
Offshoring in the Service Sector: Economic Impact and Policy Issues

By C. Alan Garner

The United States continues to run an international trade surplus in services, but business stories frequently appear about service-sector jobs moving offshore. Many Americans are particularly concerned about the loss of skilled, well-paid jobs in such fields as computer programming and accounting. These jobs seemed relatively secure at a time when many manufacturing jobs were being lost to import competition. Similarly, telephone call centers, once viewed as an economic development opportunity in some areas, increasingly are moving to low-wage countries, such as India and the Philippines. Reflecting this growing concern, some members of Congress and state legislators have focused attention on the offshoring of service jobs and production, even introducing legislation to limit the outsourcing of jobs to other countries.

Offshoring raises many questions for policymakers and the general public. For example, which service jobs will be affected most by import competition? What are the most likely effects of service-sector offshoring on U.S. output, employment, and, most important, our

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standard of living? Is offshoring really a problem that requires restrictive government actions, or are other kinds of policies more appropriate to give Americans the highest possible living standard?

This article examines the economic effects of offshoring and possible policy responses. The first section summarizes recent trends and the outlook for service-sector offshoring. The second section explains the economic, technological, and regulatory factors driving the process and identifies characteristics that make a service job susceptible to offshoring. The third section analyzes the effects of offshoring on U.S. output, employment, and standards of living. The fourth section evaluates various policy options for dealing with the economic challenges created by offshoring. Although the offshoring of service jobs hurts some workers, offshoring should not permanently lower U.S. employment or production. Moreover, the average living standard can benefit over the long run if the nation adopts policies to retrain displaced workers and move them into expanding industries.

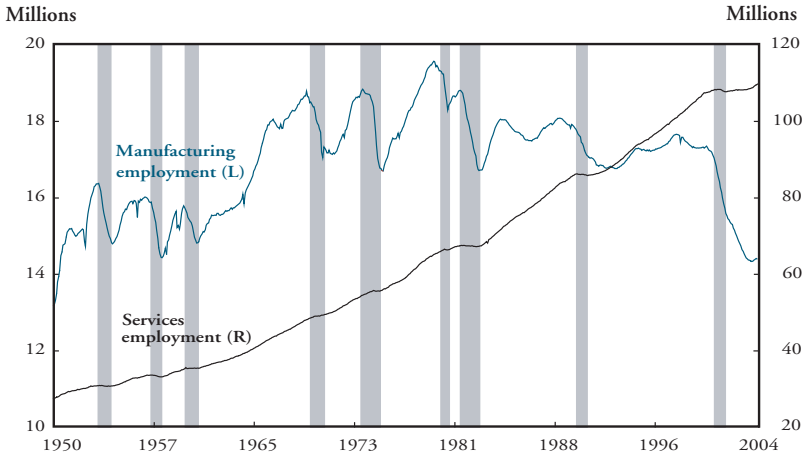
I. RECENT TRENDS AND PROJECTIONS

To judge by the headlines, service-sector jobs have been leaving the United States in large numbers. Reliable information on the offshoring of service jobs and production is rather limited, however. This section examines recent evidence on service-sector offshoring as well as projections for the years ahead. Offshoring of service jobs has actually been smaller than the headlines might suggest, but projections that offshoring will accelerate are plausible, though subject to considerable uncertainty.

Trends in offshoring

The term “offshoring” refers to the relocation of jobs and production to a foreign country. The relocated jobs and production could be at a foreign office of the same multinational company or at a separate company located abroad. In contrast, the term “outsourcing” does not necessarily imply that jobs and production are relocated to another country. Outsourcing of such jobs as janitorial services and payroll

Chart 1
JOB SHIFTS CONCENTRATED IN MANUFACTURING



Note: Shaded areas represent recessions as determined by the National Bureau of Economic Research.

Source: U.S. Department of Labor, Bureau of Labor Statistics

accounting by manufacturing firms to domestic service companies has long been an important factor driving the growth of business services employment.

The loss of service jobs and production caused by offshoring is difficult to measure. Government statistical agencies provide useful measures of international trade in services, which are described in the accompanying box, but there is no official measure of service jobs moved abroad. It is also difficult to determine the impact of offshoring from data on total services employment in the United States. Service-sector jobs have taken much longer to rebound from the 2001 recession than from previous recessions, a phenomenon that some commentators have blamed on offshoring (Chart 1). However, service-sector jobs have held up much better than manufacturing jobs during the current recovery. Also, while some of the recent softness in service-sector jobs may be due to offshoring, other factors, such as rapid productivity growth and the shedding of excess capacity in the telecommunications industry, may have played important roles.¹

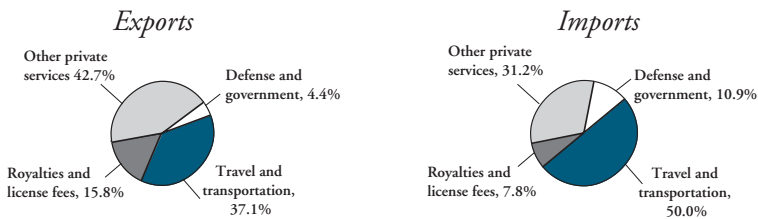
Recent estimates of job losses in the service sector caused by offshoring are small relative to total U.S. employment. For example, McCarthy (2002) estimates that about 103,000 service jobs moved

Box 1

INTERNATIONAL TRADE IN SERVICES

International trade in services covers a wide range of industries and activities (see accompanying charts). Travel and transportation includes travel expenditures, passenger fares, and other transportation, such as freight and port services. Royalties and license fees cover transactions involving patents, copyrights, trademarks, and other intangible proprietary rights to use, produce, or distribute products. Other private services include many of the industries that first come to mind when thinking of services—for example, education, financial services, insurance, telecommunications, and various business and professional services. Finally, government services include transfers under U.S. military sales contracts, direct defense expenditures abroad, and miscellaneous government transactions.

The United States has historically run surpluses in international services trade. In 2003, the nation ran a deficit of \$489 billion in total goods and services trade but ran a surplus of about \$60 billion in services alone. Service exports were \$305 billion, about 30 percent of total U.S. exports, while service imports were \$245 billion, about 16 percent of total imports.

COMPOSITION OF SERVICE EXPORTS
AND IMPORTS, 2003

Source: U.S. Department of Commerce

Table 1

EMPLOYMENT CHANGES IN AT-RISK AND LOW-RISK SERVICE OCCUPATIONS

Occupations	Level in 2000 (millions)	Job loss 2000-2002	Percent job loss 2000-2002
At-risk	14,249,730	-217,840	-1.5
Low-risk	96,441,110	-251,670	-0.3

Notes: At-risk occupations are the same as in Bardhan and Kroll. For additional details, see endnote 3.

