



C H A P T E R 7

INTERNATIONAL TRADE AND COMPETITIVENESS

The United States is more closely linked with other nations through trade, investment, and financial flows than ever before. For example, total trade in goods and services as a share of gross domestic product (GDP) was approximately 31 percent in 2012, compared with 26 percent in 2000 and 11 percent in 1970. International linkages are also reaching more deeply than ever before into the organization of industries and firms. U.S. companies are increasingly part of global supply chains, in which firms buy inputs from subcontractors located in many countries. These linkages bring both challenges and opportunities for the U.S. economy and for government policy. Macroeconomic shocks and policies halfway around the world have direct effects on growth, employment, and national balance sheets here at home, just as shocks and policies in the United States affect economies across the globe.

Significant opportunities are available for U.S. firms to expand exports and create jobs, for resources to be allocated to their most productive uses, for innovation to flourish, and for consumers to enjoy higher incomes, lower prices, and expanded choice. These opportunities, however, have been accompanied by job displacement, downward wage pressures, and other adjustment costs. Government policy plays an important role in providing infrastructure and incentives that reduce these adjustment costs, promote the creation of middle-class jobs, and foster innovative ecosystems in the private sector. Administration policies in both trade and competitiveness seek to create a fair, firm foundation for the long-term prosperity of the United States and its trading partners.

THE WORLD ECONOMY AND U.S. TRADE

Fiscal consolidation, weak financial systems, and market uncertainty have adversely affected demand in many advanced economies, and world

economic growth has suffered. In 2012, there were a number of shocks to global growth, including the impact of financial stresses in Europe that reached a peak in mid-summer. Given the globalized nature of world trade and finance, the United States cannot fully escape the impact of development in other nations.

Growth in World Economies

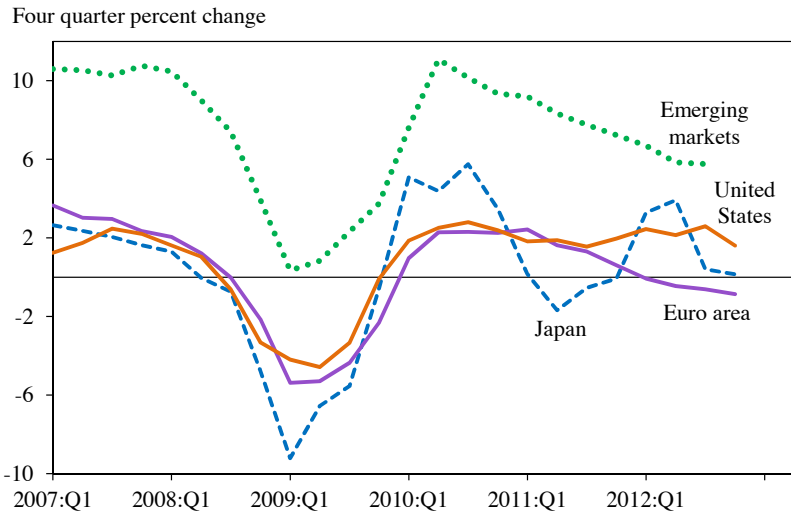
Unlike the U.S. economy, which has sustained positive economic growth for the past three years, several of the nation's major trading partners have slipped into economic contraction. In 2012, the euro area fell into recession once again, as severe austerity measures put in place to combat the region's debt crisis impeded growth. The International Monetary Fund (IMF) estimates that in 2012, the euro area economy contracted 0.4 percent, compared with growth of 2.0 percent in 2010 and 1.4 percent in 2011. While Japan was temporarily able to recover from the harsh economic slowdown resulting from the earthquake and tsunami that struck the country in early 2011, slower global demand and the phase-out of reconstruction spending brought the third largest economy in the world back into recession.

With the euro area, Japan, and the United States accounting for almost half of global GDP, slower average growth in these economies was sufficient to lower growth at the global level. Emerging market economies have relied on import demand from these large, high income economies to sustain high growth for over a decade. As import demand has weakened, particularly from Japan and Europe, economic growth in emerging markets has decelerated as well (Figure 7-1). For example, in 2012:Q2, real GDP in China grew approximately 5.65 percent at an annual rate, the lowest quarterly GDP growth China has recorded since the beginning of the global slowdown in 2008.

The Euro Crisis

After financial tensions reached a peak in mid-2012, steps were taken by both the governments of Europe and the central bank to reassure markets of the integrity of the euro area and to begin the process of reforms. In the summer of 2012, the European Central Bank announced it stood ready to stabilize the bond markets of any member state in a reform program, while governments launched the European Stability Mechanism (ESM), a joint fund to provide direct loans to governments that replaces the temporary European Financial Stability Fund (EFSF). These firewalls against financial contagion have helped restore confidence, allowing Ireland and Portugal to begin their return to financial markets. In Greece, meanwhile, European

Figure 7-1
Real GDP Growth by Country, 2007–2012



Note: Data through 2012:Q4 for all but emerging markets, for which data is available only for 2012:Q3.
Source: Country sources; U.S. Department of Commerce, Bureau of Economic Analysis; Cabinet Office of Japan; Statistical Office of the European Communities; CEA calculations.

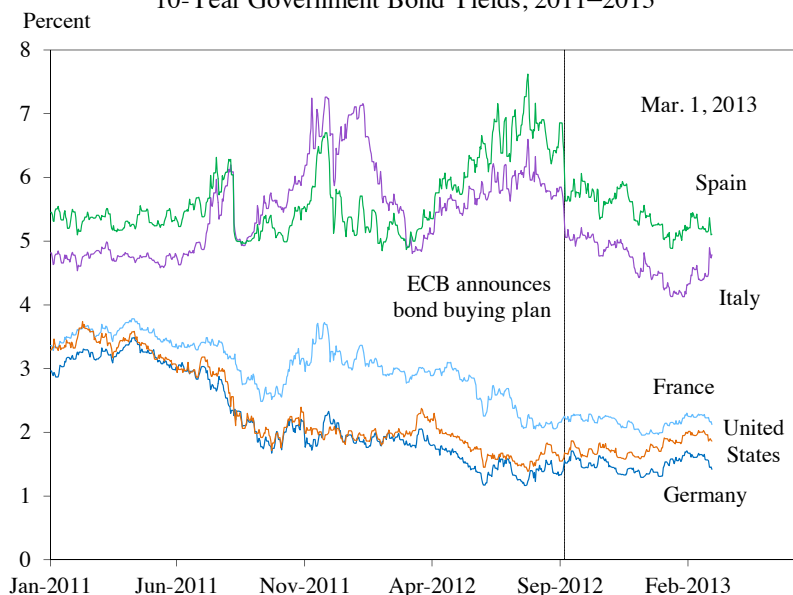
governments made important concessions in a redesigned program that reduces Greek borrowing costs and supports continued reforms.

The combined impact of these measures produced noticeable results. Bond yields in vulnerable countries fell dramatically to more sustainable levels; in the week of the announcement of the bond buying plan, Spanish 10-year bond yields declined from 6.9 percent to 5.6 percent, and Italian 10-year bond yields fell from 5.8 percent to 5.0 percent (Figure 7-2).

Meanwhile, European authorities have taken important measures to ensure that their banks have access to liquidity and hold adequate capital. The authorities have also committed to launching a banking union with a single supervisor and a European facility to recapitalize banks in troubled countries where the governments are already facing problems managing their debts. Uncertainty remains about access to a capital backstop as well as about prospects for euro area institutions for common resolution and deposit guarantees.

