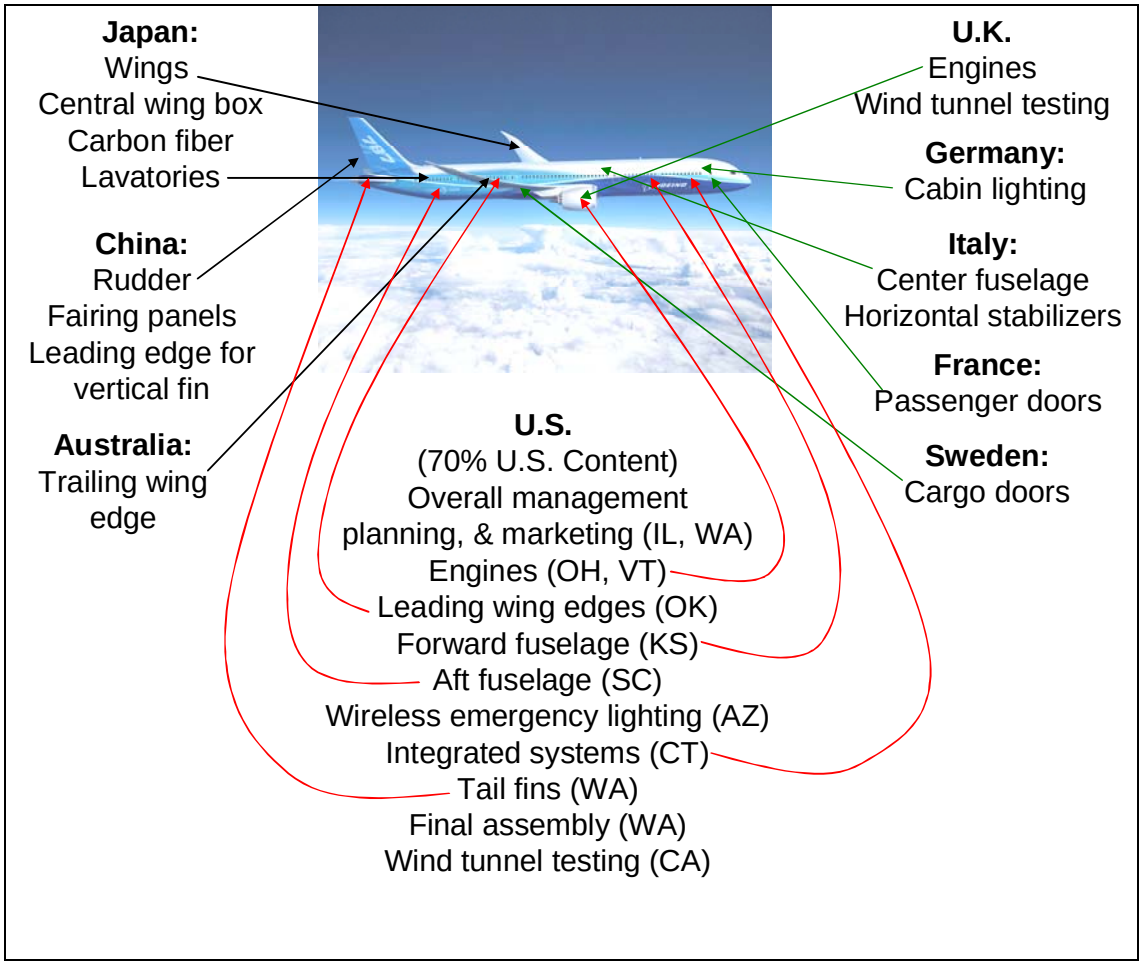
**Figure 4. Major Global Sourcing for the Boeing 787 Dreamliner**




**Source: Congressional Research Service from data from** "Boeing 787: A Matter of Materials," *Industry Week*, December 1, 2007, pp. 35-37 plus several news articles. Photograph from The Boeing Company.

Boeing's supply chain for the 787 Dreamliner illustrates several of the central tenets of 21st century manufacturing. Boeing focuses on its core competencies (designing, assembling, and marketing airplanes), attempts to maximize efficiency over the entire production network, minimizes inventories through a just-in-time manufacturing process, and works with suppliers to engender technological progress and more exacting quality control. Some of these business goals favor foreign sourcing of production or parts while others favor domestic sources. Some critics of producing wings in Japan, for example, fear that Boeing may be fostering a Japanese aircraft industry that may become a future competitor.[21] Boeing also must consider U.S. and foreign government policies in various aspects of its business decisions.

Many aspects of U.S. public policy support Boeing's production of aircraft. These arguably include procurement by the Department of Defense, the financing of exports through the Export-

[21] Peter Pae, "Japanese Helping 787 Take Wing," *Los Angeles Times*, May 9, 2005, p. C1.

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Import Bank, subsidies for research and development, subsidies for the education and training of engineers and other skilled workers, subsidies for airport construction, and official trade complaints aimed at European government subsidies of Airbus.[22] Boeing is a major U.S. exporter and generates job opportunities for thousands of Americans despite its supply chain that reaches overseas. These imports of parts and components, however, tend to be offset by exports of final product.

The iPod supply chain in **Figure 2** represents a corporate network that is a net importer. The production of iPods or similar consumer electronics also may benefit from U.S. government policies. These may include government procurement, the financing of trade transactions, subsidies for research and development, subsidies for aerospace activities (including satellite launches) and the Internet, various government market-opening initiatives, and efforts at strengthening the protection of intellectual property.

Critics of globalization tend to focus on lower costs (because of lower wages or less stringent environmental or other regulations) of manufacturing abroad. For supply chains, however, production decisions cannot rest solely on calculations of cost. Cost calculations are combined with estimates of risk to produce expected values for future operations. For example, in deciding whether to assemble a product in China, the risk of currency appreciation, shipping disruptions, political turmoil, changes in Chinese government policy, differential rates of inflation, miscommunication, accidents, terrorist incidents, and other such factors also enter into the calculations. In addition, measures that need to be taken for long-distance quality control and product safety come into play.

For example, the pharmaceutical company Pfizer is undergoing a massive overhaul of its manufacturing and supply network worldwide. Pfizer Global Manufacturing currently supplies more than 500 products with 100 manufacturing plants that it is whittling down to 43. Some plants have been closed, some sold outright, and others sold with trailing supply agreements. Now the company manufactures internally when that makes sense, and it buys the rest from outside sources. The company says that their decisions are not based entirely on cost but on creating value for its customers. This includes cost, quality, reliability, and the speed of product development as well as supply chain security.[23]

# The Public Policy Dimension of Global Supply Chains

A crucial issue for U.S. policymakers is how to create conditions that make the U.S. economy more attractive as a location for both headquarters of supply chains and for each segment of both

[22] Reuters, "U.S. to continue challenging Airbus subsidies," *International Herald Tribune*, March 6, 2008.

[23] Jill Jusko, "Reworking the Pharma Supply Chain," *Industry Week*, December 2008, pp. 47-49. Note that in 2008, Pfizer employed about 85,000 people in more than 150 countries. Of its $48.4 billion in revenues in 2007, $8.1 billion was spent on research and development mostly in the United States, the U.K., and in Singapore. See Pfizer, "Pfizer Company Fact Sheet," Updated February 21, 2008; Pfizer Asia Pacific Pte Ltd., "Who We Are;" and Pfizer UK, "Pfizer at a Glance," 2008.

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U.S. and foreign parented supply chains. In general, the more value that is added domestically, the more domestic job opportunities that may be created and greater the well-being of Americans. A possible test for policy is to ask if the predominant effect is one of diversion or creation. Does a proposed policy divert production (including services, research, and marketing) and employment that goes with production from the U.S. economy to a foreign location, draw production toward a U.S.-based location, or shift production between two foreign locations? Does the proposed policy create more production, or does it discourage productive activity? Does it induce foreign-owned businesses to locate segments of their supply chains here? Does the policy disrupt or enhance supply chain operations and decrease or increase overall supply chain efficiency and profitability? How does a policy affect the distribution of benefits among corporate executives, workers, shareholders, and consumers? Does a proposed policy encourage the delivery of products for consumers that are high in quality yet low in price? Also, does a proposed policy affect where intellectual property is created or resides, and what are the spinoff benefits for the rest of society?

Public policy affects businesses in two distinct ways. The first is in the environment for business or the economic, political, and social crucible in which it operates. This includes a wide range of factors including basic institutions of private property, commercial law and rights, market access, rights of establishment, national treatment, border barriers, exchange rate policy, protection of intellectual property, infrastructure, education and training of workers, energy policy, the climate for innovation, political governance, and the panoply of policies aimed at the general climate for business that all companies face.

The second way that public policy affects business is in actions that affect the internal operations of companies. These are actions that directly affect costs of production and profitability, and may include tax policy, specific customs duties, wage and employment policies, accounting and reporting rules, health and safety requirements, specific environmental requirements, and product safety. Some policies affecting the general business environment, such as energy costs and subsidies for research and development, also affect internal costs.

The development of global supply chains adds another dimension to the impact of public policy. This appears in the incidence (who is affected) by policy. Since manufacturing processes now have become fractured, the incidence of policy likewise has become fractured. A supply chain consists of a domestic parent, domestic suppliers, foreign suppliers, and a community of supporting functions that include logistics, supply chain management, and quality assurance. Public policy may provide incentives or disincentives for supply chain parent companies to establish and retain their headquarters in the U.S. market. This applies both to historically American companies and to foreign companies that may locate regional headquarters in the United States. Public policies favorable to business in the United States also may induce both American and foreign-owned supply chains to locate more segments of their supply chains in the United States (and vice versa).

U.S. policies, however, also may lower the costs of manufacturing abroad. Reciprocal tariff reductions; free trade areas; reducing market access barriers in other countries; improving U.S. seaports, airports, and other freight handling infrastructure; promoting faster and more efficient communications networks; and certain tax provisions may increase the incentive to source from abroad or to invest in business operations there. While such policies may work counter to efforts to induce businesses to locate activities in the United States, they also may increase the overall profitability of a U.S. parented global supply chain and may better enable U.S. businesses to leverage their supply chain operations in order to sell product in the foreign market. Therefore, while U.S. efforts at decreasing border barriers abroad tend to have an unequivocally positive

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impact on U.S. economic well-being by increasing U.S. exports, efforts at improving the business environment in foreign countries (such as protecting intellectual property or easing restrictions on foreign investment) tend to have a dual impact. While such efforts may encourage the location of segments of a supply chain in foreign countries, they also may increase the profitability of the supply chain operations for the U.S. parent company. An analogous argument holds for a policy such as imposing additional import tariffs in the United States. While such a policy may increase the incentive to locate production in the U.S. market, it also may reduce the profitability and competitiveness of supply chain operations for U.S. companies. As a result, the chain as a whole may be less able to compete with other global supply chains, may lose business, and may end up with fewer American employees overall.

The proliferation of global supply chains, therefore, has exacerbated certain trade-offs with respect to the effect or incidence of policies. For a given policy proposal, is the larger effect on the supply chain parent, on overseas operations that also affect the parent company, or on company operations, both domestic and foreign, in the United States? The varying effects of the policy may cause seemingly contradictory reactions to policy initiatives. It should not be a surprise to find various interest groups, even those within certain business sectors, at odds with each other. In view of these disparate responses, business associations, such as the National Association of Manufacturers, tend to take positions only on issues of general interest to their members. They usually do not speak out on industry sectoral issues, unless such issues are non-controversial or have wide member support.[24]

Public policy, therefore, affects different segments of the supply chain in different ways. A policy aimed at increasing the number of scientists and engineers in the U.S. economy may help to retain the research and development segment in the United States, but the focus on such high-level skills may lessen the number of new graduates who are willing to take jobs that require only lower-level labor skills and face work processes that tend to be repetitive. A policy aimed at keeping out certain types of imported materials, such as carbon steel, to assist the domestic steel industry may lessen the competitiveness of the automobile and other industries that use steel in their assembly process. The fracturing of the manufacturing process and the outsourcing of components of that process to foreign suppliers, therefore, implies that public policy also may need to be fractured (multidimensional and discriminating), designed to have different effects on different segments of the production chains and the workforce associated with those production activities.