Source: Author's calculations using the Occupational and Employment Statistics from the U.S. Bureau of Labor Statistics

offshore in 2000, while Zandi estimates service jobs were lost at a rate of about 75,000 per year from February 2001 to October 2003.² With total U.S. employment at approximately 130 million in January 2004, an annual loss of 100,000 service jobs amounts to less than 0.1 percent of total employment. This pace of offshoring also equals only 5 percent of the average annual gain in nonfarm payroll employment over the last ten years.³

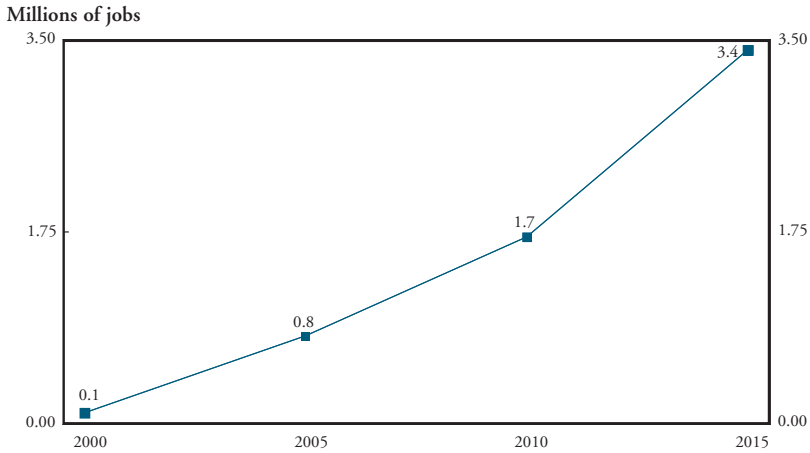
Occupational employment statistics for the United States provide additional evidence that past service-sector offshoring has been small. About 14 million service jobs were at risk of offshoring in 2000, while about 96 million service jobs had a low risk of offshoring (Table 1).⁴ The decline in the at-risk service occupations from 2000 to 2002 was about 218,000 jobs, or roughly 109,000 jobs annually, a relatively small number that is consistent with the estimates of McCarthy or Zandi. In percentage terms, employment in the at-risk occupations fell at a faster rate from 2000 to 2002 than in the low-risk occupations. This faster decline is consistent with offshoring activity, although the decline is consistent with other explanations as well, such as a faster pace of technological change in industries employing the at-risk occupations or greater cyclical sensitivity in these industries. Because offshoring was not the only cause of job loss in the at-risk occupations, the number of jobs moved offshore was undoubtedly less than 109,000 jobs annually.

Such estimates, however, may understate or overstate the total impact of offshoring on employment. The estimates may understate the total impact because domestic companies with expanding worldwide employment may have located many of their newly created jobs abroad even when they did not reduce their U.S. employment. Some of these foreign jobs might provide services to U.S. customers and potentially could have been located in the United States. Conversely, the estimates may overstate the total job loss from offshoring if the foreign outsourcing of some support jobs prevents the loss of other domestic jobs by keeping U.S. firms competitive in world markets. For example, cost reductions from offshoring IT jobs might help a U.S. financial services company win foreign contracts, preserving many professional and support jobs in the United States.

An evaluation of recent projections

Although the loss of service jobs to foreign locations has been relatively small so far, the pace of offshoring is likely to be higher in the years ahead. McCarthy (2004) finds that the pace of offshoring activity has temporarily increased to about 200,000 to 300,000 jobs annually.⁵ In part, the pace of service-sector offshoring has accelerated because of greater awareness of the potential cost savings from offshoring and increased capabilities of Indian and U.S. vendors. The pace of offshoring is projected to slow somewhat later in this decade before rising to about 340,000 jobs per year from 2010 to 2015 (Chart 2). McCarthy predicts a cumulative job loss by 2015 of 3.4 million jobs and an associated wage loss of about \$151 billion.

Alternative calculations by Goldman, Sachs & Company imply that McCarthy's projections may be somewhat conservative (Tilton). One approach looks at the share of service jobs that could be offshored on a sector-by-sector basis using information from industry experts. The second takes the service industry as a whole and estimates the share of each occupation that could be offshored. The Goldman, Sachs researchers find that, depending on the underlying assumptions, up to 6 million service jobs could be offshored over the next decade.⁶ This

*Chart 2***TOTAL NUMBER OF U.S. JOBS MOVING OFFSHORE
2000 TO 2015**

Sources: Estimated number for 2000 is from McCarthy (2002). Projections for 2005, 2010, and 2015 are from McCarthy (2004)

study also finds greater short-run potential for offshoring, concluding that service offshoring could “ramp up to a few hundred thousand jobs per year over the next two to three years.”

Such projections are subject to considerable uncertainty. Of necessity, these studies rely heavily on expert judgment about the prospects for service-sector offshoring. Because service offshoring is such a new phenomenon and is associated with rapid structural changes, projections based on more formal statistical techniques would probably not be any more reliable than expert opinion. In addition, the pace of offshoring might be affected by political events, such as protectionist legislation in the United States or geopolitical events, which are difficult to predict over a 10-to-15 year horizon.

II. WHY ARE SERVICE JOBS MOVING OFFSHORE?

Despite the uncertainty associated with recent estimates of job losses, most observers agree that the trend toward offshoring service-sector production and jobs is likely to continue. A variety of economic,

technological, and regulatory factors are driving this shift in production and jobs. This section will discuss these factors and consider which service-sector jobs are most vulnerable to offshoring in the future.

Economic factors

Lower production costs in foreign countries are a major cause of service-sector offshoring. Although the costs of land and other resources may be cheaper abroad, the main difference between the United States and developing countries is labor costs. There is a large gap in computer programmer wages between the United States and other countries (Table 2). In addition, the cost of benefits such as health insurance and pension contributions is likely to be much higher in the United States.⁷

The true difference in labor costs per unit of output may not be as large as these wage figures suggest, however, because U.S. workers have high average levels of productivity.⁸ High average productivity by U.S. workers reflects our advanced technology and large amounts of capital per worker (Irwin). Such capital includes both physical capital, such as machinery and computers, and human capital, such as skills and knowledge. The cost savings from offshoring also might be reduced if the firm incurs higher transportation and telecommunication costs or management spends more time on service quality and data security. Still, the much lower levels of wages and benefits in developing countries suggest that many services can be produced abroad at lower cost. Certainly many managers in the information technology industry have this perception. A recent survey of 252 managers found that 44 percent ranked reducing or controlling costs as the most important reason for offshoring (King).