Finally, while the global recovery is clearly underway, European nations are still facing challenges. The euro area reentered recession in 2012, and the IMF in January forecast a further contraction of 0.2 percent in 2013 with continuing declines in output in Italy and Spain. Unemployment in the euro area is hitting record highs, with 2012 unemployment rates in Greece

Figure 7-2
10-Year Government Bond Yields, 2011–2013



Source: Bloomberg.

and Spain in excess of 23 percent (Table 7-1). Sustained fiscal consolidation and the deleveraging in the banking and business sectors in the euro area continue to act as headwinds to growth. Even as European leaders continue to undertake structural reforms aimed at increasing competitiveness over the medium term, markets remain sensitive to growth and reform prospects in large economies, including countries like France, Italy and Spain. Meanwhile, a number of countries with stronger budget positions, including Germany and the Netherlands, are running significant balance of payments surpluses and thus are not an important source of demand for the European recovery. More broadly, the euro area's combined trade surplus, after adjusting for the effect of commodity prices, is rising quite rapidly, contributing to global imbalances. Weaker European economies are closing their trade deficits as imports decline with fiscal consolidation and contracting domestic demand, and Germany's current account surplus has risen back to its pre-crisis level of 6 percent thanks to the strong performance of German exports around the world.

While we are making progress on increasing U.S. exports, these also depend on expansion in overseas markets. Europe is a significant destination for American exports, accounting for more than 20 percent of U.S. goods exports and almost 40 percent of U.S. service exports. Europe is also the leading foreign source of investment in America, accounting for more

Table 7-1
Euro Area Selected Economic Indicators

	Greece		Spain		Italy		Germany	
	2009	2012	2009	2012	2009	2012	2009	2012
GDP growth (percent)	-3.3	-6.0	-3.7	-1.4	-5.5	-2.1	-5.1	0.9
Unemployment rate (percent)	9.5	23.8	18.0	25.1	7.8	10.6	7.8	5.5
Current account balance (percent of GDP)	-11.2	-2.9	-4.8	-0.8	-2.0	-1.5	5.9	6.4
Primary budget balance (percent of GDP)	-10.4	-1.7	-9.9	-4.5	-1.0	2.6	-0.9	1.4
General government debt (percent of GDP)	128.9	170.7	53.9	90.7	116.0	126.3	74.7	83.0

Source: IMF (2012); European Commission Statistical Office.

than 70 percent of all foreign direct investment in the United States in 2011. Global and U.S. economic performance will depend, in part, on continuing progress to resolve Europe's challenges.

Global Imbalances

"Global rebalancing" has been one of the Administration's major international economic policy goals for the past four years. In June 2012, the G-20 nations reiterated their support for this goal, calling upon countries with current account deficits to boost national savings, consistent with evolving economic conditions, and for countries with large current account surpluses to strengthen domestic demand and move toward greater exchange rate flexibility.

A country's current account consists predominantly of the difference between its exports and its imports of goods and services (other factors include net income on overseas assets and unilateral transfers such as foreign aid and remittances). A current account deficit occurs when a country's absorption (the sum of domestic consumption, investment and government spending) exceeds its production. In this case, it must either borrow from abroad or sell foreign assets. Current account deficits in certain countries correspond to current account surpluses in others. A current account deficit may indicate that a country offers sound investment opportunities, or it may be caused by investment bubbles or fiscal deficits. Large and persistent current account surpluses can occur when governments intervene in financial markets to prevent market-driven adjustments in interest rates and exchange rates from taking place. While large current account imbalances may not directly cause financial crises, they often indicate underlying dynamics that are unsustainable and thus have historically been important precursors to financial crises (Reinhart and Rogoff 2011).

Before the 2008 crisis, the United States was running a large current account deficit financed by surpluses from creditor nations such as China and Japan, a situation that Federal Reserve Chairman Ben Bernanke referred to as the “global saving glut” (Bernanke 2005). In China, for example, low levels of social insurance and policies designed to encourage excessive saving by firms contributed to large surpluses (Obstfeld 2012). From 2000 to 2007, the U.S. deficit ballooned to more than 5 percent of GDP, while current account surpluses in China, Germany, and Japan grew to 10, 7, and 5 percent of GDP, respectively. Current account deficits in Europe’s periphery reached alarming levels. The surplus countries came to rely on unsustainable growth in net exports to drive their economies. The deficit countries relied on unsustainable growth in household consumption, construction of residential real estate, and government budget deficits for economic growth.

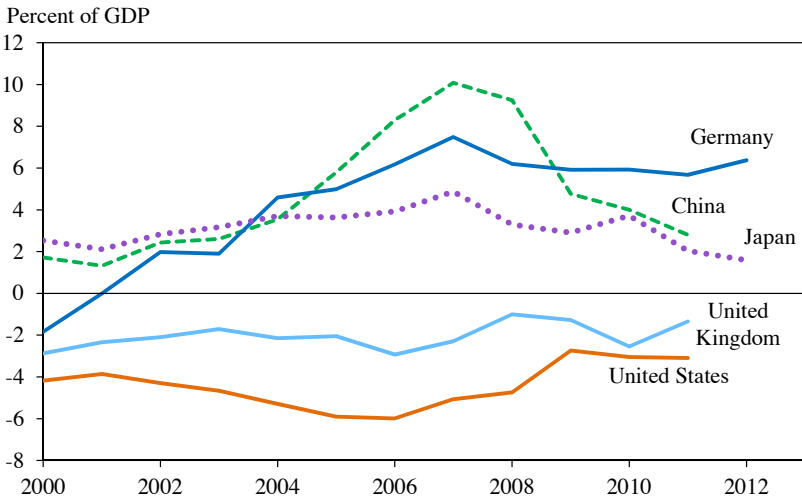
The crisis of 2008 brought about a distinct change in global imbalances: the U.S. current account deficit shrank to 3 percent of GDP in 2009, while current account surpluses in China and Japan dropped as well (Figure 7-3). The Administration, along with the wider international community, continues to press for a more balanced approach to growth in the world. Greater reliance on consumption, and less on exports and investment, will provide those countries with large current account surpluses with a more sustainable source of growth over the long run. The members of the G-20 have committed to moving more quickly to market-determined exchange rate systems and exchange rates that reflect underlying fundamentals.

TRADE AND THE MANUFACTURING SECTOR

Although the Nation’s current account balance has improved substantially since its record deficit level of \$800.6 billion in 2006, much of this improvement is due to growing surpluses of trade in services and income on investments, while the trade deficit in goods appears to have increased since the recovery from the recession began in the third quarter of 2009 (Figure 7-4). However, the increase in the goods deficit conceals the fact that from 2010 to 2012, exports of manufactures grew at a faster rate (22.0 percent) than imports (19.3 percent). The goods deficit has widened only because manufacturing imports began the period at a much higher level.