One example of how public policy may enter into business decision making to determine where to manufacture product is an analytical tool reportedly used by Dow Chemical. Dow has manufacturing capacity in several countries and can move production from location to location on short notice. The company has used a linear programming model[25] that takes account of international differences in exchange rates, tax rates, and transportation and labor costs to determine the best mix of production by location for each planning period.[26] The company is able

[24] National Association of Manufacturers, "IEAP-01 International Trade Policy

[25] A linear programming is a mathematical method of maximizing or minimizing a linear function (straight line equation) subject to linear (straight line) constraints.

[26] George S. Yip, "Global Strategy in a World of Nations?," *Sloan Management review*, vol. 29 (Fall 1989), p. 33.

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to respond quickly to government policies that may affect exchange rates, taxes, or other cost factors.

In policies aimed at creating a favorable climate for business in the American market, the United States seems to do quite well, Measures of general business climate usually place the United States first in the world in terms of "competitiveness." Relative competitiveness, however, is difficult to measure and metrics tend to be quite general. The measures do, however, indicate how a country compares with other nations as a potential generator of economic growth and as a host for international business. For example, the World Economic Forum publishes the Global Competitiveness Index for 134 countries.[27] Under this index in 2008, the United States ranked first, Switzerland second, Denmark third, Sweden fourth, Germany fifth, Finland sixth, Singapore seventh, Japan, eighth, United Kingdom ninth, and the Netherlands tenth. China was 34th.[28]

Likewise, the Institute for Management Development in Lasuanne, Switzerland publishes a *World Competitiveness Scoreboard* each year that "analyzes the factors and policies that shape the ability of a nation to create and maintain an environment that sustains more value creation for its enterprises and more prosperity for its people." The analysis divides the national environments of 55 countries into four main factors (with 331 criteria): economic performance, government efficiency, business efficiency, and infrastructure. The 2008 scorecard placed the United States first, Singapore second, Hong Kong third, Switzerland fourth, and Luxembourg fifth. China was number 17.[29] According to these analyses, the United States leads the world in providing an economic environment favorable for business.

These comparative indices however, tend to examine underlying performance factors that lead to high incomes and business development. While the United States ranks first in both of these international comparisons, they do not explain why companies headquartered in the United States choose to manufacture in countries that rank lower in "competitiveness." This is where supply chains enter the analysis.

## Major Policies Affecting Global Supply Chains

The United States pursues a range of economic policies, some industrial in nature, each carrying a package of economic and political justifications. However, in general, Washington relies mainly

[27] The twelve components of this index are: institutions, infrastructure, macroeconomic stability, health and primary education, higher education and training, goods market efficiency, labor market efficiency, financial market sophistication, technological readiness, market size, business sophistication, and innovation. See World Economic Forum, *The Global Competitiveness Report 2007-2008*. Available at http://www.gcr.weforum.org/.

[28] The World Economic Forum defines competitiveness as ... the set of institutions, policies, and factors that determine the level of productivity of a country. The level of productivity, in turn, sets the sustainable level of prosperity that can be earned by an economy. In other words, more competitive economies tend to be able to produce higher levels of income for their citizens. The productivity level also determines the rates of return obtained by investments in an economy. Because the rates of return are the fundamental determinants of the growth rates of the economy, a more competitive economy is one that is likely to grow faster over the medium to long run. World Economic Forum, *Global Competitiveness Report*, chapter 1.1.

[29] International Management Development. World Competitiveness Yearbook, 2008. Scorecard available at http://www.imd.ch/research/publications/wcy/upload/scoreboard.pdf.

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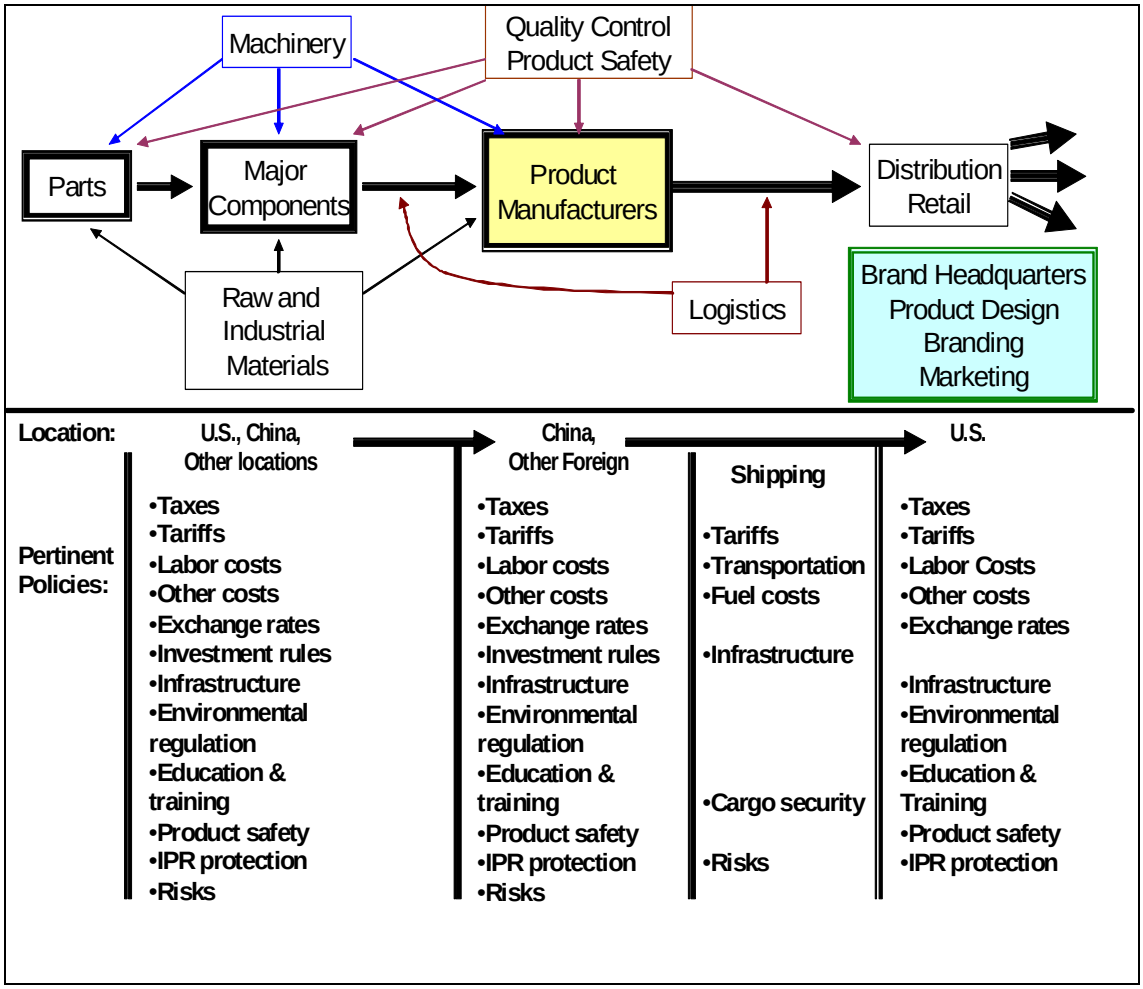
on monetary and fiscal policy to generate full employment and economic growth, even though the federal government does support specific industries, such as agriculture or aerospace, and occasionally intervenes directly to provide emergency assistance to firms such as AIG, Citigroup, or General Motors and Chrysler. The policies of most concern in this section are microeconomic in nature and affect both the environment for business and the international operations of companies.

**Figure 5** illustrates a typical supply chain with manufacturing in China or other country but with brand headquarters and major retailing in the United States. The figure also shows selected public policies that affect decisions within the supply chain, particularly those dealing with where and how each step in the supply chain is accomplished. Other policies also are important to supply chains, but they are beyond the scope of this report (such as health care, workplace regulation, accounting standards, lawsuits and other legal issues, financial regulations, and executive compensation). Much of the analysis of the policies considered, however, also may apply to these policies.

**Figure 5. A Typical Global Supply Chain with Pertinent Policy Levers**




**Source:** Congressional Research Service

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## Taxation

The public policies shown in **Figure 5** are not necessarily ranked according to magnitude of effect, but taxes tend to be at the top of any list of issues for international business. Under the current system, U.S. taxes are applied on a worldwide basis to U.S. firms while granting foreign tax credits in order to alleviate double taxation of the same income. In short, multinational corporations pay taxes on their global income but receive credit for taxes paid to foreign governments. The system permits U.S. firms to defer taxes on foreign-source income indefinitely by not repatriating profits. In effect, the current system provides an incentive for companies to retain profits abroad and to invest in low-tax countries and a disincentive to invest in high-tax countries.

There have been numerous proposals to "fix the tax code" internationally. One proposal that would provide for a country-neutral tax system would be for all countries to tax businesses at the same rate (so that a country's corporate taxes would provide neither an incentive nor a disincentive to invest or manufacture there) and for the United States to retain its foreign tax credit. Governments, however, seem reluctant to cede the ability to change tax policy and appear to be less willing to equalize taxes than, for example, to equalize import tariff rates under a free trade or other agreement. A proposal that would favor keeping investment and production in the United States would be to retain the system of worldwide taxation for U.S. companies but to impose higher taxes on investments or income derived from abroad. One proposal to accomplish this would be to permit only a deduction from income, and not a credit to be deducted from the total tax bill, for taxes paid abroad. Other proposals are to end provisions that allow companies to defer foreign-source income indefinitely, to restrict deductions for costs associated with deferred income, or to neutralize the tax benefits for companies moving their "headquarters" to a tax haven (such as Bermuda or the Cayman Islands). Another proposal, however, that would respond to the globalization of businesses is to exempt U.S. companies from paying taxes on their overseas income from investments.[30]

Numerous other tax provisions affect U.S. businesses and their manufacturing decisions. The taxation of income by Americans working abroad, the rate of taxation of corporations, various tax incentives or rebates aimed at promoting specific desired activities (such as technological change), the taxation of corporate dividends, and other tax-related issues are being debated widely. These are beyond the purview of this report.

As with other policies and their impact on global supply networks, the issue is twofold. Is the predominant effect of a change in policy one of diversion or creation? Does a change divert production from the U.S. economy to a foreign location, or does it draw production toward a U.S.-based location? Does the change create more production overall, or does it discourage economic activity?

[30] For details, see CRS Report RL34115, *Reform of U.S. International Taxation: Alternatives*, by Jane G. Gravelle. CRS Report RL31444, *Firms That Incorporate Abroad for Tax Purposes: Corporate "Inversions" and "Expatriation"*, by Donald J. Marples. U.S. Government Accountability Office, *International Taxation, Large U.S. Corporations and Federal Contractors with Subsidiaries in Jurisdictions Listed as Tax Havens or Financial Privacy Jurisdictions*, GAO-09-157, December 18, 2008.

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## Trade and Investment Policy

Global supply trains could not exist without international trade. Traditionally, trade and investment policy deals with border barriers. These include customs duties, import quotas, the freedom to move capital across borders, and the right to establish businesses (including taking over an existing company) in a given country. The development of globalized supply networks does not alter the role of traditional trade and investment policies.

Tariffs or customs duties are national taxes imposed on imports (and sometimes exports) and were originally used primarily to raise revenues for governments, particularly those with weak systems for collecting taxes. Currently for most industrialized countries, the main purposes of tariffs and quotas are to provide protection for domestic industries, to offset some of the cost advantage of foreign suppliers, and also to generate income for governments.