The relocation of labor-intensive service activities, such as legal transcription services, to countries with lower labor costs is consistent with economists' basic theory of international trade—comparative advantage. According to this theory, countries like India or China with a relative abundance of unskilled labor should specialize in labor-intensive production. Conversely, the United States and other developed countries with a relative abundance of physical and human capital should specialize in capital-intensive production.

Table 2
**AVERAGE SALARIES OF COMPUTER PROGRAMMERS
(U.S. DOLLARS)**

Country	Salary range
Poland and Hungary	\$4,800 – 8,000
India	\$5,880 – 11,000
Philippines	\$6,564
Malaysia	\$7,200
Russian Federation	\$5,000 – 7,500
China	\$8,952
Canada	\$28,174
Ireland	\$23,000 – 34,000
Israel	\$15,000 – 38,000
United States	\$60,000 – 80,000

Sources: *CIO* magazine, November 2002; Smart Access Survey, Merrill Lynch as reported in Bardhan and Kroll

The recent offshoring of computer programming jobs shows, however, that some developing-country workers are gradually acquiring the human capital needed to be competitive in tasks requiring higher levels of skill and education. The number of highly educated workers has expanded in India and other developing countries, increasing the skills available for many IT tasks, such as routine programming and back-office operations. The high quality of India's universities has contributed to this increase in human capital in areas such as programming and mathematics, although other kinds of human capital, such as project management and product development skills, may be harder to develop through formal education programs.⁹

Technological factors

Although lower production costs abroad are a major reason for service-sector offshoring, the difference in labor costs is not new. Therefore, the recent growth in service-sector offshoring must have been triggered by other factors. Technological advances in computers and telecommunications likely have played an important role.¹⁰ Recent advances in information technology are allowing companies to locate service activities in other countries in much the same way that past advances in transportation and communication allowed manufacturers to outsource goods production abroad.

Sharp declines in shipping costs and long-distance telephone costs during the last century contributed to rapid growth of international merchandise trade. Increasingly, companies were able to locate labor-intensive production processes in whatever country offered the lowest costs along with a favorable business environment. Hummels, Rapoport, and Yi show that world goods production has become more vertically specialized, with countries focusing on different stages of the production process and then shipping intermediate goods to other countries for further processing. For example, a multinational company based in the United States might do most of its marketing and research domestically but produce components in Indonesia and Taiwan with final assembly of the product in Malaysia for sale back to the United States.

Increased vertical specialization now is occurring in the service industries as well. New information and communications technologies, such as fiberoptic cable, personal computers, and the Internet, encourage vertical specialization in service production by lowering communications costs.¹¹ In the past, most services had to be produced near the customer. For many services, such as nursing or hairstyling, direct contact remains necessary. But labor-intensive service production can increasingly be located in regions of the United States or foreign countries with lower labor costs, while creative and management functions may remain at higher-cost locations.

Empirical research also suggests that the spread of new information technologies promotes increased international services trade. Freund and Weinhold find that increased Internet access is related positively to

the growth rate of a country's international services trade. After controlling for GDP and exchange rates, they find that a 10 percent increase in Internet penetration in a foreign country is associated with a 1.7 percentage point increase in the growth of service exports and a 1.1 percentage point gain in the growth of service imports.

Regulatory factors

A third factor that likely contributed to the growth of international services trade in the 1990s was deregulation of the service industries and trade liberalization by both developed and some developing countries. International trade in services includes a broad array of industries, such as financial services, entertainment, transportation, and telecommunications as well as business and professional services. Many of these industries are heavily regulated because of their economic importance and political sensitivity. For example, most countries have limited foreign ownership in telecommunications and broadcasting and have closed their postal services to foreign entry (Hufbauer and Warren).

But over the last decade, many countries have begun to deregulate their domestic service industries or increase the access of foreign service providers (Organization for Economic Cooperation and Development). These efforts to deregulate and liberalize have partly reflected international competitive pressures. Some countries concluded that highly regulated and often overpriced telecommunications firms and utilities raise production costs for other companies, putting them at a competitive disadvantage in world markets. In addition, the realization has grown that inefficient and uncompetitive service firms reduce the living standard of domestic consumers.

As other countries have started to deregulate some industries and liberalize their restrictions on international services trade, developing countries have adopted new technologies at a faster rate. As a result, telecommunications and transportation costs have tended to fall. Such factors have made some foreign countries much more attractive as a potential location for offshoring by U.S. companies.¹²

Which jobs are most vulnerable?

Given the rapid changes in technology and economic structure and the risk of a political backlash against service-sector offshoring, no one can be certain which service jobs will be most subject to foreign competition. Some jobs are unlikely to be outsourced abroad because the work must be performed in the immediate proximity of the customer. Personal service jobs, such as barbers and gardeners, are sure to remain in the United States, as are most jobs in healthcare. But the fact that Indian radiologists can screen x-rays for U.S. patients demonstrates that even some healthcare jobs can be sent offshore.¹³

The preceding discussion of the factors driving service-sector offshoring suggests some characteristics of jobs that are more likely to be outsourced abroad (Table 3). First, consistent with the theory of comparative advantage, U.S. service-sector jobs are more likely to be outsourced abroad if they are part of *labor-intensive* production processes. All other things equal, firms can reduce their costs more by offshoring jobs where labor is a high fraction of production costs. For example, an Internet retailer might manage its main computer servers—a relatively capital-intensive process—in the United States, while more labor-intensive processes, such as writing on-line descriptions of merchandise or correcting billing problems, might be located offshore.

A second important characteristic of jobs that are more likely to be offshored is that they are *information-based*. In the service sector, recent advances in information technology are a key factor shifting the boundaries between traded and nontraded services. As a result, informational factors have a central role in determining which service jobs are most vulnerable to offshoring. This explains why the business process jobs that are being offshored are mostly white-collar, information-based jobs, such as billing and accounting, computer programming, and customer service jobs.¹⁴

A third characteristic that makes jobs more vulnerable to offshoring is that job-related tasks are *codifiable*, meaning the tasks can largely be reduced to a set of rules or instructions that workers can follow routinely. Jobs with this characteristic can be more easily transmitted over fiber optic lines to wherever the instructions can be executed at lowest

Table 3

CHARACTERISTICS OF VULNERABLE JOBS

<i><u>Job characteristic</u></i>	<i><u>Explanation</u></i>
Labor-intensive	Cheaper foreign labor costs mean that jobs are more likely to be offshored if labor makes up a large share of production costs. Labor is a relatively large part of the costs in a telephone call center or legal transcription service.
Information-based	Jobs that collect, manipulate, or organize information are more likely to be offshored because recent technological advances are reducing the cost and increasing the feasibility of producing information services at a remote location. Most business process jobs, such as accounting, billing, and payroll, are information-based.
Codifiable	Jobs that can be reduced to a routine set of instructions can be conducted more easily at a remote location and may require less experience or training. Answering routine customer inquiries can often be reduced to a simple set of instructions.
High-transparency	Services can be performed more easily at a remote location when the information to be exchanged between the customer and the service provider is easy to measure and to verify. Analyzing a company's financial ratios can be offshored more easily than assessing its management skills.

cost. At call centers, for example, employees who make sales calls or conduct telephone surveys can often follow a written script and provide standard answers to frequently asked questions. In contrast, doctors, lawyers, and school teachers must exercise a large amount of judgment in how they deal with complex information, making such jobs more difficult to execute from a remote location.