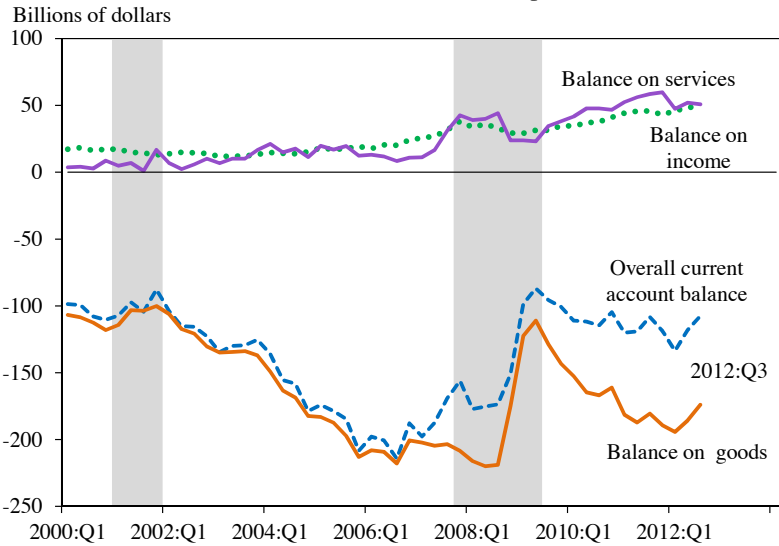
U.S. trade in manufactures, both imports and exports, has grown rapidly in recent decades primarily as a result of reductions in trade costs, the rapid growth of emerging markets, and the increasing international specialization of supply chains. Technological improvements in transportation and communication have lowered trade costs, as have reductions of tariffs and other trade barriers both at home and abroad. Emerging markets,

Figure 7-3
Current Account Balance by Country, 2000–2011



Note: Germany and Japan current account data available through 2012, U.S., U.K., and China data only available through 2011.
Source: Deutsche Bundesbank; Bank of Japan; United Kingdom Office for National Statistics; U.S. Department of Commerce, Bureau of Economic Analysis; Chinese State Administration of Foreign Exchange.

Figure 7-4
U.S. Current Account Balance and its Components, 2000–2012



Note: Shading denotes recession.
Source: U.S. Department of Commerce, Bureau of Economic Analysis.

particularly China, have grown at an impressive pace in the past decade and have moved aggressively into manufacturing. In the past 10 years, China's share of world manufacturing exports has grown from 5 percent to over 15 percent. Finally, improvements in information technology (IT) have led to the emergence of global value chains, in which tasks and components involved in production are allocated across countries to take advantage of differences in costs, skills, technology, or proximity to the market (Data Watch 7-1). As a result, trade in intermediate goods and services has grown rapidly. The effects of these forces on the U.S. economy have been profound.

Trade and Productivity

Greater openness of world markets enhances the productivity of U.S. industries and firms. Research finds that the U.S. industries experiencing the largest declines in tariffs have exhibited some of the strongest productivity gains. Bernard, Jensen, and Schott (2006) find that falling trade costs led individual U.S. manufacturing plants that already export to increase their shipments abroad, high-productivity nonexporters to become more likely to export, and low-productivity plants to become more likely to exit the domestic market. Together, these effects result in a reallocation of economic activity toward high-productivity firms, thereby raising overall industry productivity. Studies of numerous other countries show similar gains in industry productivity through trade-induced reallocation across firms.

Evidence also shows that decreases in industry-level trade costs lead to within-firm productivity growth. Lileeva and Trefler (2010), for example, found that the Canada-U.S. Free Trade Agreement caused increases in labor productivity, product innovation, and adoption rates for advanced manufacturing technologies among Canadian exporters. Pierce (2011) showed that U.S. tariffs lower the productivity of U.S. firms, in part by slowing the rate at which older, less-productive production lines are phased out in favor of new product lines. Several other studies have found that trade liberalization increases research and development (R&D) and technology upgrading.

Firm productivity and exports also can be enhanced when trade liberalization lowers the cost, and expands the variety, of imported intermediate inputs.¹ Although much of the evidence for this channel comes from studies of middle- and low-income countries, Amiti and Wei (2009) found that

¹ Houseman et al. (2011) concluded that the decline in input prices associated with shifts to lower-cost producers may not be fully captured by statistical agencies, and as a result the data may suggest that manufacturers are producing more goods with fewer inputs, when in fact the real value of those inputs has simply been understated. After attempting to correct for this so-called "offshoring bias," the authors concluded that average annual manufacturing productivity growth would be between 6 percent and 14 percent lower, and value-added growth would be 7 percent to 18 percent lower than official estimates between 1997 and 2007.

imports of service inputs, such as telecommunications, insurance, finance, computing, and other business services, have a significant positive effect on manufacturing productivity in the United States. In a similar vein, Francois and Woerz (2008) showed that, across advanced economies, increased import penetration in producer services results in better export performance, particularly by skill- and technology-intensive industries.

GROWTH OF TRADED SERVICES

The United States is currently the world's largest services exporter. In 2011, U.S. exports of private services exceeded \$600 billion, and sales through foreign affiliates exceeded \$1 trillion. Taken together, international sales of services by U.S. companies are on the order of \$1.7 trillion a year, an amount equal to approximately 11 percent of U.S. GDP. Services trade accounts for approximately 30 percent of U.S. exports and 15 percent of U.S. imports. A study by the Organisation for Economic Co-operation and Development and the World Trade Organization (WTO), however, estimated that nearly 60 percent of the value of U.S. exports can be attributed to the service sector. This estimate takes into account both direct services exports, as measured in official trade statistics, and indirect services exports embodied as intermediate inputs in goods exports. The main traded service categories are "other private services" (which includes items such as business, professional, and technical services, insurance services, and financial services), royalties and license fees, and private travel.

Falling costs of travel, communication, and information technology have increased the opportunities for trade in services. Over the past 10 years, services imports and exports both almost doubled. Much of the growth was accounted for by increased trade in business services, especially digitally enabled services, defined by the Bureau of Economic Analysis (BEA) as those for which digital information and communications technologies (ICT) significantly facilitate cross-border trade. According to the BEA, from 1998 to 2010, exports of all ICT-enabled services grew at an annual rate of 9 percent to reach 61 percent of total U.S. services exports, up from 45 percent in 1998. Imports of ICT-enabled services grew at an annual rate of 10 percent, rising to 56 percent of U.S. services imports, from 34 percent. Increases in business, professional, and technical services contributed most to the overall increase in ICT-enabled services trade. The private services surplus was \$162 billion in 2010; of this, \$116 billion resulted from a trade surplus in ICT-enabled services.

Some estimates suggest that about 70 percent of employment in business services is in industries potentially subject to international competition

Data Watch 7-1: Implications of Global Value Chains for the Measurement of Trade Flows

While international trade and foreign direct investment have been growing rapidly for decades, recent advances in information technology along with improving industrial capabilities in emerging markets have made it profitable to segment production processes and relocate them throughout the world, creating global value chains. This shift has made it increasingly difficult to interpret international trade statistics. In the past, it was safe to assume that most if not all of the value of a traded product was created in the country that exported it. Thus, a country's industrial capabilities could be judged by the content of exports, trade rules could be tied to gross levels of trade in specific products, and exports could be directly related to domestic job creation. With the rise of global value chains, however, one can no longer be sure how much of the value of a product or service is added in the country that declares it as an export. For example, in 2009, between one-third to one-half of the total value of exports of transport parts and equipment from most major producing countries originated in a different country. Similar patterns emerge in the electronics sector: in China and Japan, the world's largest exporters of electronic goods in 2009, the foreign content of electronics exports was about 40 percent. In Mexico, the share was over 60 percent (OECD 2013).