For the major countries of the world, average tariff rates are now quite low (2.9% for the 10 advanced industrialized nations) but higher at 9.8% for the 142 developing nations of the world.[31] In the United States, certain import-sensitive products may have relatively high tariff rates (e.g., 25% for pickup trucks, 50% for cotton jackets/coats). Other nations also protect certain sectors either through high tariffs or stringent import quotas.

With respect to supply chains, border barriers still raise the cost of imports regardless of whether the product is traded within a supply chain or is traded in open markets. An established supply chain, however, is likely to be less sensitive to border barriers, since such networks are based on long-term relationships and established lines of communication. Over the long-term, however, if border barriers are raised or lowered enough to offset other non-monetary considerations, companies may change the location of manufacturing or other segment of the manufacturing process. Border barriers play a greater role in business decisions on initial plant location, but such decisions also call into play the whole range of factors affecting the competitiveness of the location being considered. Traditional trade and investment policy, therefore, still appears viable in pursuing U.S. goals of economic growth, employment, and a rising standard of living over the long term.

Currently, three major avenues exist to reduce tariffs. First, tariff reductions and other trade liberalizing measures are being negotiated on a multilateral basis through the World Trade Organization (WTO), although the current Doha Round is stalled.[32] Second, on a bilateral or regional basis, countries are negotiating free or preferential trade agreements.[33] Countries also provide trade preferences to certain nations (particularly those with the lowest income levels) or nations with special historical relationships (e.g., former member of an empire). A third, but

[31] Ng, Francis K. T., "Trends in average applied tariff rates in developing and industrial countries, 1981-2007," World Bank spreadsheet at http://econ.worldbank.org/WBSITE/EXTERNAL/EXTDEC/EXTRESEARCH/0,,contentMDK:21051044~pagePK:64214825~piPK:64214943~theSitePK:469382,00.html.

[32] See CRS Report RL32060, *World Trade Organization Negotiations: The Doha Development Agenda*, by Ian F. Fergusson.

[33] For a discussion of the effects of free-trade agreements, see CRS Report RL31356, *Free Trade Agreements: Impact on U.S. Trade and Implications for U.S. Trade Policy*, by William H. Cooper.

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rarely used method, is to provide normal trade relations status (most favored nation status) to a country that currently does not enjoy such status (e.g., North Korea, Cuba).

Two major avenues are used to increase tariffs or other barriers to trade. For countries that are members of the WTO, tariffs are bound (normally cannot be increased), but they can be raised as a result of various escape clause or market disruption cases. The escape clause or safeguard procedures include anti-dumping or countervailing duty investigations. Also current U.S. tariffs as actually applied tend to be lower than the levels that are bound under World Trade Organization agreements. A second method is through trade sanctions imposed for security or other political considerations (e.g., banning trade with Burma/Myanmar).[34] The use of dispute settlement mechanisms (at the World Trade Organization or provided for in free trade agreements), the use of escape clauses, and invoking safeguard procedures provide a way to target trade policy at a specific product.

A complication in trade policy caused by the globalization of supply networks occurs in the incidence of policy. An increase in customs duties in the United States, for instance, may end up raising costs not only for the foreign exporter but for the American headquarters of a company that has a supply chain with a foreign subsidiary that manufactures the product for export to the United States. It also usually raises the cost of the import to the American consumer.

For example, some have proposed raising tariffs on all imports from China in response to its arguably undervalued exchange rate, a rate which is seen as making Chinese exports cheaper and harming import-competing industries in the United States. Under traditional economic models, imposing tariffs on imports from China would increase the price of such imports (assuming no change in exchange rates), reduce the quantity of imports from China purchased in the United States, and shift some production either to a competing supplier located in the United States or to an exporter in another country that makes similar products. Such protection of domestic industries helps import-competing industries in the United States and hurts exporters from China, although it also may help exporters from Mexico, Southeast Asia, or other countries that make products that compete with those from China. However, more than half of China's exports originate from foreign-owned or foreign-affiliated companies located there. Most of these companies are parts of globalized supply networks. A Chinese exporter, therefore, actually may be a company wholly or partly owned by an American multinational corporation. An increase in an import tariff, therefore, may help U.S. companies competing with imports from China, but it also may end up hurting the U.S. headquarter company as well as its associated Chinese supplier. It also may hurt a U.S. retail-oriented supply chain (such as a discount big box store) that stocks its shelves with items from China.

Debate over the Korea-U.S. Free Trade Agreement (KORUS FTA) also highlighted the effect of globalized supply networks on trade policy. Among the Big Three U.S. automakers, Ford and Chrysler were reported as opposing the KORUS FTA, while GM has remained neutral. GM's position is thought to stem partly from its ownership of Daewoo Motors in Korea.[35] Opponents of

[34] See CRS Report RL33944, *Trade Primer: Qs and As on Trade Concepts, Performance, and Policy*, coordinated by Raymond J. Ahearn.

[35] CRS Report RL34330, *The Proposed U.S.-South Korea Free Trade Agreement (KORUS FTA): Provisions and Implications*, coordinated by William H. Cooper.

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the FTA point out that the United States exported only 6,500 cars to Korea in 2007 (for a market share of less than 5%), while Korean automakers sold 775,000 automobiles in the United States (for a market share of nearly 30%). What these figures do not indicate, however, is that GM Daewoo sold some 125,000 automobiles in the Korean market in 2007. If these cars are counted as U.S. sales there, the American market share in Korea would be about 12.8%. That is still considerably less than the 30% market share for Korean automakers in the U.S. market, but this Korean share also includes about 250,000 vehicles that were made at the Hyundai plant in Alabama.[36] This illustrates the complexity for policy caused by multinational corporations with significant operations in foreign countries. In the GM case, its Korean operations are primarily aimed at the Korean market, and Hyundai's U.S. operations are mainly aimed at the U.S. market. Each subsidiary hires local workers, while profits (not reinvested) flow back to the parent companies.

Countries around the world currently are actively engaged in negotiating bilateral and regional free-trade agreements (FTA). FTAs normally contain provisions that require a phased reduction or elimination of tariffs by each side and either elimination or expansion of import quotas. FTAs also address a range of other trade-related issues, such as investment flows, access for service providers, and protection of intellectual property rights. The United States already has FTAs with fourteen countries: Canada and Mexico (NAFTA), Israel, Jordan, Morocco, Singapore, Chile, Bahrain, and certain Central American nations (CAFTA). FTAs with Columbia, Panama, and South Korea have been negotiated but await congressional approval, and several more are in the process of being negotiated.

What effect does an FTA have on a global supply chain? For the sake of brevity, consider a reduction in tariffs under an FTA between the United States and another country such as Thailand. The United States and Thailand have had intermittent talks on establishing a U.S.-Thailand FTA. The United States has an average tariff rate of 2.7% while Thailand's is 10%. Eliminating import duties in the United States on products from Thailand implies that the assembled price of the product imported into the U.S. market avoids an increase in cost that would have been collected by U.S. Customs at the port of entry. Depending on the number of competing products in the domestic market, such tariff costs usually are passed on to the consumer or absorbed by the producer. Eliminating the tariff, therefore, either reduces costs to the U.S. consumer or increases profitability of the import supply chain. It also decreases U.S. government revenues and increases the incentive to produce in Thailand. This may divert production from the U.S. market, even though certain parts of the supply chain still located in the United States may become more profitable and employ more workers (e.g., research and development, branding, advertising, and management).

Eliminating import duties in Thailand have a comparable effect on U.S. exports there. The cost of U.S. products in Thailand would be reduced for the Thai consumer, and U.S. exports would be expected to increase. The impact of the mutual tariff reductions on the U.S. balance of trade with Thailand depends on how responsive imports in each country are to tariff reductions (demand elasticities) and the size of the trade flows before the FTA is implemented.

[36] Troy Stangarone, *Moving the KORUS FTA Forward in a Time of Economic Uncertainty* , Pacific Forum CSIS, PacNet No. 66, Honolulu, HI, December 11, 2008.

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In addition to the bilateral trade effects, FTAs also may affect trade with other countries through the diversion of product flows. The increased trade or production within the FTA countries may either be a net addition to economic activity in the countries involved (because of the larger bilateral market) or a diversion of economic activity away from other countries and into the countries in question. In most cases, countries that negotiate FTAs with the United States also participate in other bilateral and regional FTAs. For example, Thailand also has an FTA-type agreement with China. The combination of the two FTAs would provide a two-fold incentive for the U.S. producer. If the U.S. company has assembly operations in Thailand but obtains parts or components from the United States or from China (with whom it also as an FTA), the U.S. company may ship more parts and components directly from the United States and China to Thailand and bring more finished product to the American and other markets. If the U.S. company provides raw materials for parts or components shipped to Thailand from either the United States or China, U.S. exports would tend to rise but to do so less than if the final product were manufactured directly in the United States and then shipped to Thailand. Either way, the income earned by the U.S. company managing the supply chain would tend to rise. Any increase in profits to the U.S. company could be repatriated to the United States or could be reinvested abroad.[37]

The net effect on a supply chain and the U.S. trade balance because of a cut in tariffs under an FTA, therefore, depends on the relative magnitude of the tariff reductions on each side, the nature of and location of the supply chain, and the responsiveness of trade flows to tariff reductions. In general, however, since U.S. tariffs tend to be lower than those of FTA partner countries, the greater benefit of trade liberalization arguably will go to U.S.-based companies.

For an American company with a global production network, the more countries that participate in a free trade area the better. Such a "common market" with no internal tariffs not only eliminates the need to pay duties as components and final products circulate within the national borders defining the FTA, but it also reduces the required documentation and calculations to determine country of origin. U.S. multinational companies generally support efforts to establish regional free trade areas and to eliminate border barriers.[38]

The growing maze of bilateral FTAs, however, pose a different problem for businesses, particularly for their operations in other countries. For example, Thailand has become a manufacturing location for many companies. Thailand has had held talks with the United States on establishing a bilateral FTA, has signed a limited FTA with China, has a framework agreement with India, and has broad FTAs with Australia and New Zealand and with other members of the Association of Southeast Asian Nations. It also is in FTA discussions with Japan, India, and Peru. If each FTA that has been implemented has different provisions and rules, the cost of complying with rules of origin requirements or the paperwork involved in documenting that the goods fall under the FTA may exceed the lower tariffs provided by the FTA. Some international businesses have indicated that because of the "nuisance" cost of complying with rules of origin or other requirements in FTAs, they just pay the usual tariff rather than try to qualify for a lower FTA

[37] Note that this analysis does not take into account possible offsetting effects to a change in trade flows induced by a tariff change. For example, increased exports could lead to a stronger dollar which then reduces U.S. exports.

[38] Numerous interviews by the author with businesses involved in global markets.

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rate.[39] This is an argument for the U.S. approach of using a "template" for FTAs in order to ensure consistency across such agreements.

Other aspects of international trade and investment policy include the right of establishment of foreign-owned businesses in countries and the right to national treatment. In essence, these rights ensure that foreign-owned and domestic companies are treated equally both in terms of the right to establish and operate a business and in terms of applicable laws and government action. National treatment also may allow governments to prohibit foreign companies from doing anything not allowed for domestic companies. With the exception of foreign investment that raises security or antitrust complications,[40] the United States provides both national rights of establishment and national treatment as do the countries that are members of the WTO. The more established these rights are in countries, the more likely that globalized supply networks will consider locating in those countries—including in the United States.