The preceding characteristics apply largely to the tasks executed by the workers. A fourth characteristic of easily offshored jobs is a high degree of *transparency* in the information to be transmitted between the worker and the customer. When customer information is easily available and verifiable, the transaction can be more readily conducted at a remote location. For example, credit information is easily available on most U.S. households, making it possible to set up a fairly simple rule to determine who is eligible for a new credit card. Such information can be sent abroad and processed wherever the cost is lowest. But many small businesses are more informationally opaque. Berger and others argue that provision of financial services to such businesses may be easier for institutions headquartered in the nation where the services are provided. An offshore banker would find it more difficult to visit a company's management, customers, and suppliers to collect more qualitative information.¹⁵ When customer information is not highly transparent, face-to-face contact may be an important advantage because the buyer and seller can develop higher levels of trust and understanding (Leamer and Storper).

Examination of these characteristics provides some reassurance that, although some U.S. service jobs are vulnerable to offshoring, many others are not. Many back-office functions may be vulnerable to relocation abroad, and continued progress in information technology may gradually extend the range of tasks that can be offshored.¹⁶ However, the difficulty of codifying some tasks and the need for face-to-face contact ensure that the vast majority of high-skilled jobs will remain in the United States.

III. ECONOMIC IMPACT OF OFFSHORING

The offshoring of services is likely to continue, and probably even accelerate in the years ahead, because companies face strong economic incentives to move certain productive activities to cheaper foreign locations. Moreover, technological advances and deregulation have expanded the kinds of activities that can be located abroad. Many Americans are naturally concerned that offshoring may reduce U.S. output and employment. However, other important issues include the impact of offshoring on the average living standard and the distribution of income.

Long-run effects on output and employment

Economic theory suggests that international trade will not reduce U.S. output or employment over the long run, and, in fact, such trade will likely have positive long-run effects. The movement of service jobs to a foreign location does not permanently reduce domestic output or employment. In the long run, real GDP is determined by the nation's productive resources, such as the size of the labor force and the amount of physical capital, and by technology. If the economy is operating below its potential output as determined by these factors, wages and prices can adjust to eliminate imbalances and redirect labor and other resources to their best uses. These adjustments may take a long time, however, if prices and wages change sluggishly. As a result, monetary or fiscal policy can be eased to stimulate the demand for domestically produced goods and services.¹⁷ Easier monetary policy can stimulate interest-sensitive private spending, such as residential investment or consumer purchases of durable goods. More stimulative fiscal policy may raise government purchases of goods and services directly or encourage private spending through lower taxes or higher transfer payments.

Exchange rate adjustments can also play an important role in keeping the economy operating at its long-run potential output. If offshoring or some other factor causes the United States to run a trade deficit, the foreign exchange value of the dollar may come under downward pressure. A lower value for the dollar tends to increase the dollar

price of imported goods and services, making U.S. consumers and businesses more reluctant to buy from abroad. Dollar depreciation also tends to make domestically produced goods and services more competitive in foreign markets, generating additional output and employment in the United States.

Over the long term, offshoring also may produce new export opportunities for U.S. companies by encouraging more rapid growth in developing countries, such as China and India. In international services trade, the United States is highly competitive in such industries as entertainment, financial services, tourism, and advanced medical services. Wilson and Purushothaman project that China will have the world's largest economy by 2050, and India will have the world's third largest economy (after the United States). As countries' incomes per person rise, spending on services increases as a share of GDP, potentially creating new demand for U.S. service exports. Although these long-run opportunities may offer little consolation to workers currently displaced by import competition, such projections suggest the United States can remain a leader in international services trade.

Short-run effects on employment

Although service-sector offshoring will not reduce U.S. employment over the long run, a faster pace of offshoring may have short-run employment effects. Job losses in sectors experiencing rapid offshoring may require the reallocation of labor from the offshoring sectors to other industries that are creating domestic jobs. Jobs losses due to offshoring are likely to be permanent in the sense that the workers will not be recalled to a similar position with that company. Workers whose jobs have been permanently lost are more likely to move to another state or switch occupations to find new employment. As a result, they may be unemployed longer than the average job loser, and they may experience greater long-term income losses.¹⁸

Research on displaced manufacturing workers shows the costs of trade-related job losses vary substantially depending on the characteristics of individual workers. Kletzer found that displaced manufacturing workers experienced earnings losses averaging 12 percent upon reemployment. In comparison, displaced nonmanufacturing workers had

average earnings losses of just under 4 percent. But the reemployment prospects of manufacturing workers depended heavily on the individual workers' characteristics. Younger and more-educated workers had greater success in finding new jobs. Older, less-educated workers with long tenures in their job were unemployed longer or, if reemployed, were more likely to experience earnings losses exceeding 30 percent.

The reemployment prospects of recently displaced IT workers may be relatively good compared with displaced manufacturing workers. It is unclear to what extent the findings for manufacturing workers carry over to service workers. But to the extent that these findings do apply, displaced IT workers may have better reemployment prospects because they tend to be younger and better educated. Reemployment may still require costly job search and long-term earnings losses for some computer programmers or other IT workers whose specific skills are no longer needed domestically.¹⁹ However, even these individuals often possess more general computer skills that may improve their job prospects.

The living standard

The most basic concern about service-sector offshoring, however, is its effect on the U.S. living standard. In discussing the living standard, it is useful to distinguish between the average real income of the U.S. population (measured in terms of the goods and services people can purchase) and the distribution of income across persons. Economic theory suggests that offshoring, like other increases in international trade, is likely to raise the average real income of U.S. citizens. Service-sector offshoring is likely to lower the cost of some services to consumers simply because it reduces firms' production costs, and in a highly competitive economy much of those cost savings will be passed on to consumers.²⁰ To the extent that businesses keep those cost savings as higher profits, firms may expand their investment in U.S. plant and equipment or increase dividend payments to their predominantly U.S. shareholders. For these gains by U.S. citizens to be maintained over the long run, U.S. exports will eventually have to rise enough to pay for the

increased imports, and the labor released by offshoring will have to be redeployed to other sectors in which the United States has a comparative advantage.