Official trade statistics are measured in gross terms—the amount the importer pays the exporter for the good. That approach is appropriate for adding up a country's balance of payments made to, and received from, the rest of the world. To determine how much value an exporter adds to a good or service traded internationally, however, one must subtract the value of intermediate inputs supplied by other countries, including the country importing it. Removing these intermediate flows from exports gives a measure of “value-added” trade.

Measuring value-added trade reveals a number of surprising facts. For example, according to Koopman et al. (2010), in 2004 about 8 percent of total gross U.S. imports was U.S. value added in the form of U.S. intermediate inputs used in foreign production. About 25 percent of the value of U.S. gross exports was made up of imported intermediate inputs; however, about half the value of those inputs originated in the United States, so only about 13 percent of U.S. gross exports were not U.S. value added. By contrast, about 37 percent of China's exports were value added somewhere else. Johnson and Noguera (2012) estimate that, while still large, the U.S.-China imbalance is approximately 40 percent smaller when measured on a value-added basis, and the U.S.-Japan imbalance is approximately 33 percent higher. They also show that domestic value

added in gross exports for the world as a whole has fallen dramatically in recent years, indicating the rise of global value chains.

The Organisation for Economic Co-operation and Development and the World Trade Organization recently released a new data set containing estimates of value-added trade for 40 countries and 18 industries for 2005, 2008, and 2009 (OECD 2013). Future releases will see an expansion in the number of countries, industries, and time periods, dating back to 1995. This effort represents a substantial improvement in the availability of information about global value chains.

(Jensen 2009). There is a widespread concern that, as business services become more tradable over time, these jobs will be lost to import competition from low-wage, labor-abundant countries. However, given the abundance of capital and highly skilled workers in the United States, the most successful U.S. export industries tend to be those that employ capital and skilled labor most intensively. In the services sector, the largest export industries—integrated record production and distribution, software publishers, web search portals, satellite telecommunications, and motion picture and video production—also pay the highest wages (Jensen 2011). The fact that the United States has consistently maintained a positive trade balance in services, and high-skill business services in particular, suggests that the world is willing to pay for the high-quality, skill-intensive services that the United States provides.

Despite America's apparent comparative advantage in tradable high-skill, high-wage business services, export activity on the part of these firms faces significant impediments. About 25 percent of manufacturing plants export; in business services, only about 5 percent of businesses export (Jensen 2009). While differences in language and culture may pose greater barriers to trade in services than in manufactures, services also are differentially affected by an array of government-imposed impediments, such as restrictions on foreign ownership and partnership arrangements; nationality, residency, or local presence requirements for service providers; licensing and accreditation requirements; and limitations on the scope of activities. Hufbauer, Schott, and Wong (2010) have estimated that the aggregate level of barriers to services imports in emerging markets such as China, India, and Indonesia is equivalent to a tariff on these imports of more than 60 percent. After decades of liberalization through trade agreements, tariffs in that range are relatively rare for goods. Recent research also has found that restrictions on foreign acquisitions, discrimination in licensing, restrictions on the repatriation of earnings, and inadequate legal recourse all

have a significant negative effect on investment inflows into services sectors (Borchert, Gootiiz, and Mattoo 2012). The Administration has undertaken several important initiatives to address these impediments, discussed further below.

TRADE POLICY

World trade collapsed in 2009; the recovery, while substantial, is being held back by slow global growth. In response, in his 2010 State of the Union address, the President launched the National Export Initiative (NEI), an Administration-wide effort to double U.S. exports in support of up to 2 million additional American jobs by the end of 2014. Under the NEI, the Administration continues to focus on improving trade advocacy and export promotion efforts, removing or reducing barriers to U.S. exports of goods and services, increasing access to credit, robustly enforcing trade rules, and pursuing policies at the global level to promote strong, sustainable, and balanced growth. In 2012, U.S. exports of goods and services amounted to \$2.2 trillion, an all-time record, despite challenging global economic conditions.

Longer-term trends affecting trade include the rapid growth in emerging markets and the rise of global value chains. The growth of emerging markets makes them the most likely source of future U.S. export growth. The International Monetary Fund estimates that developing countries will account for more than three-quarters of the economic growth of all U.S. trading partners in the next five years. It is vital, therefore, that the United States secure from these countries more open and transparent market access for U.S. firms. In addition, because of their growing involvement in global value chains, U.S. firms are increasingly exposed to policies and barriers behind the borders, not just at the borders, of countries around the world. Countries vary widely in their use of subsidies, export taxes, support for state-owned enterprises, financial market restrictions, ownership restrictions on foreign direct investment, government procurement, and enforcement of intellectual property rights, to name a few.

To address these challenges, the United States has pursued a robust program of enforcement of existing rules through WTO dispute settlement and a negotiating strategy for new agreements aimed at securing deep commitments with like-minded countries on a broad array of trade-related measures. The overriding goal of these latter initiatives, whether multilateral, plurilateral or bilateral, is to open markets and set standards for conduct that eventually shape the standards adopted by the global trading system. The United States continues to adhere strongly to the precept that trade liberalization at the multilateral level holds the highest potential for securing

Box 7-1: Small Businesses and the NEI

Small businesses, defined by the Small Business Administration as independent businesses having 500 or fewer employees, account for more than half of nonfarm private GDP. These 27.5 million businesses, many of them family-owned companies, are a key part of the U.S. economy. However, they are far less likely to export or to use inputs from abroad than are larger firms. In a world of imperfect financial markets, the costs of financing export operations pose an especially high barrier for smaller firms, because they are more likely to need external financing to undertake export transactions. Small businesses also can find it more difficult to learn about foreign markets and to overcome foreign trade barriers and unfair trade practices compared with larger firms.

Through the NEI, the Obama Administration is committed to helping small businesses overcome such barriers to exporting. The NEI calls for a national outreach campaign both to identify small businesses that may be able to increase their exports and to raise awareness generally among the nation's small businesses about export opportunities. The NEI provides training and other technical assistance to help small businesses prepare to become exporters, sets up pilot programs to match small businesses with export intermediaries, and outlines several measures to support small businesses once they begin to export to new markets. Thanks in part to the efforts of the NEI, a record of nearly 287,000 U.S. small and medium-size enterprises (SME) exported in 2010 (98 percent of all exporters), a total increase of more than 16,600 SMEs over 2009. The goal is to increase the national base of SME exporters by 50,000 by 2017.

wide-ranging market-opening outcomes. The United States will continue to complement its multilateral approaches with discussions at the plurilateral and bilateral levels to build consensus for, and commitments to, market-opening agreements critical to the growth of trade-supported jobs.

In 2012, market-opening trade agreements with Korea, Colombia, and Panama entered into force. The United States is currently negotiating with 10 partners in the Trans-Pacific Partnership to tackle 21st-century trade issues in the Asia-Pacific region. In January 2013, the President announced plans to negotiate toward an international services agreement with an initial group of 20 trading partners, aimed at removing impediments to global services trade. In February, the Administration announced its intention to launch negotiations for a comprehensive Transatlantic Trade and Investment Partnership with the 27-member European Union, aimed at expanding what is already the world's largest economic relationship,

accounting for one-third of total goods and services trade and nearly half of global economic output.