How successful is the United States in attracting segments of global supply chains? Data on investments by U.S. and foreign multinational corporations indicate that the United States has been an attractive market for foreign direct investments (FDI, investments in a controlling interest [at least 10% of equity] in productive assets by a foreign corporation). In 2007, FDI in the United States was $232.8 billion of which $144.9 billion (62%) came from Europe. Of the total, $108.1 billion (46%) was in manufacturing.[41] On balance, however, U.S. corporations invest more abroad in productive assets than foreigners invest in the United States. In 2007, U.S. direct investment abroad was $313.8 billion with $55.2 billion (18%) invested in foreign manufacturing.[42]

## Labor and Health Care Costs

### *Labor Costs*

Labor costs are one of the most controversial aspects of globalized manufacturing chains.[43] The argument is that U.S. companies are "shipping jobs overseas" or "outsourcing jobs" in search of cheap labor to reduce costs of production.[44] In 2007, for example, hourly compensation costs for production workers were $24.59 in the United States, $28.91 in Canada, $2.92 in Mexico, $16.02

[39] Interviews by the author in 2006 and 2008 in Shanghai, China; Taipei, Taiwan; and Tokyo, Japan.

[40] CRS Report RL34561, *Foreign Investment and National Security: Economic Considerations*, by James K. Jackson. CRS Report RL33103, *Foreign Investment in the United States: Major Federal Statutory Restrictions*, by Michael V. Seitzinger

[41] U.S. Bureau of Economic Analysis, *Foreign direct Investment in the U.S.: Country and Industry Detail for Capital Inflows, 2007*, accessed January 27, 2009.

[42] U.S. Bureau of Economic Analysis, *U.S. Direct Investment Abroad: Country and Industry Detail for Capital*, accessed January 27, 2009.

[43] See CRS Report RL34091, *Globalization, Worker Insecurity, and Policy Approaches*, by Raymond J. Ahearn.

[44] CRS Report RS21883, *Outsourcing and Insourcing Jobs in the U.S. Economy: An Overview of Evidence Based on Foreign Investment Data*, by James K. Jackson; CRS Report RL32292, *Offshoring (a.k.a. Offshore Outsourcing) and Job Insecurity Among U.S. Workers*, by Linda Levine.

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in Korea, and $37.66 in Germany. Compensation costs for China for all manufacturing employees in 2006 were estimated at about $0.81.[45]

One of the major drivers of globalized manufacturing networks has been to internalize differences in labor costs within the supply chain. Companies match wages, productivity, and skills with the variety of tasks required in the production process. Tasks requiring skilled workers, such as design, engineering, research and development, and marketing, tend to be located in high wage areas (such as the United States, Europe, Japan, and Singapore), while those requiring low skilled workers, such as assembly and packaging, tend to be located in low wage areas. Companies that produce in the United States also must do such skill and wage matching (such as Caterpillar or Boeing) by locating assembly or supplying plants in lower cost regions and by establishing global supply chains to import certain parts or materials from lower cost countries in Asia, Latin America, and elsewhere. In most cases, companies with assembly plants in the United States buy some manufacturing inputs from abroad.

It also should be noted that firms tend to cluster to take advantage of concentrations of skills, similar production processes, and specialized suppliers. Within the United States, there is Silicon Valley in California, the Research Triangle, in North Carolina, the High-Tech Community along Route 128 in Boston, financial services and transportation in Atlanta, and plastics and aerospace in Wichita, Kansas. The same is true for clusters of industries abroad, including financial services in London, medical research and development in Singapore, and fashion design in Paris. These centers seem to attract industries regardless of their relatively high cost of labor. Studies of such clusters indicate that the most important sources of prosperity can be created and are not dependent on "inherited" advantages, such as relative wage costs.[46]

Still, the difference in labor costs between, for example, the United States and China ($23.82 per hour vs $0.67 in 2006) are striking. The level of wages, however, is not the only factor in determining where segments of the supply chain are located. Labor costs, for many products, account for a relatively small share of total manufacturing costs, and high wages can be offset by high productivity. However, the fracturing of the production process implies that the labor-intensive segment of a supply chain can be concentrated in a low-wage country. For example, fashion design may be centered in Paris, but garment assembly still may be done in lower wage locations.

Low wages, though, may not stay low. American businesses in China, for example, have found that once workers gain certain skills, there is so much competition for those workers that their wages are bid up by competitor companies. Also inflation rates, exchange rate appreciation, and rising shipping costs can offset some of the wage differential. When this is combined with political risk, product safety concerns, and other factors, the supply chain manager may not always choose the country with the lowest wages. For example, wages in Bangladesh may be even lower than those in China, but for a variety of reasons (e.g., low labor productivity, lack of

[45] U.S. Bureau of Labor Statistics, "International Comparisons of Hourly Compensation Costs in Manufacturing, 2006," Economic News Release USDL: 09-0304, March 26, 2009.

[46] Michael E. Porter, "Clusters of Innovation, Regional Foundations of U.S. Competitiveness," Council on Competitiveness and the Monitor Group, October 2001, pp. 5-7.

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supporting infrastructure, and shipping costs), Bangladesh has not become a major manufacturing platform for U.S. businesses.

A 2007 survey of U.S. companies in China indicated that a major shift in perceptions is occurring regarding China as a low-cost country. Companies there have been experiencing increases of 7% to 10% per year in costs for white collar management, support staff, blue-collar workers, and raw materials. More than half of the companies surveyed agreed or strongly agreed that India, Thailand, and Vietnam are challenging China's position as the leading low-cost export platform. In the survey, the leading reason for establishing manufacturing bases in China was access to the local market with labor costs savings second and access to the Asian market third.[47]

Those who oppose moving segments of supply chains from the United States to foreign countries where labor costs are lower generally raise issues such as lower labor standards and working conditions abroad.[48] In cases, they have put pressure on the U.S. headquarters of the supply chain to require higher labor standards from its supplier companies located in countries such as China. Some large U.S. companies have adopted workplace codes of conduct for their Chinese suppliers.[49]

Labor standards have become an issue in various free trade agreements negotiated by the United States. In a May 2007 "Bipartisan Agreement on Trade Policy" the Bush Administration and leaders of Congress agreed to include certain provisions related to labor (as well as the environment and intellectual property rights) in trade agreements.[50]

An early implementation of this trade deal appeared in the pending free trade agreement with Peru. On June 25, 2007, the United States and Peru signed amendments to the pending U.S.-Peru Trade Promotion Agreement that included labor provisions from the bipartisan trade deal. This included a statement that the United States and Peru would be required to adopt, maintain and enforce their own labor laws as well as five basic internationally-recognized labor standards, as stated in the 1998 International Labor Organization Declaration. These included (1) freedom of association; (2) the effective recognition of the right to collective bargaining; (3) the elimination of all forms of forced or compulsory labor; (4) the effective abolition of child labor and a prohibition on the worst forms of child labor; and (5) the elimination of discrimination in respect of employment and occupation. The Peru amendments also provide that any decision made by a signatory on the distribution of enforcement resources would not be a reason for not complying with the labor provisions, and that parties would not be allowed to derogate from labor obligations in a manner affecting trade or investment.[51]

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[47] Booz Allen Hamilton, *China Manufacturing Competitiveness, 2007-2008* (Shanghai: American Chamber of Commerce in Shanghai, 2008), pp. 4, 13.

[48] The AFL-CIO, for example advocates the reform of trade rules to hold companies accountable for respecting workers' rights no matter where they produce and calls for the international community to recognize strong workers' rights and to incorporate obligations to uphold these fundamental rights in international rules and institutions. See AFL-CIO, "Policy Solutions to Shipping Jobs Overseas," accessed via Internet on September 15, 2008.

[49] See archived CRS Report RL31862, *Workplace Codes of Conduct in China and Related Labor Conditions*, by Thomas Lum.

[50] See U.S. Trade Representative, "Trade Facts, Bipartisan Agreement on Trade Policy," May 2007.

[51] See CRS Report RL34108, *U.S.-Peru Economic Relations and the U.S.-Peru Trade Promotion Agreement*, by M. (continued...)

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Labor issues also have been raised in debates over proposed free trade agreements with Columbia and South Korea as well as in considering renewal of trade promotion authority.[52]

The declining share of U.S. employment accounted for by manufacturing over the past half century has long been a concern for policymakers. For the 21 sub-sectors comprising the manufacturing sector in the United States, between the fourth quarter of 2000 and third quarter of 2008, employment declined by 22% or 3.8 million jobs. This occurred despite an increase of 7 million jobs in all private employment—excluding manufacturing.[53] The current U.S. recession began in December 2007 and the global financial crisis erupted in the fall of 2008. Since then employment has fallen considerably across the United States and in many countries of the world (with the exception of China). These declines, however, arguably are cyclical, and as economies recover so should employment. Over the long term, however, the decline in U.S. manufacturing employment can be traced to increases in labor productivity and import competition but also is related to the focus on core competencies in global supply chains and the outsourcing of noncore functions (such as accounting, security, shipping, and janitorial services provided by companies in the service sector). Increases in productivity and technological change are part of the normal development of an economy. Most workers displaced by technology find employment elsewhere, although some may be negatively affected (lower wages, fewer benefits) for some period of time.

Those displaced by imports, however, may find it difficult to transfer their skills to other industries because they tend to be in traditional industries, such as apparel, leather, textile mills, and primary metals.[54] In apparel, for example, the global supply chains include producers (such as brand name clothing manufacturers) who may contract with overseas suppliers to manufacture garments according to their specifications with their brand labels. Apparel supply chains also include big box retailers who may source and sell product both from U.S. brand name suppliers and from non-U.S. manufacturers located in markets around the world. While the lower prices enabled by the various supply chains may benefit the consumer, and the wholesale and retail sectors in the United States claim much of the revenue from sales of the imported product, the import-competing industries may turn to the government for help through programs such as Trade Adjustment Assistance in retaining workers[55] or for assistance in retooling factories or in pursuing innovations or through trade remedy laws.

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(...continued)

Angeles Villarreal. For information on the International Labor Organization, see http://www.ilo.org/global/lang-en/index.htm.

[52] See CRS Report RL34470, *The Proposed U.S.-Colombia Free Trade Agreement: Economic and Political Implications*, by M. Angeles Villarreal; CRS Report RL32540, *The Proposed U.S.-Panama Free Trade Agreement*, by J. F. Hornbeck; CRS Report RL34330, *The Proposed U.S.-South Korea Free Trade Agreement (KORUS FTA): Provisions and Implications*, coordinated by William H. Cooper; and CRS Report RL33743, *Trade Promotion Authority (TPA): Issues, Options, and Prospects for Renewal*, by J. F. Hornbeck and William H. Cooper.

[53] U.S. Bureau of Labor Statistics.

[54] Congressional Budget Office, *Factors Underlying the Decline in Manufacturing*, December 23, 2008, p. 6.

[55] U.S. Department of Labor, Employment and Training Administration, *Trade Adjustment Assistance*, Fact Sheet, c.2008.

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### *Health Care Costs*

In early 2009, the debate over and legislation on health care is addressed partly toward the costs for health care by businesses in the United States.[56] The result could affect supply chains.

In the United States, much of health care is provided by employers, so health care costs have become an integral part of labor costs. The costs for health care in the United States are the highest in the world. The Congressional Budget Office (CBO) estimates that spending on health care and related activities will account for about 17% of gross domestic product in 2009 ($2.6 trillion or $8,300 per capita) and under current law CBO projected that share to reach nearly 20% ($13,000 per capita) by 2017.[57]

Business interests have claimed that these costs are hurting the ability of U.S.-based businesses to compete in world markets and are causing firms to move production to other countries.[58] General Motors, for example cites health care costs as a major burden when compared with manufacturers in Japan and Europe.[59] This issue is complex, and reform to improve the competitiveness of the U.S. market as a base for supply chain operations is but one consideration in a range of factors pushing health care reform high onto the agenda of many interest groups. Organizations representing international business agree that something needs to be done to reduce the cost of health care paid by businesses, but there is less of a consensus on the specifics of how that could be achieved.[60]

## Environmental Regulation

As with labor issues, environmental regulation both as applied to businesses in the United States and as contained in various international trade and other agreements tends to be quite controversial. The issue for governments is how to find a balance between three potentially conflicting objectives: security of supply, industrial competitiveness, and environmental sustainability.[61]

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[56] See CRS Report R40581, *Health Reform and the 111th Congress*, by Hinda Chaikind.