Moreover, increased international trade in services may raise U.S. productivity growth over the long run. International trade shifts resources from sectors where U.S. workers are comparatively less efficient to sectors where they are comparatively more efficient. The U.S. comparative advantage is likely to be in industries employing large amounts of physical and human capital per worker, factors that increase labor productivity. As a result, U.S. labor is likely to be shifted toward industries with higher real output per worker.²¹ (A different issue is whether offshoring leads to mismeasurement of productivity growth. This issue is discussed in the accompanying box.) In addition, foreign competition puts pressure on U.S. firms to innovate by developing new products, improving their management techniques, and so forth. Many empirical studies find that more open economies tend to have faster productivity growth (Edwards).

Offshoring could also facilitate greater IT investment in the future. Some economists argue that the offshoring of IT hardware production helped drive down the costs of high-technology goods and speeded the adoption of new technologies, raising U.S. productivity growth in the late 1990s. A similar process now may be under way in computer software and services (Mann). To the extent that foreign production of computer software and services lowers costs, adoption of these technologies will likely expand further in healthcare, construction, and other services, categories that have lagged in productivity growth.

But economists have long realized that the living standards of some workers and their families can be hurt by free trade even if average real income per person improves. Computer programmers might, for example, be displaced from high-paying jobs when companies offshore some of their programming to India. In principle, the government could enact policies to redistribute some of the overall economic gain to workers displaced by import competition, leaving them better off than before, but such redistributions often do not take place in practice.

The U.S. income distribution appears to have become more unequal in the 1990s, with highly educated workers gaining relative to those with less human capital. However, most research finds that

*Box 2***EFFECTS OF OFFSHORING ON MEASURED PRODUCTIVITY GROWTH**

How does offshoring affect the measurement of U.S. labor productivity? Some commentators have argued that recent productivity growth is overstated because of rising offshore production. According to this view, a software company might relocate programming jobs to India but continue to book software sales from its U.S. office. In this example, the company's domestic output may appear to remain the same while domestic employment goes down, increasing measured output per U.S. worker.

Conceptually, the U.S. national income accounts are constructed in a way that prevents this type of overstatement of domestic productivity. Computer programming performed abroad is a service input that is subtracted from the value of goods and services sold in calculating U.S. GDP. Thus, the net value produced domestically goes down through offshoring in addition to domestic employment, leaving productivity correctly measured.

In principle, measurement errors in service imports might result in either overstatement or understatement of U.S. productivity growth. Many international transactions may not be measured correctly, as evidenced by the large errors and omissions component of the international accounts. The prices of international service transactions may be hard to determine accurately, particularly when the transactions occur between foreign and domestic affiliates of the same company rather than being traded between unrelated firms in the market.

However, even if the national accounts were missing large amounts of service-sector offshoring, recent U.S. productivity growth would still appear far too rapid to be explained by such mismeasurement (DeLong, Schultze). If measured service imports were too low by \$100 billion and this missing component developed over the last two years, U.S. productivity growth would be overstated by only 0.4 percent per year. Such a gain would explain only a small part of the rapid U.S. productivity growth over that period.

import competition and offshoring have been minor causes of growing income inequality.²² Technological advances, such as computers and other information technology, were probably the main reason for growing inequality. Employers have demanded more-educated workers, who could more easily master new technologies.

The effects of service-sector offshoring on the U.S. income distribution in the years ahead will not necessarily match the experience of the 1990s. Some of the computer programming and other technical jobs that are being offshored require higher-than-average skill levels and pay above-average wages. Other offshored jobs, such as routine back-office tasks and some call-center jobs, involve lower skill levels and below-average wages. Given the uncertainties about which type of job will be affected the most by future offshoring, the effect on the U.S. income distribution is difficult to predict. But it is certainly possible that offshoring could continue to make the income distribution less equal if foreign competition disproportionately hurts less-educated service workers and if more-educated workers can shift quickly to other high value-added jobs.

In summary, service-sector offshoring may cause temporary dislocations as some workers are displaced by more efficient service providers in other countries, but domestic output and employment should not be lowered permanently. Moreover, increased international trade in services is likely to raise the average U.S. living standard over the long run, although the possibility cannot be ruled out that service-sector offshoring will make the nation's income distribution less equal.

IV. ISSUES FOR U.S. POLICYMAKERS

Although there are sound reasons to believe that service-sector offshoring ultimately can improve the average U.S. living standard, the short-run dislocations and the reduced long-run prospects facing some workers make offshoring a growing political issue. Policymakers are coming under increasing pressure to “do something” about the issue. Indeed, policymakers should be proactive in several areas related to international services trade, but poorly conceived policy actions might do more harm than good. This section evaluates various policy responses to service-sector offshoring.

Macroeconomic policy

In the face of import competition, maintaining aggregate U.S. output and employment equal to potential over the long run is largely a matter of macroeconomic policies. As noted earlier, in the long run, proper macroeconomic policies can help to keep U.S. output growing at a sustainable rate with low inflation. Monetary and fiscal policies influence the overall demand for goods and services, and exchange rate adjustments alter the competitiveness of domestic products relative to those produced abroad. Monetary or fiscal policy instruments must be set with the overall economy in mind, however, and the overall economy reflects such factors as rapid technological change and cyclical demand fluctuations as well as offshoring.

But rapid structural change—of which offshoring is a part—may create more uncertainty for policymakers about the degree of slack in the economy and the proper settings for policy instruments. For example, Silvia argues that globalization and rapid productivity growth have caused past statistical relationships between real GDP growth and employment growth to break down. And a faster pace of job restructuring may raise the economy's equilibrium unemployment rate, making it harder to use unemployment as a measure of cyclical slack and, therefore, as a guide to setting monetary and fiscal policies. Kohn notes that it may not be possible to isolate the structural factors from the cyclical factors with much confidence until the economy comes much closer to full employment.

Trade policy

As service-sector offshoring has grown, policymakers have come under increased pressure to restrict service imports. For example, the state of New Jersey required a computer-service contractor to relocate an 11-employee help center to Camden from Bombay at an extra cost to the state of nearly \$1 million (Schroeder and Aeppel). Moreover, a provision in a spending bill signed in early 2004 prohibited the federal government from awarding certain contracts to private companies that would perform the work overseas (Schneider). Although this provision was little noticed domestically and affects few contracts, the measure aroused fears of U.S. protectionism in India.