In the WTO, the United States is advocating new approaches that can offer opportunities for agreements on issues that have been part of the Doha Development Agenda, such as trade facilitation, and in areas that are outside the Doha agenda, such as expansion of the Information Technology Agreement. The United States also welcomed Russia's membership in the WTO, a membership that will provide significant commercial opportunities for U.S. exporters.

Finally, the Administration aims to address potential disruptions that trade can cause to domestic labor markets. The Federal Government's Trade Adjustment Assistance (TAA) program is designed to assist workers whose jobs have been lost to import competition or threatened by trade-related circumstances. The program provides financial, job training, and relocation assistance to newly unemployed workers displaced by trade, with the goal of making it easier for these workers to develop new skills and then enter more vibrant sectors of the economy. In fiscal year 2012, the TAA program certified 1,131 petitions that permitted more than 81,000 workers to participate in the program.

BUILDING U.S. COMPETITIVENESS

The Nation must construct an economy based on a solid foundation of educating, innovating, and building better infrastructure, a foundation that can be strengthened in both manufacturing and in services. A hallmark of the Administration's policies is the recognition that there are many spillovers within and between economic sectors and regions. Thus, well-chosen policies reinforce each other both to increase competitiveness and to provide more middle-class jobs. For example, grants that assist workers and firms that invest in apprenticeships benefit other firms in their industry and region that can draw on a pool of skilled labor. Because of the myriad benefits that arise from having a broad base of innovative workers, economic growth and fairness go hand in hand. That is, Administration policies are built around the idea that the country does best when everyone does their fair share and plays by the same rules.

Manufacturing

While manufacturing employment has declined as a share of the workforce for the past 50 years, the absolute number of manufacturing jobs was relatively constant at about 18 million from 1965 until 2000. However, starting in 2000, manufacturing employment dropped precipitously. The

United States lost 3.5 million manufacturing jobs in the 7 years before the Great Recession and then lost another 2.3 million during the recession.

This job loss has serious implications for the economy. First, the decline in manufacturing employment significantly reduced the number of middle-class jobs, especially for less educated workers. Wages and salaries in manufacturing are 7 percent higher than in the rest of the economy, and total hourly compensation (which includes the value of benefits such as health care and pensions) is 13 percent higher. After controlling for factors such as education, age, gender, race, union status, and location, the compensation premium for manufacturing rises above 14 percent. A 2012 Department of Commerce study comparing manufacturing workers to those in other private industries finds similar results (ESA 2012). Workers of all education levels and occupations in manufacturing—from assemblers to design engineers—earn more than their peers in other industries, showing manufacturing’s value in maintaining a strong American middle class. Second, growing evidence shows that manufacturing production has positive spillover impacts on other parts of the economy. Spillovers occur when one company’s activities benefit other businesses even though the latter did not pay for them (Economic Application Box 7-1). As discussed below, the loss of manufacturing activity has reduced these benefits.

Spillovers Between Manufacturing Production and Innovation

The argument is sometimes made that loss of U.S. production jobs is part of an efficient global division of labor in which the United States focuses on higher-end innovative activity and cedes lower-skill production activity to other countries. However, this argument does not always hold.

First, production need not be a low-skill activity. Some of our main competitors in manufacturing employ more highly skilled production workers and pay significantly higher wages than do companies in the United States. Countries such as Germany and Denmark compete through business and government support for “high-road” production practices, in which workers participate in innovation as well as production. The higher wages paid to these highly-skilled workers are offset by their higher productivity (Helper, Krueger, and Wial 2012).

Despite its private and social benefits, however, companies do not always adopt the high-road strategy because successful implementation requires them to adopt a whole suite of interrelated practices. For example, a study of U.S. valve producers found that more-efficient firms adopted advanced information technology, while simultaneously changing their product strategy (to produce more customized valves), their operations strategy (using their new IT capability to reduce setup times, run times,

Economics Application Box 7-1: Agglomeration Economies and Spillovers Across Regions

Businesses are not spread out evenly across space but tend to clump together, or “agglomerate.” As explained in Alfred Marshall’s *Principles of Economics* (1890), firms group together because proximity allows them to share workers, ideas, and other inputs more easily. Numerous studies have found that establishments located near other establishments, whether in related industries (a cluster) or in diverse industries (urbanization), tend to be more productive (Rosenthal and Strange 2003).

A cluster is a geographically concentrated ecosystem of customers, suppliers, trade associations, and labor unions that do business with one another. These groups have collective capabilities. Like the common pasture in medieval English villages on which the livestock owned by many residents grazed, this “industrial commons” allows firms, particularly small firms, to nourish their technological capability using shared assets. These common resources help to accelerate innovation and commercialization. For example, firms located near each other can share equipment needed for testing, and can more easily meet face-to-face, which improves knowledge-sharing and trust-building. Service firms (such as those in the Los Angeles film industry)—not just manufacturers—benefit from agglomeration.

In some cases, both the grouping of firms and the higher productivity may be the result of a third factor. For example, several firms may each decide to locate near a natural harbor; their lower transport costs may increase their productivity, but at least initially there may be little benefit due to the proximity of other firms. Still, research suggests that the entry of a large factory to a community tends to increase the productivity of surrounding firms (Greenstone, Hornbeck, and Moretti 2010). Other research indicates that the benefits of R&D investment are primarily local, suggesting that ideas—and by extension productivity—are improved in geographically concentrated industries. Jaffe (1989) uses data from patent citations to show that inventors disproportionately build on the work of nearby scientists. Branstetter (2001) argues that the benefits of R&D appear to be primarily confined to the borders of the investing country.

Because the benefits of a shared asset spill over to help even firms that did not contribute to paying for it, and because profit-maximizing firms will not value this benefit to other firms in making their plans, market forces are unlikely to provide enough investment in shared assets. A case thus can be made for government to subsidize such activity. For example, government support for key local assets such as a university or

apprenticeship program may help a cluster to develop through improved access to specialized R&D and skilled workers. Other successful clusters have emerged from a mix of firm- and government-led actions such as the cluster of computer and technology companies in Silicon Valley.

Once lost, these ecosystems can be hard to recreate. For any single firm, the decision to move production elsewhere may make economic sense. But that decision affects suppliers and the local talent pool, making it easier for the next firm to leave and harder for the next firm considering coming there to say yes. Conversely, new industries can build on foundations left by older clusters. For example, Optimus, a Pittsburgh biofuels startup, uses a 100-year-old union training program to reduce the costs of training technicians to service its innovative equipment—and to demonstrate its product. Supported by the new federal Workforce Innovation Fund, a partnership of startups, unions, and Carnegie Mellon University is creating apprenticeship programs that build on this model of shared training and product demonstration assets.

and inspection times), and human resource policies (employing workers with more problem-solving skills and using more teamwork). The success of changes in one area depended on success in other areas. For example, customizing products was not profitable without reductions in the time required to change over to making a new product, something made possible both by improved IT capabilities and the improved use of this capability by the empowered workers. Conversely, the IT and training investments often did not pay off in firms that did not customize their products (Bartel, Ichniowski, and Shaw 2007).