[57] Congressional Budget Office, *Key Issues in Analyzing Major Health Insurance Proposals*, A CBO Study, Washington, DC, December 2008, p. 13.

[58] Lee Hudson Teslik and Toni Johnson, *Healthcare Costs and U.S. Competitiveness*, Council on Foreign Relations, Backgrounder, Publication 13325, December 30, 2008.

[59] General Motors. "About Us, Competitive Challenges, Health Care," GM 2006 Corporate Responsibility Report, 2006.

[60] For further information, see, for example: CRS Report RL34389, *Health Insurance Reform and the 110th Congress*, by Chris L. Peterson. National Association of Manufacturers, *The NAM's Health Care Agenda*, Policy Issue Information/Human Resources Policy/ Health Care, accessed through Internet on January 2009.

[61] For a European analysis of this issue, see EurActiv.com PLC. Fifth Report of the High Level Group on Competitiveness, Energy and The Environment, Contributing to an Integrated Approach to Competitiveness, Energy and Environment Policies, November 8, 2007. Available at http://ec.europa.eu/enterprise/environment/hlg/doc_07/hlg-fifth-08-11-07.pdf. For a review of pertinent U.S. environmental law, see CRS Report RL30798, *Environmental Laws: Summaries of Major Statutes Administered by the Environmental Protection Agency (EPA)*, by Susan R. Fletcher et al..

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For the U.S.-based part of global supply chains, environmental regulation may affect costs of production[62] as well as consumer perceptions and demand. Foes of globalization and international supply chains, moreover, sometimes accuse U.S. businesses of sourcing products overseas where environmental requirements may be less stringent and compliance less costly. One solution proposed is to harmonize environmental regulations across countries.

The May 2007 "Bipartisan Agreement on Trade Policy" between Congressional leaders and the Bush Administration contained key provisions related to the environment. In the agreement, the Administration and Congress agreed to incorporate a specific list of multilateral environmental agreements in free trade agreements. The list included the Convention on International Trade in Endangered Species, Montreal Protocol on Ozone Depleting Substances, Convention on Marine Pollution, Inter-American Tropical Tuna Convention, Ramsar Convention on Wetlands, International Whaling Convention, and Convention on Conservation of Antarctic Marine Living Resources.

The competitiveness of U.S. industry often is raised in debates over environmental policy. The policy discussion on greenhouse gasses, for example, turned partly on the effect of environmental policy on the ability of companies to compete in the global marketplace. If a country has legally binding carbon control restrictions while others do not, the potential exists that the country with the restrictions will find itself at a competitive disadvantage vis-à-vis countries without comparable policies and could lose global market share for certain carbon emitting production. In addition, this potential shift in production could result in some of the U.S. carbon reductions being counteracted by increased production in less regulated countries (commonly known as "carbon leakage").[63] Debates over environmental policy, therefore, often center on what can be categorized as the three-Cs: Cost, Competitiveness, and Comprehensiveness.[64]

Supply chains also have entered into policy debates over other environmental issues, such as illegal logging and sustainable development. Some headquarters firms have been targeted for protest because of actions of overseas members of their supply chains.

## Currencies and Exchange Rates

Exchange rates determine the value of one currency in terms of another. The exchange rates of most industrialized nations are allowed to float while many developing nations actively intervene to manage their exchange rates. For floating currencies, their value is determined by international financial transactions with occasional intervention by governments. Managed exchange rates

[62] See, for example, CRS Report 98-738, *Global Climate Change: Three Policy Perspectives*, by Larry Parker and John Blodgett.

[63] CRS Report R40100, *"Carbon Leakage" and Trade: Issues and Approaches*, by Larry Parker and John Blodgett.

[64] For further information, see CRS Report RL30024, *U.S. Global Climate Change Policy: Evolving Views on Cost, Competitiveness, and Comprehensiveness*, by Larry Parker and John Blodgett; CRS Report RL30853, *Clean Air Act: A Summary of the Act and Its Major Requirements*, by James E. McCarthy et al.; CRS Report RL34762, *The National Ambient Air Quality Standards (NAAQS) for Particulate Matter (PM): EPA's 2006 Revisions and Associated Issues*, by Robert Esworthy and James E. McCarthy; CRS Report RL34513, *Climate Change: Current Issues and Policy Tools*, by Jane A. Leggett; or CRS Report RL34659, *China's Greenhouse Gas Emissions and Mitigation Policies*, by Jane A. Leggett, Jeffrey Logan, and Anna Mackey

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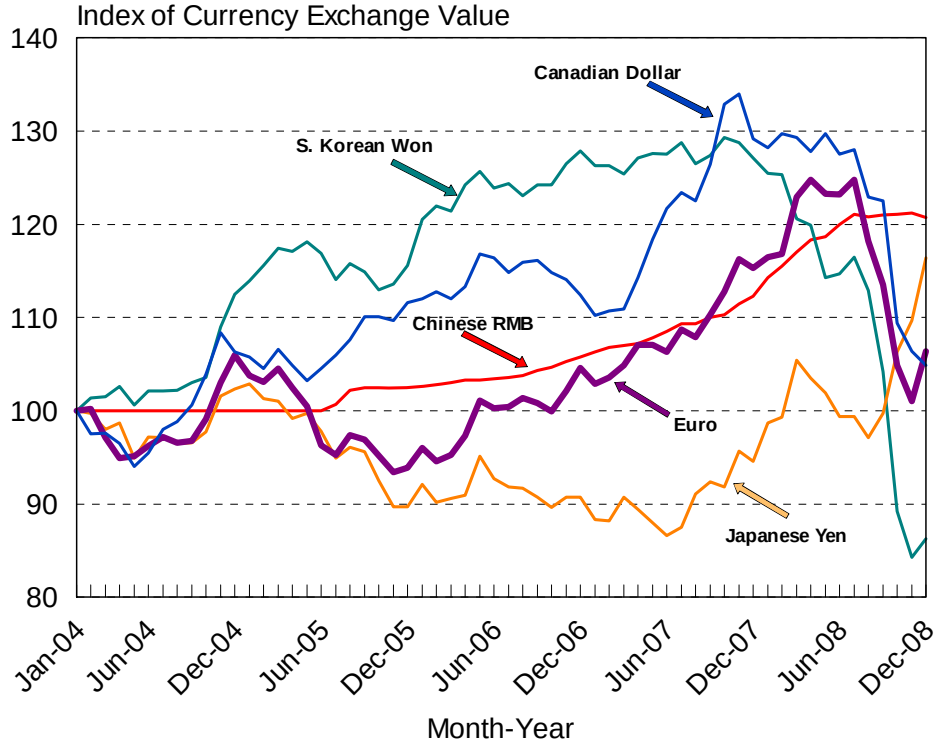
usually are pegged to or managed against either one currency, such as the dollar, or to a basket of currencies that usually contains the dollar along with currencies such as the Euro or Japanese yen. China has such an exchange rate regime.

Exchange rates can change dramatically over relatively short periods of time relative to the life of a typical manufacturing chain. When the value of the dollar declines, it increases the dollar cost of all products produced in countries whose currency has appreciated relative to the dollar. If a country's exchange rate is tied to the value of the dollar, that currency will decline in tandem with dollar, and the dollar depreciation will have no effect on the price of goods traded between the two countries. The prices of goods traded with countries without a dollar tie (such as Europe, Japan, India, or South Korea), however, will change. A country that ties the value of its currency to the dollar, however, still has to pursue policies to maintain its exchange rate that may cause domestic interest rates to rise or the rate of inflation to increase.

**Figure 6** shows the value of several currencies relative to the dollar between January 2004 and December 2008 (a time when the global financial crisis worsened). This has been a period of high volatility in exchange rates with the Canadian dollar up by 34% at one point in 2005 before dropping to almost parity in December 2008, the Japanese yen down by 12% in 2005 but up 16% at the end of 2008, and the Chinese Renminbi (RMB) up by 21% since Beijing announced its managed float in July 2005. The Euro also has risen and fallen over the period. At the end of 2008, the Korean won was 33% below its peak in October 2007.

**Figure 6. Indexes of Currency Values Relative to the U.S. Dollar for the Canadian Dollar, S. Korean Won, Chinese RMB, Euro, and Japanese Yen**




**Source:** Congressional Research with Data from PACIFIC Exchange Rate Service.

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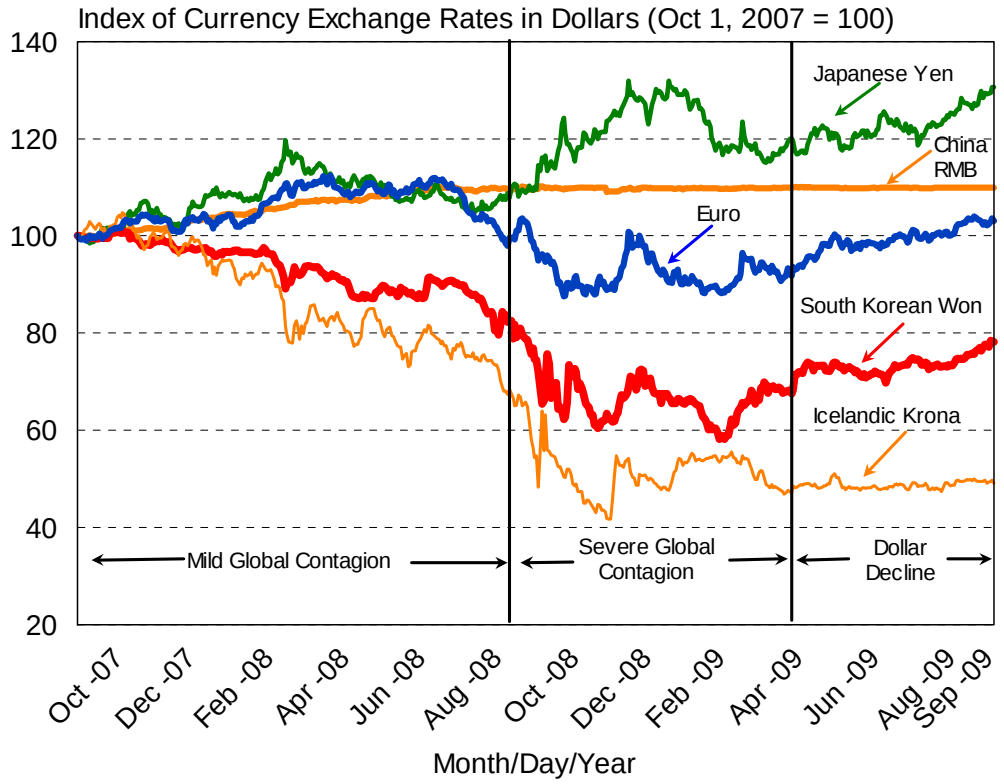
**Figure 7** shows indexes of the values of selected exchange rates over the global financial crisis. Again it shows the volatility of exchange rates and the surge in the value of the dollar relative to the Euro and South Korean won. It also shows the strengthening of the yen and the gradual appreciation of the Chinese currency.

The effect of currency appreciation on a supply chain can be illustrated by the Chinese RMB.[65] The appreciation of the RMB has a similar effect on production costs (calculated in U.S. dollars) as a wage (or other cost) increase in China. However, it has one major difference. Exchange rates fluctuate more than wage rates. Exchange rates move in both directions, while wage rates tend to be "sticky downward." They rise but rarely fall. A supply chain manager, therefore, is less likely to shift production because of an appreciation in China's exchange rate than in response to a comparable rise in wages. In China's case, however, the exchange and wage rates are both moving in the same direction. Together they work to magnify the increase in costs to manufacture there.