Economic research finds that protectionism is a costly way to preserve U.S. jobs. For example, Francois, Arce, Reinert, and Flynn estimate that protection of U.S. coastal shipping has cost Americans between \$200,000 and \$387,000 annually in reduced national income per job protected, while Hufbauer and Goodrich calculate that the recently revoked safeguards for the U.S. steel industry caused a net loss of jobs because of layoffs by steel-consuming industries. When a domestic industry is unlikely to regain its international competitiveness, a better option is to adopt policies that ease the reallocation of labor and capital to industries with stronger competitive positions. Because U.S. capital markets are already quite flexible, policymakers need to focus primarily on labor reallocation.

Although current laws provide assistance to manufacturing workers displaced by international trade, some economists advocate expanding and redirecting such programs. For example, Kletzer and Litan propose wage insurance for displaced workers as opposed to the current system, which emphasizes extended unemployment benefits. Under their proposal, wage insurance would reimburse eligible workers for some fraction of their wage loss, but the reimbursement would be paid only when the workers are reemployed. Such a system would provide stronger incentives for workers to take a new job rather than remaining unemployed and would emphasize on-the-job learning instead of training programs. Displaced workers would also receive subsidies for health insurance while unemployed. Although some older manufacturing workers became eligible in 2003 for the Alternative Trade Adjustment Assistance Program, which incorporates some of these features, white-collar workers and those under the age of 50 are not eligible for such assistance. With service offshoring likely to grow in importance, policymakers could consider extending adjustment assistance to displaced service-sector employees.

Another area where U.S. policymakers should be proactive is international trade negotiations to reduce foreign barriers to services trade and protect the intellectual property of U.S. companies. Although service-sector deregulation is contributing to increased offshoring, many foreign service industries remain highly regulated (Hufbauer and Warren). Trade negotiations can help assure access to foreign markets for efficient U.S. service companies. In addition, U.S. service compa-

nies must have adequate protection for their copyrights, patents, and other intellectual property, which are an important basis for their international comparative advantage.

Immigration policy

Some observers have also linked service-sector offshoring to U.S. immigration policy. One concern is that temporary foreign workers in the IT industry acquired skills and business contacts during their U.S. stay that facilitated offshoring when those workers returned to their home countries. When computer programmers and other technology workers were in short supply in the late 1990s, U.S. firms often temporarily hired skilled workers with H-1B visas. In October 2003, the annual quota for such visas declined to 65,000 workers from a limit of 195,000 workers in the previous three years.

Temporary immigration of highly skilled workers may have various economic effects. Increased temporary immigration in the late 1990s may have held down the wages of some skilled U.S. workers. But fluctuations in the number of temporary immigrants also may cushion U.S. employees against sharp downturns in demand because temporary workers often return to their home countries if they lose their employment in the United States.

Although temporary workers in the IT industry may carry technical knowledge back to their home countries, any assessment of immigration policies also must recognize that skilled immigrants provide important benefits to U.S. companies. Craig Barrett, the chief executive of Intel, has been quoted as saying that shortages of skilled engineering graduates in the United States are more likely to drive jobs abroad than the presence of immigrant workers. Policymakers must be careful not to choke off the flow of well-educated workers who are needed to run innovative, knowledge-based service companies.

Education and research

To further improve the U.S. living standard, policymakers must ensure that the nation has highly educated workers of its own and a fertile research environment. Recent economic growth has come largely

from new ideas embodied in our human and physical capital rather than increased material input and manual labor (Greenspan). The U.S. comparative advantage in international services trade is based largely on our relative abundance of human capital and our ability to generate new ideas. Currently, however, the United States may not be graduating enough workers with the skills demanded by new technologies. In many service industries, U.S. companies will need more educated and creative workers to maintain their international competitiveness. Policy-makers must, therefore, improve our educational system and enhance training opportunities for workers of all ages.

As developing countries build their human capital and move into higher value-added services, U.S. companies will need to innovate and create new products that can be exported to growing foreign markets. Strong research institutions, such as universities and corporate laboratories, are essential to maintaining a rapid pace of innovation. Such innovation is based not only on new technologies but also on new products and business models that can take full advantage of the technological advances. Specialized institutions, such as venture capital firms and business incubators, play an important role in building internationally competitive industries using new technologies.

State and local policies

Offshoring of service-sector jobs also raises important issues for state and local policymakers. The outsourcing of government support services to foreign locations is one of the main areas where efforts to restrict offshoring have arisen. As the New Jersey example cited earlier makes clear, jobs can be kept at a domestic location, but often at a high cost to taxpayers. Governments choosing this course will have less to spend on other needs unless their citizens are willing to be taxed more.

Offshoring also raises issues for economic development officials. State and local governments sometimes offer large incentives to attract specific businesses or industries to a particular geographic area. A major goal of such incentives is typically to generate new jobs. Because of the recent technological changes that facilitate service-sector offshoring and the uncertainty about which jobs and industries will be affected, development officials should be cautious about targeting incentives to service

industries. Governments often have a hard time predicting which industries will prosper and which will lose in the rapidly changing global economy. A recently attracted telephone call center, for example, might suddenly relocate to another country or the jobs might be replaced by new voice-recognition technologies.²³

As a result, many economists advise against targeting specific industries or companies. Governments should focus on providing basic services, education, and infrastructure that can serve a wide range of industries, while allowing private investors to select specific business opportunities. To the extent, however, that incentives will be targeted to specific industries, development officials should consider whether their target industries may be vulnerable to offshoring. Table 3 can help officials evaluate which industries may feel increased pressures to move jobs offshore.

V. CONCLUSION

Although the offshoring of service-sector jobs is still small relative to the total U.S. job market, offshoring is likely to increase in the future. Many service tasks can be performed abroad more cheaply because of lower foreign labor costs, reduced telecommunications costs, and technological advances that allow more services to be produced at remote locations. Although the offshoring of service jobs displaces some workers, who may experience anxiety and lasting economic losses, offshoring should not permanently lower the nation's employment or production. And, it is likely to improve the average living standard if displaced workers are retrained and moved into new jobs with higher value added.

Although international services trade ultimately can benefit the U.S. standard of living, policymakers should not be complacent. The key, however, is to choose the right policy actions. Laws protecting a particular service industry will likely raise the costs of services to consumers and other businesses, hurting overall welfare. Instead, policymakers should ease the movement of resources from sectors that are losing to international competition toward sectors that are gaining. Improved educational systems, better trade adjustment programs, and international negotiations to open foreign markets and guarantee intel-

lectual property rights are areas where proactive policy can improve national welfare. In addition, sound monetary and fiscal policies can help maintain full employment for U.S. citizens.