Second, there may be spillovers from production to innovation. Thus, while Moretti (2012) shows that the positive wage spillovers associated with innovation jobs are greater than those associated with manufacturing jobs, it may not be possible to keep the innovation jobs in the long run if production jobs are lost. For example, when production in consumer electronics migrated to Asia decades ago, the United States lost the potential to compete for follow-on innovations and subsequent production in flat-panel displays, LED lighting, and advanced batteries (Pisano and Shih 2012). Making products exposes engineers to the problems and the capabilities of existing technology, generating ideas both for improving processes and for applying a given technology to new markets. Losing this exposure makes it harder to come up with innovative ideas.²

² The U.S. auto industry could have ended up on this path, but as a result of the Administration's rescue of General Motors and Chrysler, and investments in innovation, the industry is growing and healthy.

Even when American firms do maintain a technological edge, their operations may be less profitable than if they were part of a vibrant industrial commons. E-ink, a Massachusetts firm now owned by its Taiwanese business partner, designed the electronic “ink” that represents the Kindle’s key innovative element. Because the firm was located so far away from its Asian suppliers, its engineers were not able to interact on a daily basis with other firms in the supply chain that were inventing new products, making it hard for the firm to find new markets for its inks. The situation is similar throughout the rest of the LCD flat-panel-display industry. Harvard Business School Professor Willy Shih estimates that, because the United States has offshored much of its production capacity in this industry, U.S. firms capture only about 24 percent of the profits from U.S. Kindle sales (Pisano and Shih 2012).

Rise of Global Supply Chains

In recent decades, the structure of manufacturing has changed dramatically. Instead of vertically-integrated firms that obtain most of their inputs from within national borders, lead firms now purchase many inputs from outside suppliers around the world. Most manufacturing production today occurs in layers of specialized, smaller firms that provide components for final assembly and sale by large lead firms or original equipment manufacturers (OEMs). For example, CEA calculations estimate that in the United States in 1988, there were fewer than two employees in firms making automotive parts for every automaker employee. By 2010, parts companies had four employees for every automaker employee (Data Watch 7-2).

Because of this vertical dis-integration, almost all large U.S. manufacturers now depend on their suppliers for well over half their value-added. In most cases, these suppliers are shared with other firms. This arrangement has some advantages—for example, it may create opportunities for cross-fertilization. But shared supply chains also have a weakness in that firms’ incentives to invest in their suppliers are reduced. If an OEM helps its supplier develop a new technology, the supplier’s other customers—often the OEM’s rivals—will enjoy these improvements without having contributed. As a result, OEMs have less incentive to make such investments and may be more inclined to shift costs and risks down the supply chain to smaller suppliers. These practices, called “free-riding” by economists, improve the larger firms’ financial performance in the short run but may weaken the entire supply chain in the long run.

Data Watch 7-2: Measuring Supply Chains

The potential collapse of General Motors and Chrysler in December 2008 underscored the importance of understanding the operation of supply chains. Because the large auto manufacturers all relied on a common set of suppliers, a failure of any of the major players could have threatened the viability of the entire industry.

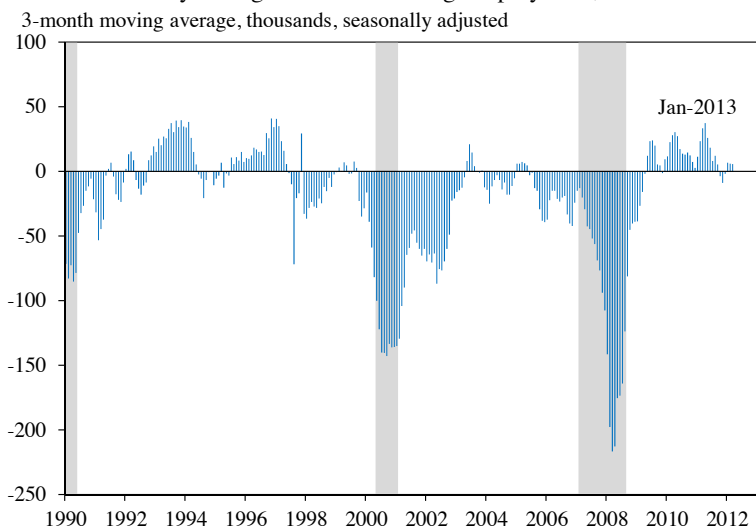
Measuring the size of this supply chain presents a statistical challenge. U.S. government statistical agencies assign each worksite in the United States to a single industry on the basis of its primary activity. Two North American Industrial Classification System (NAICS) codes are commonly used for reporting sales and employment in the auto industry—NAICS 3363 (motor vehicle parts manufacturing) and NAICS 3362 (motor vehicle body manufacturing)—but these codes do not capture all workplaces involved in the auto supply chain. First, many firms that make auto parts are not classified as serving the automotive market, but rather by the materials or the technology they use, such as “plastics product manufacturing” or “forging and stamping.” Similarly, the NAICS codes do not link tooling producers to their customer industry. Second, the worksites that focus on nonproduction activities such as research or management are not categorized with the industry they serve; rather, they are grouped together in “Professional, Scientific, and Technical Services.” In addition, contract workers in auto parts plants are assigned to the temporary help industry, rather than to motor vehicle parts production.

Using survey data for late 2010, the Council of Economic Advisers has estimated the number of jobs in the auto supply chain based on a more inclusive definition that includes all of this activity. While the conventional definition of auto parts showed employment of 553,860 for this period, the CEA estimate was more than 1 million. The high degree of interdependence in the auto industry made the 2008 financial crisis particularly perilous, because contagion from financial troubles at one firm in the industry easily could have spread to others. The CEA’s larger estimates of the size of the auto supply sector imply this risk was greater than previously realized.

Prospects for U.S. Manufacturing

The U.S. economy gained nearly 500,000 manufacturing jobs between January 2010 and January 2013, after losing more than 5 million manufacturing jobs in the previous decade (Figure 7-5). These job gains represent not just a cyclical recovery but also potentially the start of a longer-term trend toward the “in-sourcing” of manufacturing. About three-quarters of the

Figure 7-5
Monthly Change in Manufacturing Employment, 1990–2012



Note: Shading denotes recession.

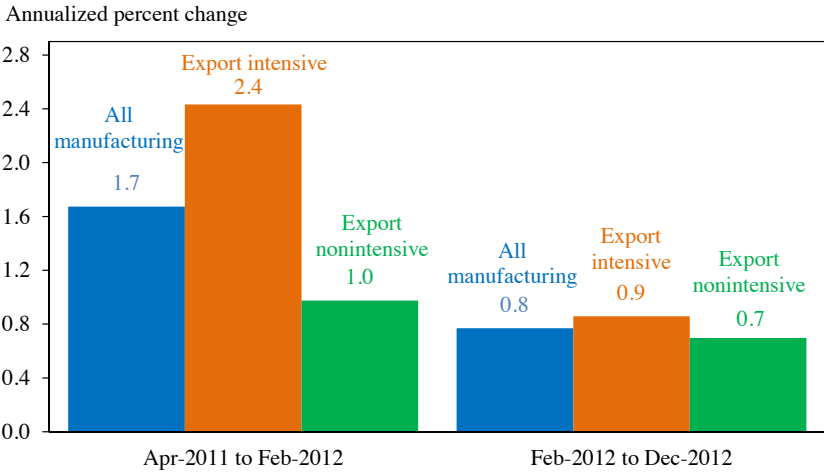
Source: Bureau of Labor Statistics, Current Employment Statistics; CEA calculations.

increase in U.S. manufacturing shipments since the end of the recession is due to an increase in domestic demand and inventory restocking; the other quarter comes from an increase in exports. Because of the extensive spillover benefits associated with a vibrant manufacturing sector, this recovery has positive implications for long-term growth of the economy as a whole.