**Figure 7. Indexes of Currency Exchange Rates Relative to the Dollar over the Global Financial Crisis**




**Source:** Congressional Research. Underlying Data from PACIFIC Exchange Rate Service.

[65] CRS Report RS21625, *China's Currency: A Summary of the Economic Issues*, by Wayne M. Morrison and Marc Labonte

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Over the long term, however, exchange rate appreciation can dramatically affect the relative cost of production in a country. At the time of the Plaza Accord in September 1985, for example, the Japanese yen was worth 230 yen per dollar. At the end of 2008, the rate had been around 90 yen per dollar for a 155% appreciation in the yen. This greatly affected the price competitiveness of products exported from Japan and also many of its imports and has been a major factor in the movement of considerable amounts of production by Japanese multinational companies to locations overseas.

In a survey of U.S. manufacturers in 2008, 40% of 500 survey participants indicated that the value of the dollar had an effect on where they choose to source their business. At the time of the survey, the value of the dollar was falling, and nearly half of the responses said that they were already sourcing more business in the United States.

## Infrastructure and Transportation

Global supply chains could not exist without efficient transportation networks supported by infrastructure (ports, roads, railroads, airports, etc.) that enable products within the manufacturing network to move freely from one segment of the chain to the next. Infrastructure also can be defined to include the electrical grid, pipelines, the Internet, or telecommunications equipment. The issue of infrastructure in general is beyond the purview of this report.[66]

One part of infrastructure and transportation that is critical to global supply chains seems to be oceanic shipping and air freight. The oceans are no longer a barrier that isolates and protects countries. Instead, modern communications and transportation have brought markets of the world onto each other's doorsteps. The oceans and skies have become avenues of interaction rather than barriers of separation. Shipping, however, raises certain issues for public policy. These revolve around risks in the supply chain, particularly costs, security risks and delays in shipping.

The spike in petroleum prices in 2007-2008 exposed a vulnerability of oceanic and other transportation to a critical cost variable. When the price of oil rose to $140 per barrel, the cost of shipping a standard 40-foot container from Shanghai to the United States rose to $8,000 compared with $3,000 early in the decade. Shipping speeds also were reduced to conserve on fuel. The increase in shipping costs was equivalent to a 9% import tariff on trade or what amounted to a reversal of most of the trade liberalization that had been accomplished over the previous three decades.[67] the net result of the rise in shipping costs was that some companies switched production to locations closer to home, some in the United States.[68]

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[66] For policy discussion, see CRS Report RL33206, *Vulnerability of Concentrated Critical Infrastructure: Background and Policy Options*, by Paul W. Parfomak; CRS Report RL31116, *Water Infrastructure Needs and Investment: Review and Analysis of Key Issues*, by Claudia Copeland and Mary Tiemann; CRS Report RL30153, *Critical Infrastructures: Background, Policy, and Implementation*, by John D. Moteff; CRS Report RL34567, *Public-Private Partnerships in Highway and Transit Infrastructure Provision*, by William J. Mallett; CRS Report RL34127, *Highway Bridges: Conditions and the Federal/State Role*, by Robert S. Kirk and William J. Mallett; and CRS Report RL33875, *Electric Transmission: Approaches for Energizing a Sagging Industry*, by Amy Abel.

[67] Larry Rohter, "Shipping costs start to crimp globalization ," *International Herald Tribune*. August 2, 2008.

[68] David Blanchard, "The Latest Global Hotspot: The USA," *Industry Week*, October 2008, pp. 54-56.

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For example, in October 2007, the cost of shipping residential heaters from China to Bowling Green, Kentucky became too high for Desa LLC, and the company shifted manufacturing operations back to the United States. Not only had the cost of ocean shipping risen but the 2,000 mile inland trucking costs from the West Coast to Kentucky (along with a cut in the export rebate by the Chinese government, rise in price of Chinese steel, and the rising value of the Chinese currency) also made sourcing from China unprofitable.[69] During the global financial crisis, however, the bottom "dropped out" of the container shipping market. As economic activity and trade contracted, so did the need for transoceanic shipping.

About 12 million standardized shipping containers arrive at U.S. seaports annually. With the exception of automobiles or bulk commodities, this the preferred method for transporting manufactured goods from overseas factories to wholesale distributors in the United States. Air freight is more expensive but is critical for lighter products such as electronic components used in "just-in-time" assembly operations. The possibility that a shipping container sent from a foreign port might contain terrorism-related devices, weapons, counterfeit products, and other prohibited items has raised concerns over container security to a new level. A distinct trade-off exists, however, between ensuring security and facilitating the free flow of commerce. For example, the Maritime Commerce Security Plan of the U.S. Department of Homeland Security states that the plan is to improve the security of the maritime supply chain to lower the risk that it will be used to support terrorism while at the same time to protect and facilitate lawful maritime commerce.[70]

Simply stated, the question for policy makers relative to global supply chains and shipping rests on what measures are required to reduce the probability of a terrorist or other incident without unduly interfering with commerce. In the 110th Congress, for example, H.R. 1 (P.L. 110-53), "Implementing Recommendations of the 9/11 Commission Act of 2007" required by the year 2012 container scanning by imaging and radiation detection equipment at a foreign port before a container is loaded. The SAFE Port Act enacted in 2006 required, among other things, that U.S. Customs and Border Protection (CBP) conduct a pilot program to determine the feasibility of scanning 100% of U.S.-bound containers. In order to fulfill this and other requirements, in December 2006, the CBP and the U.S. Department of Energy jointly announced the formation of the Secure Freight Initiative.[71]

### *Scanning*

While the security benefits associated with the requirement for 100% scanning of all cargo containers bound for the United States seem to be obvious and apparent, actual implementation has raised numerous issues. This is one example of the tradeoff between national security and supply chain efficiency.

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[69] Jonathan Katz, "Welcome Back U.S. Manufacturing," *Industry Week*, August 2008, pp. 34-37.

[70] U.S. Department of Transportation. MARAD. *Maritime Commerce Security Plan for the National Strategy for Maritime Security*, October 2005.

[71] See CRS Report RL33512, *Transportation Security: Issues for the 111th Congress*, by David Randall Peterman, Bart Elias, and John Frittelli. Also, see Department of Homeland Security, "DHS and DOE Launch Secure Freight Initiative," Press Release, December 7, 2006.

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In testimony before Congress in 2008, the U.S. Government Accountability Office laid out the major challenges related to this requirement. Among them were concerns over the lack of information on the efficacy of host government examination systems, additional time and cost requirements (particularly for equipment placed miles from where the cargo containers are stored and the comparatively short period of time containers are available for scanning when transshipped), the inconsistency with widely accepted risk management principles, and the possibility that foreign governments would call for reciprocity of 100% scanning by the United States of outbound containers.[72]

Many foreign shippers, port authorities, and U.S. businesses overseas are viewing this goal of 100% scanning with some alarm.[73] Shanghai, for example, is the world's second most busy port with total container throughput of 26.1 million units in 2007.[74] In Shanghai most containers are shipped from manufacturers on smaller boats that gather at an island port offshore where they are loaded onto ocean going vessels. Scanning a container as it is being transferred from one boat to another is extremely difficult.[75] The American Chamber of Commerce in China has stated that, the scanning of every container bound for the United States "will no doubt lead to major logistics bottlenecks as the massive volume of shipped goods funnels through a limited number of scanning stations. This is a potential deal-breaker for perishable goods and just-in-time supply."[76]

Singapore has the world's largest container shipping center. Singapore is the 13th largest source of U.S. imports and accounted for 13% of all U.S. imports of goods in 2007. Singapore's Ports Command of the Immigration and Checkpoints Authority reported that in 2007 it was scanning about 15% of the 24 million cargo containers that pass through its ports each year. It is able to scan an incoming container truck in a few minutes, although the scan takes extra time to set up and interpret the results. Singapore signed on early to the Cargo Security Initiative of the United States and has been operating for several years as a pilot port. The Authority indicated its concern that the American side keeps announcing new initiatives (e.g., the Megaports Initiative and the Secure Freight Initiative) that seem to overlap and have different sponsoring agencies. With so many containers being handled, the port authority also is concerned that even adding a few seconds to the handling of each container would have cumulative effects on the efficiency of its operations. It views with dread the requirement for 100% container screening.[77]

In April 2008, the Association of German Seaport Operators (Zentralverband der Deutschen Seehafenbetriebe, ZDS) sharply critiqued the 100% scanning requirement. ZDS argued that scanning 100% of United States bound container cargo would require tremendous financial

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[72] Caldwell, Stephen L., "Supply Chain Security, Challenges to Scanning 100 Percent of U.S.-Bound Cargo Containers." Testimony Before the Subcommittee on Surface Transportation and Merchant Marine Infrastructure, Safety, and Security, Committee on Commerce, Science, and Transportation, U.S. Senate, GAO Report GAO-08-533T, June 12, 2008.

[73] Miller, John W.. "New Shipping Law Makes Big Waves In Foreign Ports," *Wall Street Journal*, October 25, 2007. pg. B.1.

[74] "Shanghai Port Grows as Trade Shrinks," *CargoNews Asia*, January 9, 2009.

[75] Interviews by the author with U.S. Consulate officials and business executives in Shanghai, China, February 2008.

[76] The American chamber of Commerce, People's Republic of China, *2008 White Paper, American Business in China*, 2008, pp. 105-106.

[77] Briefing of author in Singapore by the Ports Authority, August 2007.

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outlays and time. The port of Hamburg, for example, ships 120,000 containers to the United States per year. At a cost of €300 ($375) per container, additional outlays would reach € 36 million ($45 million) per year not counting the 15 minutes per container for an assessment (and longer for the containers tagged for physical inspection).[78] On the airfreight side, however, in October 2008, the United States and the European Union did reach an agreement for screening air cargo on U.S.-bound passenger aircraft.[79]

### *Logistics Security in China*

In 2007, the Global Supply Chain Council in Shanghai conducted a survey of international companies there dealing with secure logistics. The respondents indicated that security in logistics had become an important element in their strategy and operations. Many of the companies surveyed had reorganized their international supply chains to comply with new international regulations, such as the Container Security Initiative. In addition, many technological initiatives had been launched that were aimed at improving the security of the supply chain. These included the use of radio frequency identification, E-seals (physical locking mechanisms with technology to detect and report tampering), satellite supported tracking of containers, electronic locks, image recognition devices, and biometric identification.

In this survey, 62% indicated that security was a critical factor for their company. The respondents considered the probability of a terrorist attack low. They were more concerned with damage due to neglect by their own employees or theft. They were the least concerned with smuggling of cargo or people. Two thirds of the respondents in the survey had been engaged in working with and certifying known suppliers and service providers, introducing security and audit procedures, using information technology for more visibility, and using dual sourcing. The number of companies that had audited their own procedures was twice as high as the number of companies that had audited their partners in their supply chain.

## Product and Food Safety

The safety of imported manufactured products and food gained significant attention in 2007 when items such as lead in paint, adulterated pet food, and melamine in milk products, drew wide public attention.[80] Fears of mad cow disease also have hurt U.S. beef exports.[81] Until the recent rise in such cases, companies manufacturing abroad often were less likely to take measures to ensure quality in purchased inputs than they did in their own production processes. Now, however, companies are realizing that their reputation as a company and their whole supply chain can break down if even a single sub-contractor provides a defective product.

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[78] Zentralverband der Deutschen Seehafenbetriebe (German Seaport Operators), "Position Paper on House Resolution No. 1 (H.R. 1): Implementing Recommendations of the 9/11 Commission Act of 2007 – 100% Container Scanning. April 6, 2008.

[79] "US, EU reach cargo-screening agreement," *The Journal of Commerce Online*, October 31, 2008.