ENDNOTES

¹Similarly, the sharp decline in manufacturing employment in Chart 1 should not be attributed solely to import competition and offshoring. Although manufacturing began to decline before the recession, the cyclical downturn and the September 11 terrorist attacks weakened manufacturing. In addition, the decline in manufacturing's share of total employment is part of a long-run trend. Rapid productivity growth has allowed manufacturers to expand their output while reducing employment. Declining factory employment has become a worldwide phenomenon affecting Japan, Brazil, and China as well as the United States (Hilsenrath and Buckman).

²McCarthy's estimates are based on a judgmental analysis of how different occupations would be affected by offshoring. This method will be described in more detail later in the article. Zandi's estimates are based on a simulation of Economy.com's model of the U.S. economy under the assumption that the nonoil trade deficit remained at the \$400 billion level prevailing in early 2001. In the simulation, the economy loses fewer service jobs than actually occurred, with the difference being attributed to offshoring. Zandi notes, however, that the simulation probably overstates job loss caused by offshoring since some of the erosion of the trade deficit probably had nothing to do with offshoring. In addition, it is not clear whether the model fully captures other influences on employment during this period, such as rapid productivity growth or possible overinvestment in the telecommunications industry.

³Nonfarm payroll employment grew by about 1.9 million jobs per year over the last decade. The loss of jobs through offshoring looks even smaller when measured relative to gross job flows. Because there is a high degree of "churn" in the job market with individual workers leaving one job and taking another, gross job flows are much bigger than the net employment change in any given year. Bernanke estimates that about 31 million U.S. jobs are eliminated each year, of which about 15 million are longer-term job losses. Thus, service-sector offshoring would account for less than 1 percent of such losses.

⁴Service occupations were classified as at risk using the categories in Bardhan and Kroll. These include office support occupations, business and financial support occupations, computer and math professionals, paralegals and legal assistants, diagnostic support services, and medical transcriptionists. Low-risk service occupations were calculated by the author as total employment minus workers in farming, construction and extraction, manufacturing, and at-risk services. The calculations used the U.S. Bureau of Labor Statistic's occupational employment statistics. Comparable data are available only for the period from 1999 to 2002.

⁵McCarthy's study considers four main factors affecting the offshoring decision: whether the service is delivered locally, whether necessary skills are available offshore, to what extent technology supports the business process, and whether the process is defined consistently and well documented. Based on these factors, McCarthy assigns a rank from 1 to 5 to each occupation indicating how rapidly jobs are likely to move offshore in the future. For example, for occupational categories ranked at level 2, 1.5 percent of jobs are expected to move offshore by 2005, 3.5 percent by 2010, and 8.0 percent by 2015. The same percentages apply

to all occupational categories with this ranking. These percentages are then applied to 505 service occupations defined by the Bureau of Labor Statistics to compute the number of service jobs that are likely to move offshore.

⁶Bardhan and Kroll also conclude that McCarthy's projections may be too conservative. They do not forecast the number of jobs that will move offshore, but they estimate that offshoring might adversely affect up to 14 million service jobs. The adverse effects could include either relocation of the jobs to another country or downward pressure on the wages and benefits paid by the remaining U.S. jobs.

⁷According to the Bureau of Labor Statistics, benefits represent 27.8 percent of total compensation for full-time employees in service-producing industries. These industries include transportation, communication and public utilities; wholesale and retail trade; finance, insurance, and real estate; and service industries. Part-time workers receive, on average, much lower benefits as a percent of total compensation.

⁸Baily and Solow summarize several studies comparing productivity across countries. They find that in the mid-1990s, labor productivity in Japan was about 70 percent of the U.S. level, while the figures for Korea and Brazil were 36 percent and 42 percent, respectively. However, relative productivity levels varied substantially across industries. For example, Japan had higher productivity than the United States in automobile manufacturing and consumer electronics, but much lower productivity in retailing, food processing, and construction. Although Baily and Solow do not provide evidence for India, it seems likely that India has a much lower average level of labor productivity than the United States, but its information technology industry may come closer to U.S. levels than many other Indian industries.

⁹Some observers report that wages are rising rapidly in India for workers with the highest levels of human capital. One Indian firm, for example, gave 80 percent raises in one year to retain its skilled employees (Maher). But such sharp wage increases may reflect temporary skill shortages associated with the rapid growth in demand for Indian programmers. Over a longer horizon, the supply of skilled Indian IT workers is also likely to grow, helping maintain the cost advantage of the Indian IT industry.

¹⁰The recession and stock market correction also may have accelerated service-sector offshoring by forcing firms to reduce costs to improve their profitability.

¹¹Not only have these new technologies lowered international communications costs, but the dramatic increase in bandwidth has made some information-services offshoring possible that simply would not have been feasible with older technologies. Reliable data on the prices of international bandwidth are difficult to obtain. However, as an illustration, the price of international bandwidth between the United States and Japan fell from \$114,052 per megabit in 1998 to \$10,464 in 2002. Although the prices might be very different for developing nations depending on the market structure of their telecommunications industry, these countries are experiencing similar downward trends. The International Telecommunication Union reports that "the Asia-Pacific region is witnessing an explosion of international Internet bandwidth." Reflecting recent increases in bandwidth, India now has more Internet than voice telephone capacity.

¹²Another issue receiving increased attention is whether the U.S. tax code for multinational corporations encourages offshoring. Multinationals with U.S. headquarters are taxed on their foreign income when this income is repatriated to the United States rather than when it is accrued. Some observers contend that the ability to defer these taxes gives U.S. multinationals an incentive to shift jobs and production abroad (Liesman). However, others argue the corporate tax code for multinationals has complex effects, and that ending the deferral of taxes on foreign income could potentially hurt our economy (Hines). For example, establishing foreign subsidiaries may allow U.S. multinational corporations to secure greater foreign market access for their products. The increased foreign sales could lead, in turn, to additional hiring of highly paid managers and researchers at the companies' U.S. headquarters. Hubbard argues there is growing evidence that "foreign affiliates are in fact complements to domestic investment and employment."

¹³Pollack notes that offshoring of radiological services is actually quite small at this time, and the offshoring of such services is unlikely to grow quickly in the future because of medical licensing requirements. Nevertheless, this example illustrates the power of new information technologies to facilitate service-sector offshoring.