Since early 2012, diminished impetus from several key drivers of growth, as described in Chapter 2, has challenged the growth of U.S. manufacturing. First and most important, export growth has begun to slow, reflecting the slower pace of global growth. Second, after surging during the past few years, demand by domestic business for new capital equipment appears to have slowed. Third, firms finally appear to have replenished their inventories to levels more consistent with demand after heavily depleting stockpiles during the recession.

As noted above, “export-intensive” industries have played a large role in the recovery of manufacturing since the end of the recession. From April 2011 through February 2012, industries that export at least 20 percent of their shipments accounted for 57 percent of manufacturing output and 51 percent of manufacturing employment. During this period, manufacturing production and hiring rose faster in these industries than in others. Since February 2012, however, manufacturing production and hiring has slowed,

Figure 7-6
 Employment in Export Intensive and Export Nonintensive
 Manufacturing Industries, 2011–2012



Note: Export-intensive manufacturing industries are three-digit NAICS industries in which exports as a share of total shipments exceeded 19.9 percent, the average for the manufacturing sector as a whole in 2011. Export-intensive industries accounted for about 57 percent of manufacturing output in 2011. Source: Federal Reserve Board, G.17; CEA calculations.

with nearly two-thirds of the slowdown in output and 90 percent of the slowdown in hiring occurring in export-intensive industries (Figure 7-6).

Other trends, however, suggest a brightening outlook for manufacturing. The continued recovery in the housing sector should lead to greater demand for construction supplies, and the order backlog for commercial aircraft is substantial. In addition, although production of nondurable goods like food and beverage products, plastics and rubber, and chemicals has lagged that of durable goods so far during the recovery, it should accelerate as consumer and business demand becomes more broad-based. Indeed, with capacity utilization now close to its historical average, and weekly work hours elevated above it, even a moderate rise in demand could quickly translate into a pickup in production, hiring, and investment.

Prospects for In-sourcing. Several recent reports have concluded that manufacturers increasingly view the United States as a favorable production location.³ Factors cited for this change include trends in unit labor costs, expansion of domestic energy resources such as wind and natural gas, and greater recognition of the “hidden costs” of moving production abroad.

Over the past decade, U.S. unit labor costs—the cost of labor required to produce one unit of output—have grown much more slowly than in other

³ Academic literature often refers to this phenomenon of work returning to the United States from abroad as “on-shoring.”

developed nations (Figure 7-7). U.S. hourly compensation in manufacturing has grown somewhat over the past decade, but rapid productivity growth has reduced the cost of producing a unit of manufactured output in the United States. Meanwhile, when measured in U.S. dollars, the cost of manufacturing a unit of output in key trading partners has risen, in some cases substantially.

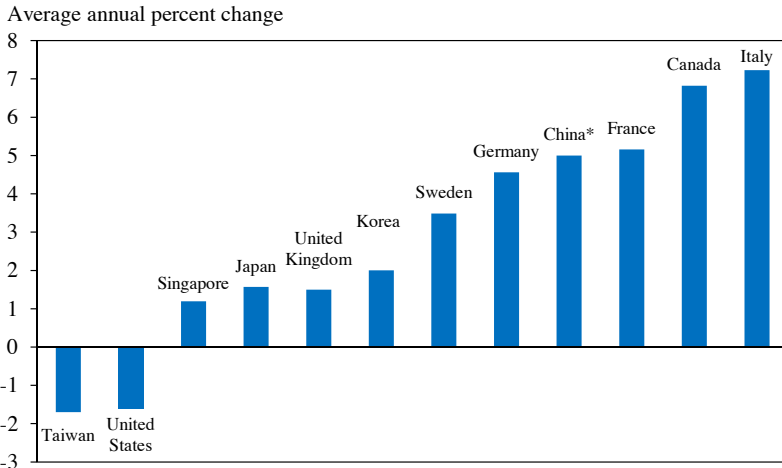
Several recent studies by management consultants argue that these trends create the potential for a “manufacturing renaissance” in the United States and estimate that the result could be 1 million or more new manufacturing jobs by 2015 (Boston Consulting Group 2012; Inch and Dutta 2012; Simchi-Levi et al. 2011). A key assumption of most of these analyses is that U.S. manufacturing wages continue to be stagnant. Thus, while these trends provide favorable tailwinds for U.S. manufacturing, they will not by themselves lead to sustainable prosperity. In contrast, the “high road” model discussed above also yields favorably low unit labor costs—but does so by increasing productivity, rather than by reducing wages.

Reassessing the Costs of Moving Production Abroad. Based on their experience during the past decade, American firms now have a greater understanding of the magnitudes of hard-to-measure costs attributable to the risks and complexities of operating far from home. Initially, “many manufacturers who had offshored their operations likely did so without a complete understanding of the ‘total costs,’ and thus, the total cost of offshoring was considerably higher than initially thought,” according to a study of 287 manufacturers conducted by Accenture (Ferreira and Heilala 2011).

Compared with operating in the United States, setting up a supply chain in China and learning to communicate with suppliers requires many long trips and much time of top executives—time that could be spent on introducing new products or processes at home. There is also greater risk from a long supply chain, because shipping prices and delivery times can vary enormously. In addition, U.S. companies are coming to value more highly the advantages that come from having production, innovation, and design close together. For example, Intel manufactures its most advanced chips in the United States, near where they are designed (Helper, Krueger, and Wial 2012).

To take another example, Sleek Audio, a start-up manufacturer with innovative headphone technology, initially went to China for all of its production. After years of flying several times a year to China, and an incident in which millions of dollars of product had to be scrapped because of poor quality, the owners moved manufacturing to the United States. They began to work with a local manufacturer with experience in making precision products for the military, Dynamic Innovation, located within 10 minutes of Sleek Audio in Florida. In the course of redesigning the product for more

Figure 7-7
Change in Manufacturing Unit Labor Costs, 2003–2011



Note: Average annual percent change for China represents 2003–2009 data. The BLS does not track manufacturing unit labor costs for China, and many economists have expressed concern over the reliability of recent Chinese economic statistics (Wan 2013).

Source: Bureau of Labor Statistics, International Comparisons of Manufacturing Productivity and Unit Labor Costs; Ceglowski and Golub (2011).

automated U.S. production, the firms dramatically improved product quality, replacing hand-welded plastic panels with robot-welded aluminum ones that also significantly improved sound quality (winning an award from the Consumer Electronics Association). The price was higher in the United States, but the improved product features and ability to customize design more than offset this cost (Prasso 2011; Koerner 2011; Hackel 2011).

Numerous other collaborations that bring together different forms of expertise are keeping jobs in the United States. Many of these collaborations bring together shopfloor workers with a concrete understanding of plant conditions and engineers with deep technical knowledge. For example, management and members of the machinists’ union at an Ashland, Kentucky chemical plant have worked together for two decades to improve both product quality and working conditions (Davidson 2013).

Productivity in Services

The service sector encompasses widely varied activities, ranging from house cleaning to data entry to investment advice. Despite this diversity, some common trends can be observed—trends similar in many respects to those seen in manufacturing.

As noted, many services are becoming increasingly globalized; as in manufacturing, there is also less vertical integration. In the hotel industry,

for example, it is now common for a lead firm such as Marriott to create and advertise an overall brand, while the day-to-day oversight of the workforce is handled by a separate hotel operating company, and staffing may be organized by a temporary-services firm (Weil 2011).