[80] For information on food safety, see CRS Report RL34198, *U.S. Food and Agricultural Imports: Safeguards and Selected Issues*, by Geoffrey S. Becker; CRS Report RL33472, *Sanitary and Phytosanitary (SPS) Concerns in Agricultural Trade*, by Geoffrey S. Becker.

[81] CRS Report RS21709, *Mad Cow Disease and U.S. Beef Trade*, by Charles E. Hanrahan and Geoffrey S. Becker.

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In response to cases of tainted imports from China, the United States and China have reached a number of agreements to address health and safety concerns. These agreements were negotiated by U.S. agencies such as the Consumer Product Safety Commission, the National Highway Traffic Safety Administration, and the U.S. Department of Health and Human Services and their counterparts in China.[82]

The U.S. Department of Agriculture through its Food Safety and Inspection Service also has developed guidelines for processors, retailers, wholesalers, and logistics providers involved in meat, poultry, and egg product supply chains.[83] In 2004, the U.S. Department of Homeland Security established the National Center for Food Protection and Defense (NCFPD) at the University of Minnesota. The NCFPD is a multidisciplinary and action-oriented research consortium charged with addressing the vulnerability of the nation's food system to attack through intentional contamination with biological or chemical agents. The program takes a comprehensive, farm-to-table view of the food system and examines all aspects of the system from primary production through transportation and food processing to retail and food service.[84]

## Education and Training

The ability of American firms to compete in the global marketplace, depends partly on the availability of skilled workers and managers. Also, rapid advances in science and technology are a continual challenge to the scientific and technical proficiency of the U.S. workforce.[85] For policymakers, the issue centers on (1) whether U.S. public education adequately prepares young people for the realities of the marketplace; (2) whether the system prepares enough students to pursue rigorous programs of study in science and technology; (3) whether U.S. education and other institutions promote innovation sufficiently for the United States to remain at the forefront of scientific and technological advances; (4) whether sufficient opportunity is provided for adults to be retrained and retooled; and (5) the extent to which companies may rely on foreign workers for certain jobs.

The analysis of these issues is beyond the purview of this report. Congress has recently addressed some of these issues in the context of the nation's science and technology (S&T) workforce.[86] A premise in promoting a better-trained and equipped S&T workforce is that such workers are essential in generating new ideas and technology that can lead to new business opportunities and jobs for the domestic economy. Another premise is that for high-technology firms to locate operations in the United States, there must be S&T savvy employees to work in the companies. The 110th Congress passed the America Competes Act (P.L. 110-69) to address concerns regarding the science and technology workforce and education. Other issues considered included demographic trends and the future S&T talent pool, the current S&T workforce and changing

[82] CRS Report RS22713, *Health and Safety Concerns Over U.S. Imports of Chinese Products: An Overview*, by Wayne M. Morrison.

[83] See http://www.fsis.usda.gov/About_FSIS/index.asp.

[84] See http://www.ncfpd.umn.edu/index.cfm.

[85] See CRS Report RL34539, *The U.S. Science and Technology Workforce*, by Deborah D. Stine and Christine M. Matthews.

[86] H.R. 2272 (110th Congress), America Competes Act (P.L. 110-69).

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workforce needs, and the influence of foreign S&T students and workers on the U.S. S&T workforce.

## Protection of Intellectual Property

An important part of the legal, financial, and economic environment in which a company operates is the protection of intellectual property rights (IPR). Intellectual property includes patents, copyrights, trade secrets, trade marks, and geographical indications (use of a geographical name in branding or promoting a distinctive product, an action designed to take advantage of the quality and reputation of a product originating in a certain region). IPR violations are claimed to cost U.S. manufacturers billions of dollars each year in lost sales. There is also concern about the potential health and safety consequences of counterfeit pharmaceutical drugs and other products, as well as the link between terrorist groups and organized crime and traffic in counterfeit and pirated goods.[87]

In the 110th Congress, legislation (P.L. 110-403) was enacted to establish a new structure to coordinate federal IPR enforcement activities. The role of Congress in addressing IPR and trade-related issues stems from the power to regulate international trade in the U.S. Constitution. Section 337 of the Tariff Act of 1930 (19 U.S.C. 1337) is the primary option available to U.S. companies to protect themselves from imports into the United States of goods made by foreign companies that infringe U.S. intellectual property rights. The U.S. International Trade Commission (ITC) administers Section 337 investigations. Since 2001, over 90% of unfair competition acts asserted under Section 337 have involved patent infringement. [88]

Global supply chains enable product makers to exert considerably more control over their property rights in companies abroad who are part of their production process when compared with those producers who procure parts or products from completely unrelated suppliers. Still companies face cases of technology leakage, reverse engineering, and counterfeiting of products by parties whether located in domestic or in foreign markets. They also create sensitive strategic issues about technology transfer or how much intellectual property or defense-related technology embedded in equipment can be made available to supply chain partners overseas.[89]

Global supply chains can, however, provide a presence in the foreign market for the company with claim to intellectual property at risk. This may provide a segue into the foreign government policymaking structure through the U.S. company with standing there. When a U.S. company is incorporated abroad, it can become a "naturalized" actor in the political process there. Appeals for stricter enforcement of intellectual property by a locally incorporated company often can complement country-to-country negotiations on IPR issues.

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[87] For details, see CRS Report RL34292, *Intellectual Property Rights and International Trade*, by Shayerah Ilias and Ian F. Fergusson. CRS Report RL34593, *Infringement of Intellectual Property Rights and State Sovereign Immunity*, by Brian T. Yeh.

[88] CRS Report RS22880, *Intellectual Property Rights Protection and Enforcement: Section 337 of the Tariff Act of 1930*, by Shayerah Ilias.

[89] See CRS Report RL31832, *The Export Administration Act: Evolution, Provisions, and Debate*, by Ian F. Fergusson.

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Problems with IPR protection can be found in many countries of the world, including the United States, but are quite common in China. As China has developed, it has become a focus of U.S. efforts to reduce violations of IPR held by American companies. The Chinese government has undertaken anti-piracy campaigns and there is an increasing number of IPR cases in Chinese courts, but overall piracy and counterfeiting levels there still remained high in 2007. U.S. copyright industries estimate that 80% to 95% of all of their members' copyrighted works sold in China were pirated.[90]

Chinese counterfeits include many products, such as pharmaceuticals, electronics, batteries, auto parts, industrial equipment, toys, and many other products, that may be exported and could pose a direct threat to the health and safety of consumers in the United States. Inadequate IPR enforcement is a key factor contributing to these shortcomings. China has high criminal thresholds for prosecution of IPR violations as well as difficulties in initiating cases. This arguably results in limited deterrence. Civil damages are also low.[91]

Free trade agreements negotiated by the United States generally have included chapters that contain provisions that strengthen protection for copyrights, patents, and trademarks, as well as rules for enforcement. Recent free trade agreements, including those with Central American countries, Bahrain, Oman, and Peru have resulted in commitments to strengthen IPR protection and enforcement in those countries. The signed (but not yet approved by Congress) agreements with South Korea, Columbia, and Panama also contain IPR provisions. A number of trade and investment framework agreements with countries also have provisions to enhance intellectual property protection and enforcement.

## Risks

In addition to the security, safety, integrity, and currency risks faced by companies with globalized supply chains, a policy risk also exists. A policy risk is the chance that either the home government or a foreign country will enact a change in policy that harms the business operation. U.S. embassies and organizations of U.S. businesses overseas devote considerable effort toward monitoring policy developments of local governments in order to head off adverse policy decisions. These include local content and labor requirements, import and export regulations, and safety provisions. Such policies, frequently pursued for protectionist purposes, often dictate the location of specific global supply chain activities and increase the difficulty of standardizing global supply chain efforts across multiple markets.[92]

In a sense, however, global supply chains may have contributed to political stability among countries. They have created interdependencies among nations that provide incentives for governments to maintain stability in international relationships. This has lessened the prospect of political risk arising from international disputes. The growing economic interdependence between

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[90] U.S. Trade Representative, *2008 Special 301 Report*, Washington, DC, 2008, pp. 19-22. CRS Report RL33536, *China-U.S. Trade Issues*, by Wayne M. Morrison

[91] U.S. Trade Representative, 2008 Special 301 Report.

[92] John T. Mentzer, Matthew B. Myers, and Theodore P. Stank, *Handbook of Global Supply Chain Management* (Thousand Oaks, CA: Sage Publications, 2007), p. 23.

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Japan and China, for example, is considered to have had a calming effect on relations when disputes have arisen over history and politics. Taiwanese businesses on the mainland also have pressed their government to relax restrictions on Chinese investment in Taiwan and for more direct airline flights between China and Taiwan.[93] China's trade and investment relations with Southeast Asian nations has had a similar effect in reducing political tensions and in seeking peaceful solutions to thorny issues such as territorial claims. U.S.-China economic interaction likewise seems to have contributed to calmer political and security relations.

For some risks, such as political upheavals, insurance is available to U.S. businesses.[94] Still, political unrest in countries can severely disrupt supply chain operations. Recent political turmoil and street demonstrations in Thailand, for example, have caused multinational companies to exercise more caution in investing there.

As the global financial crisis has demonstrated, multinational firms, particularly in the financial sector may generate risks that domestic regulators either do not recognize or do not address. AIG, the insurance company rescued by the United States in 2008 was brought down primarily by its financial-products unit that marketed credit default swaps. This unit was headquartered in London, not in the United States, and government regulation of such products essentially did not exist.[95] The need for the U.S. government rescue of AIG proved to be a key factor in the spread of what eventually became a global financial crisis and recession.

## Fiscal, Monetary, and Industrial Policies

In the current financial crisis, countries around the world are either contemplating or implementing various stimulus packages to help their economies recover from the global slowdown. One way that supply chains enter the debate is in estimating the impact of fiscal policies—particularly government spending or subsidies—on the domestic economy. If, for example, government policy is to inject funds into the economy, where should they be injected in order to maximize the economic (not political) impact of the policy?

Each dollar injected into an economy has what economists call a multiplier effect. This is a rule of thumb that estimates what the final impact of that dollar would be on the total economy after it goes through various rounds of spending. Estimates of the fiscal multiplier vary, but they usually range from about 2 to 4. At the 4-level, each dollar injected into the economy ends up being spent and respent an average of 4 times. The reason the multiplier is not larger is that at each round of spending there is "leakage" from the system. If for example, $1 is given in the form of a tax

[93] CRS Report R40493, *Taiwan-U.S. Relations: Developments and Policy Implications*, by Kerry Dumbaugh

[94] CRS Report 98-567, *The Overseas Private Investment Corporation: Background and Legislative Issues*, by Shayerah Ilias.

[95] Robert O'Harrow, Jr. and Brady Dennis , "The Beautiful Machine; Greed on Wall Street and blindness in Washington certainly helped cause the financial system's crash. But a deeper explanation begins 20 years ago with a bold experiment to master the variable that has defeated so many visionaries: Risk. explanation begins 20 years ago with a bold experiment to master the variable that has defeated so many visionaries: Risk.," *Washington Post*, December 29, 2008; Brady Dennis and Robert O'Harrow, Jr. ,"A Crack in The System; 1998, AIG Financial Products had made hundreds of millions of dollars and had captured Wall Street's attention with its precise, finely balanced system for managing risk. Then it subtly turned in a dangerous direction ," *The Washington Post* , December 30, 2008.

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rebate, the recipient may spend three-fourths of that amount (75¢ in the first round of spending) and may save or is taxed one-fourth of the amount (25¢), by the time all rounds of spending are complete, the eventual effect will be approximately a $4 increase in total spending. As a general rule, therefore, the multiplier effect will be larger the lower the saving and tax rates. These tend to occur in lower income households who tend to save less and are in lower tax brackets. However, lower income households also may purchase more imported goods (lower priced items), so the greater spending by households in the first round may be offset by more leakage because of purchases of imports.

If the funds are provided to a business in the form of a loan or subsidy, the business may spend all of it, but the business may purchase some of its products from abroad or invest the funds in overseas operations. Such spending abroad also constitutes a "leakage" from the domestic economy (in the first round). A question for policy, therefore, is which industries in the United States tend to have the least leakage from imports? In industries with Buy American provisions (such as certain rapid transportation, domestic ship transport, and national defense), leakage is kept small by law. Much government procurement falls under Buy American constraints,[96] although signatory countries to the WTO Government Procurement Agreement must implement requirements to buy local according provisions of the agreement.[97]

**Figure 8** shows exports and imports by U.S. multinational companies in selected sectors in 2005. The sectors are ranked according to those with the largest net exports at the top and those with the largest net imports at the bottom.[98] There were many other sectors with data collected by the U.S. Bureau of Economic Analysis in which multinational companies operated, but those sectors had fewer than three companies reporting, and their data was suppressed to avoid disclosure of amounts for individual companies. The rank order in the figure roughly parallels the rank order for size of the fiscal multipliers for the sectors indicated. Food, computers and electronics, machinery, chemicals, metals, and mining tend to have the higher first round effects (less import leakage and more exports), while motor vehicles, retail and wholesale trade, and petroleum products tend to have lower first-round effects (more leakage abroad).

[96] CRS Report 97-765, *The Buy American Act: Requiring Government Procurements to Come from Domestic Sources*, by John R. Luckey.

[97] World Trade Organization, *The Plurilateral Agreement on Government Procurement (GPA)*, Trade Topics, accessed January 15, 2009 http://www.wto.org/english/tratop_e/gproc_e/gp_gpa_e.htm.

[98] U.S. Bureau of Economic Analysis, *U.S. Direct Investment Abroad , U.S. Parent Companies* , accessed December 30, 2008.

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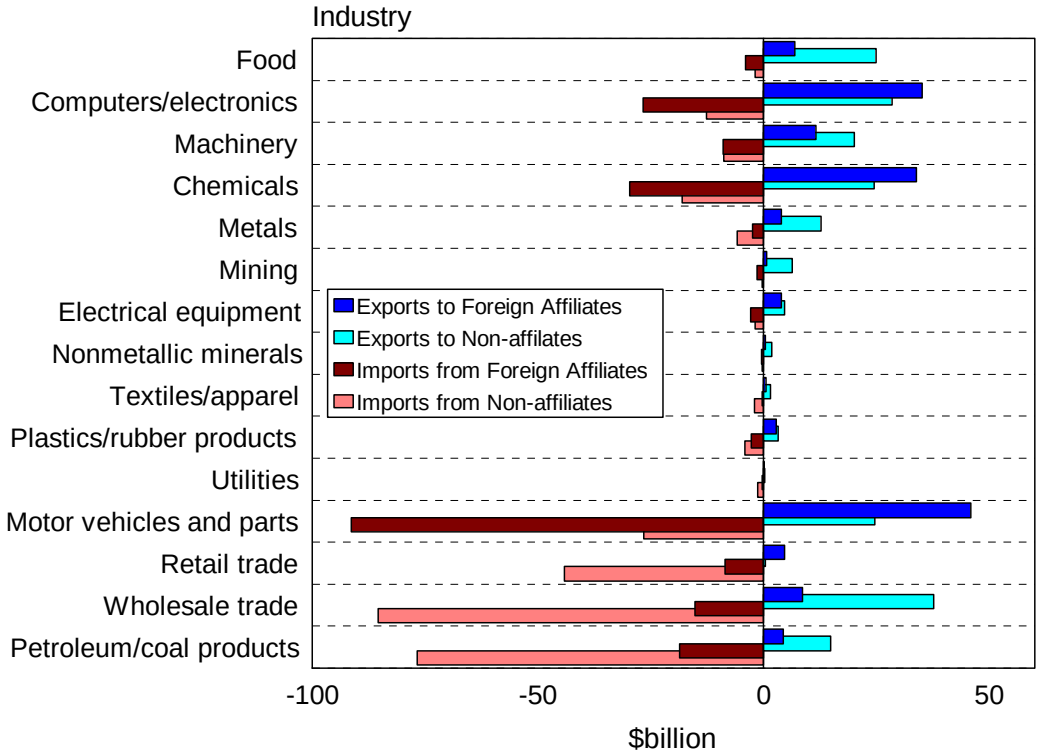
**Figure 8. Exports and Imports by U.S. Multinational Companies in Selected Industries, 2005**




**Source:** Congressional Research Service with data from U.S. Bureau of Economic Analysis.

Supply chains have an additional effect that is related to the macroeconomy. If an economy drops into recession or a business contacts, some of the layoffs in a supply chain can occur overseas. Adjusting production by slowing imports has less impact on the U.S. labor force than laying off workers in the United States. The supply chain linkages, however, also imply that a recession in a country as large as the United States may also cause a slowdown in economic activity elsewhere. This coupling of economies in the global marketplace may contribute to the synchronization of recessionary economic conditions and make global recovery even more difficult.

At the microeconomic level, as indicated in the policy discussion above, the impact of policy depends partly on the nature of the policy, itself, but it also depends on how and where along a supply chain the policy is applied. In a typical supply chain, policy points arise all along the process from initial research, branding and design to parts procurement, assembly, packaging, shipping and to final sale. The question is whether specific governmental actions intended to accomplish one goal, actually are able to accomplish that goal given the globalized nature of the industry and profit maximizing behavior of businesses.

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## Policy Review Mechanisms

In the United States, there are mechanisms in place to review the effect of proposed regulations on U.S. businesses and their ability to compete in the global marketplace. The overall responsibility in the Administration for such review lies with the Office of Management and Budget,[99] but most of the formal analysis of the policies that affect trade and competitiveness are done in the Department of Commerce in the Office of Competition and Economic Analysis. This office provides information on the impact of economic and regulatory policies on the competitiveness of U.S. manufacturing and services industries. It does this by analyzing the effects of both domestic and foreign policy developments on U.S. industries.[100]

The U.S. International Trade Commission (USITC) conducts economic analysis at the request of the Congress and President as well as the Commission itself. The Commission's analysis is used to contribute to the development of sound and informed U.S. international trade policy and to the public debate on issues relating to U.S. international trade and competitiveness. USITC analysis attempts to integrate industry, trade and tariff data with industrial and economic expertise to prepare a wide range of official Commission reports and staff developed articles. The USITC conducts analysis of major international trade proposals including all proposed Free Trade Agreements.[101]

P.L. 110-69 (Sec. 1006) directed the President to establish a President's Council on Innovation and Competitiveness. This Council is to undertake various activities for promoting innovation and competitiveness in the United States, measure progress in such promotion, and report annually to the President and Congress on such progress.

Currently, the U.S. Congress does not have established procedures to evaluate the impact on business supply chains and industrial competitiveness of proposed legislation, although business-related interest groups certainly make their positions known. Within the Congress, the Economic Competitive Caucus (Representative Todd Tiahrt Chairman) focuses on eight areas where it feels the federal government could remove barriers to economic competitiveness for U.S. businesses.

The Congressional Budget Office (CBO) conducts budgetary impact analysis for proposed legislation and analyzes specific policy and program issues related to the budget. The agency undertakes such studies at the request of the Congress. CBO analysis does not usually address, however, the effect of proposed legislation on the competitiveness of U.S. based businesses.[102]

In the U.S. private sector, the Council on Competitiveness is a group of corporate CEOs, university presidents, and labor leaders. It states that its members are committed to enhanced U.S. competitiveness in the global economy through the creation of high-value

[99] Robert W. Hahn and Robert E. Litan, "Counting regulatory benefits and costs: lessons for the US and Europe," *Journal of International Economic Law 473–508*, vol. 8, no. 2 (June 2005), p. 473–508.

[100] See Office of Competition and Economic Analysis website at http://www.ita.doc.gov/td/industry/OTEA/OCEA/OCEA-index.html.

[101] See USITC website at http://www.usitc.gov/ind_econ_ana/index.htm.

[102] For information on the Congressional Budget Office, see http://www.cbo.gov/aboutcbo//.

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economic activity in the United States. As a nonpartisan, nongovernmental organization in Washington, D.C., the Council attempts to shape the debate on competitiveness by bringing together business, labor, academic and government leaders to evaluate economic challenges and opportunities.[103]

Much of business input into the impact of U.S. policy on business interests seems to be done through trade associations, labor unions, special interest groups, and various lobbying efforts. The administration also has formal private sector advisory committees, particularly for international trade policy. The United States Trade Representative, for example, has advisory committees dealing with trade policy and negotiations and trade and the environment plus committees representing labor, agriculture, and industry.

In Europe, the European Union requires that all major European Commission initiatives contain an Impact Assessment. Such assessments contain an evaluation of the social, economic, and environmental impacts of various policy options associated with a proposal. The EC encourages estimates to be expressed in qualitative, quantitative, and, where appropriate, monetary terms, although in practice, most assessments are based on surveys of business.[104]

In Sweden, the Board of Swedish Industry and Commerce for Better Regulation (NNR) is an independent, non-partisan organization funded entirely by its members. The membership consists of the 14 largest Swedish business organizations and trade associations with a combined membership of some 300,000 companies. The principal focus of the NNR is regulatory simplification and a more business-friendly environment, not only in Sweden but also in the European Union. One of its principal tasks is to coordinate the business sector's scrutiny of Impact Assessments by the EU and to negotiate with regulatory agencies during the evaluation of the costs and benefits of a new regulation.[105]

# Conclusion

International business supply chains provide the structure for the new world of globalized business. Much of U.S. international trade is conducted by globalized supply chains. For public policy, supply chains affect the magnitude of impact for fiscal stimulus packages and also the incidence of trade policy. Supply chains also are affected by the range of policies that have an impact on the competitiveness of U.S. business. Whether taxes, environmental regulations, labor policy, or shipping security, business supply chains are directly affected by changes in the business environment, whether in the domestic or foreign markets. In the world of globalized supply chains, a policy aimed at imports, may actually hit U.S. parented supply chains as well as foreign companies and countries.

[103] For information on the Council on Competitiveness, see http://www.compete.org/.

[104] Elsie Echeverri-Carroll and Sofia G. Ayala, "Regulation and Competitiveness of U.S. Businesses: Is it time for a Competitiveness Impact Statement?," The University Of Texas At Austin, 2008.

[105] Ibid.

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The fracturing of business into core and non-core competencies and into domestic and foreign segments of supply chains implies that what had been purely domestic economic and regulatory policy now may affect the operations of U.S. parented supply chains abroad, and what had been primarily international economic, trade, and investment policy now also has a clear domestic effect. The globalization of supply has added complexity to both the managers of the supply chains and to policymaking.

As the 111th Congress and the Obama Administration consider changes to economic policy, the basic issues raised by global supply chains may come into play, particularly considerations of the incidence of policies. For example, is the goal of a policy to support business to promote the overall efficiency and profitability of U.S. parented supply chains even if significant segments of those chains are located abroad, or is the goal to induce companies to move production or other business activity to the United States even if such action reduces supply chain efficiency and the ability of the U.S.-parented supply chain to compete in the global marketplace? In international trade and investment policies, does the incidence of the policy fall on overseas segments of American parented supply chains? If the policy is to reduce imports into the United States, what effect will that have on global supply chain operations? Is there a balance between trade policies designed to increase U.S. exports (e.g., by reducing tariffs abroad) and those that may induce U.S. companies to move production overseas (e.g., easing foreign country limits on direct investments). As global supply chains attempt to maximize their efficiency and profitability, they face trade-offs between border transaction costs (including tariffs), factor costs (including labor and capital), logistical costs (including shipping), external business costs (ease of doing business, regulations, etc.), and various risks (including security, financial, and political risk). How does government economic policy influence these factors and trade-offs in ways that are in accord with, rather than counter to, U.S. national goals?

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