As in manufacturing, there are wide variations in performance across firms within individual service industries. In retail trade, for example, in the late 1980s and 1990s, Wal-Mart's real value-added per worker was more than 40 percent higher than that of other general merchandise retailers (Johnson 2002). Trucks with on-board computers had 13 percent higher capacity utilization than trucks without them (Hubbard 2003). Much of the productivity improvement realized by high-productivity service firms has been associated with investments in information technology (Bosworth and Triplett 2007). Obtaining these performance improvements often involves investing simultaneously in information technology and in complementary organizational changes, as in the valve case described earlier. For example, retailers who can quickly integrate data on consumers' purchases with their systems for replenishing inventory are more productive than those who cannot (Wailgum 2007; Zhu 2004).

Finally, although the use of IT and other innovations in services has led to large productivity gains, the benefits of these gains have not been evenly shared. Although IT adoption has led to increased pay and autonomy for workers who interpret information, such as financial advisers, it has led to reduced employment and pay for jobs that can be described in rules that a computer can follow—jobs such as routine claims processing that require moderate skills and that once paid middle-class wages (Levy and Murnane 2005).

CREATING AN ECONOMY BUILT TO LAST

A hallmark of the Administration's policies to reverse the middle-class jobs deficit is leveraging positive spillovers to raise labor demand and productivity, and to create new industries and products, while equipping American workers with the tools they need to succeed in a modern economy. The President's blueprint for creating an economy built to last aims to promote synergies within local areas and among companies that add to growth in investment and good jobs.

The following discussion uses manufacturing as an example to illustrate these policies, but their usefulness is not limited to manufacturing. For example, the U.S. Department of Agriculture has for decades helped an industry made up largely of small producers remain internationally competitive, by providing an integrated set of services with large spillover benefits

to farmers and rural communities: land-grant universities for research and training; cooperative extension agents that help to diffuse practices shown by this research to be effective; access to capital (in part through the department's own credit agencies); and programs that help farmers set up cooperatives to achieve economies of scale in purchasing and marketing.

Strengthening Competitiveness: The Manufacturing Example

A competitive U.S. manufacturing sector is a key to the Administration's vision of a U.S. economy that is innovative and competitive and that provides good jobs. Rising costs abroad coupled with sustained domestic productivity gains make the United States an increasingly attractive location for investment. But good policy is also needed to fully capture the benefits of this underlying trend and encourage investment in middle-class jobs in the United States. The view that a strong "industrial commons" is important for competitiveness, but also subject to market failure, suggests that government policy should promote the creation of, and access to, these shared resources. Thus, the Administration's policies work to promote the type of manufacturing that builds innovative capability and raises living standards.

The Administration's proposals help in several ways to strengthen these types of manufacturing. First, general policies to improve productivity and wages (such as the policies to support education, health care, and a clean environment discussed in other chapters of this *Report*) are essential to building long-term economic competitiveness.

Second, the Administration has made trade policy a priority. These policies have particular importance in manufacturing. Some argue that much of the steep manufacturing employment decline in the early 2000s was caused by a sharp rise in imports from emerging nations, especially China (Autor, Dorn, and Hanson, forthcoming; Pierce and Schott 2012). In some cases, producers exporting from these nations have benefited from policies that gave them an unfair advantage relative to manufacturers in the United States. In response to these policies, the Obama Administration, in addition to pursuing the broader trade policies discussed earlier in the chapter, launched an Interagency Trade Enforcement Center charged with protecting American companies from unfair trade competition.

Third, the Administration has championed tax credits to reduce the costs of socially beneficial actions (such as R&D). These policies aim to reward firms for providing lasting social benefits. In contrast, a "smoke stack-chasing" approach tries to lure individual firms to a particular location using tax abatements and other incentives. In general, these subsidies are awarded to firms for undertaking activity that would have occurred anyway; the subsidy simply influences the location of the activity. Thus these

individual incentives generally do not lead to net investment (Chirinko and Wilson 2008). State and local governments provide more than \$80 billion a year on such incentives, including \$25 billion to manufacturers (Story 2012).

Finally, the Administration has championed sector-specific policies that use the convening power of government to promote coordination and investment. Productive ecosystems that promote innovation and good jobs require strong partnerships among industry stakeholders, including business, government, unions, trade associations, and universities. A sectoral approach to encouraging the development of such ecosystems (in manufacturing and in other industries) can help to build simultaneously both the demand for and the supply of shared assets, such as trained workers, competent customers engaged in innovation, suppliers of components, and standards for equipment design. The supply-chain analysis above suggests that policy may be needed to address two key issues: free-rider problems that lead to underinvestment and information barriers that hinder coordination among stakeholders in a supply chain.

The Administration's flagship manufacturing initiative is a \$1 billion National Network for Manufacturing Innovation fund that will create up to 15 institutes to help ensure that new technology bridges the gaps from invention to product development to manufacturing at scale. Leveraging the assets of a particular region, each institute will bring together universities, companies, and government to co-invest in the development of new technologies that spill over to provide general benefits to a region's manufacturing base, rather than just a single company. Institutes will build workforce skills and business capabilities in large and small companies. A pilot center, the National Additive Manufacturing Innovation Institute, opened last year in Youngstown, Ohio. The universities and firms participating in the institute matched the initial \$30 million in federal funding with \$40 million of their own.

As discussed, many firms have been slow to adopt even well-known improved practices and thus lack the capability to participate in such innovative endeavors. To help these firms upgrade their operations, the Administration has proposed increased funding for the Manufacturing Extension Partnership program, which provides a range of business services to small manufacturers.

The Administration also has proposed initiatives to replenish the technology pipeline, by increasing funding for advanced manufacturing R&D. Despite tightening budgets, the Administration has emphasized the importance of funding industrially relevant, advanced manufacturing technologies such as advanced materials, smart manufacturing, and robotics.

CONCLUSION

The United States economy benefits from being closely linked with other nations through trade, investment, and financial flows. The Nation's economic recovery and long-run growth prospects depend in large part on U.S. businesses being able to compete in an open, fair and growing world economy. The Federal government is determined to do its part to facilitate this outcome. Sound macroeconomic policies that aim at strong, balanced, and sustainable growth are but one element. Another is a trade policy aimed at the maintenance of open, competitive markets, compliance with WTO obligations, and leadership in the multilateral trading system. The United States pursues a policy that supports jobs through trade, enforces trade rules, bolsters international trade relationships, and partners with developing countries to fight poverty and expand opportunities.

Creating and maintaining a competitive industry or region requires continuous investment by firms, workers, and communities. These investments are often more productive if others are also investing. In a number of cases (especially in manufacturing), investments in these productive ecosystems were allowed to lapse, affecting both competitiveness and job quality. Administration policy has helped to reverse these lapses, leading to domestic economic growth and increased exports.

Many of the policies discussed in connection with manufacturing also benefit consumers and workers in the services sector, such as policies that promote access to education. In addition, sector-specific policies for services are discussed in other chapters of this *Report*. For example, as discussed in Chapter 5, the administration has convened the Partnership for Patients, which brings together hospitals and clinics in a community to work to reduce errors in patient care.

While much remains to be done, these policies have laid a foundation for competitiveness and prosperity for both the United States and its trading partners.