¹⁴Common language is also important in offshoring decisions because language plays a key role in information transmission. Customer service jobs are typically offshored to such countries as India or the Philippines, which have large English-speaking populations. For other tasks, however, common knowledge of a computer programming language or mathematical symbols might be more important than a common spoken language.

¹⁵Such issues are not unique to the financial services industry. For example, many IT firms are still trying to determine which technology services can be offshored effectively and which cannot. Flynn quotes the executive vice president of a consulting firm as saying, "What companies are finding is that offshore can be good for generic, commodity services. Corporate customers have problems very local to their applications and very specific to their companies."

¹⁶For example, improved quality and lower costs for videoconferencing might make it easier to perform less codifiable jobs from abroad. However, jobs that are good candidates for offshoring also may tend to be performed by computers in the future. Advances in voice recognition technology, expert systems, and artificial intelligence may eventually allow computers to handle many customer service jobs and perhaps even routine x-ray screening.

¹⁷The effectiveness of monetary and fiscal policies in an open economy partly depends on the size of the country and its exchange rate system. For a large open economy with flexible exchange rates, such as the United States, both monetary and fiscal policies can stimulate aggregate demand, although their effects may be smaller than in a closed economy (Mankiw).

¹⁸Groshen and Potter argue that various factors, such as technological change, reorganization of production and offshoring, may have caused sectoral reallocation of labor and increased permanent layoffs in recent years. To the extent that sectoral reallocation has an important effect on joblessness, offshoring might raise the economy's equilibrium or "natural" rate of unemployment over the longer run. However, economists do not universally agree that sectoral reallo-

cation is an important cause of joblessness. Rissman finds, for example, that structural shifts across broad industry categories do not adequately explain sluggish employment growth. Moreover, some theories suggest that the natural rate of unemployment depends on relatively stable factors, and that fluctuations in the natural rate are unlikely to contribute much to observed fluctuations in the unemployment rate (Hall).

¹⁹For some IT workers, the boom in technology spending in the late 1990s and the scarcity of particular programming skills may have raised some programmers' wages to levels that were unsustainable over the long term even without the expanded offshoring of IT jobs. Such workers may have earned temporary rents that would have disappeared over time as the high wages encouraged more U.S. workers to acquire the new computer skills. In addition, the fall in technology spending may have reduced the demand for such workers and their wage rates independently of the growth in offshoring.

²⁰In addition, offshoring may sometimes improve product quality. An example is faster delivery of a service because of time-zone differences between the United States and an offshore processing center. One provider of Internet financial services, E-Loan, offers some customers the opportunity to choose whether their loan application is processed in India or the United States. Customers choosing India receive faster processing, although it is not clear that the faster processing is due solely to the time-zone difference. Most customers choose to have their application processed abroad, suggesting customers value the faster processing time.

²¹Gordon provides a simple numerical example of how offshoring can increase a firm's labor productivity. However, Gordon also argues that offshoring has been only a minor cause of the recent surge in U.S. productivity, and Sichel points out that the links between offshoring and productivity growth are much more complicated than Gordon's simple example suggests.

²²See Cline and Irwin for a summary of the evidence. In addition, the wages of workers with less human capital may have been depressed by competition for jobs from an increased flow of immigrants. Borjas, Freeman, and Katz find the wages of college graduates rose 21 percent relative to those of high school graduates from 1980 to 1995, but they estimate that international trade and immigration accounted for only 10 percent of this change.

²³Krueger notes that prediction of job growth is difficult because the labor market is constantly changing. A quarter of all workers today are in occupations that were not even listed in the Census Bureau's occupation codes in 1967. That being the case, this article will not attempt to predict where the new jobs will be created. However, there are many areas where the growth might come. An aging world population may create many healthcare jobs, while biotechnology, nanotechnology, and alternative energy sources are sometimes identified as important emerging technologies. Some observers believe that many new IT jobs will be created, but these may be in different areas and require different human capital than the IT jobs that are being offshored. The difficulty in predicting growth in demand for particular occupations should not lead to pessimism about the economy's overall ability to generate jobs.

REFERENCES

- Baily, Martin Neil, and Robert M. Solow. 2001. "International Productivity Comparisons Built from the Firm Level," *Journal of Economic Perspectives*, Summer.
- Bardhan, Ashok Deo, and Cynthia A. Kroll. 2003. "The New Wave of Outsourcing," *Research Report*, Fisher Center for Real Estate and Urban Economics, University of California at Berkeley, Fall.
- Berger, Allen N., Qinglei Dai, Steven Ongena, and David C. Smith. 2002. "To What Extent Will the Banking Industry Be Globalized? A Study of Bank Nationality and Reach in 20 European Nations," Board of Governors of the Federal Reserve System, International Finance Discussion Papers, no. 725, May.
- Bernanke, Ben S. 2004. "Trade and Jobs," speech at the Fuqua School of Business, Duke University, Durham, March 30.
- Borjas, George J., Richard B. Freeman, and Lawrence F. Katz. 1997. "How Much Do Immigration and Trade Affect Labor Market Outcomes?" *Brookings Papers on Economic Activity*, no. 1.
- Cline, William R. 1999. "Trade and Income Distribution: The Debate and New Evidence," Institute for International Economics, *Policy Brief*, no. 99-7, September.
- DeLong, Bradford J. 2003. "Thinking About Puzzling Anomalies in the Flow of Macroeconomic Data." www.jbradforddelong.net/movable_type/2003_archives/002380.html, October 2.
- Edwards, Sebastian. 1998. "Openness, Productivity and Growth: What Do We Really Know?" *Economic Journal*, March.
- E-Loan. 2004. "E-Loan Gives Home Equity Customers the Choice to Participate in Indian Outsourcing Program," PRNewswire-First Call, March 1.
- Flynn, Laurie J. 2003. "Companies Sending Work Abroad Are Learning Cultural Sensitivity—to Their American Customers," *New York Times*, December 8.
- Francois, Joseph, Hugh Arce, Kenneth Reinert and Joseph Flynn. 1996. "Commercial Policy and the Domestic Carrying Trade: A General Equilibrium Assessment of the Jones Act," *Canadian Journal of Economics*, February.
- Freund, Caroline, and Diana Weinhold. 2002. "The Internet and International Trade in Services," *American Economic Review*, May.
- Gordon, Robert J. 2003. "Exploding Productivity Growth: Context, Causes, and Implications," *Brookings Papers on Economic Activity*, no. 2.
- Greenspan, Alan. 2004. "The Critical Role of Education in the Nation's Economy," speech to the Greater Omaha Chamber of Commerce 2004 Annual Meeting, Omaha, February 20.
- Groschen, Erica, and Simon Potter. 2003. "Has Structural Change Contributed to a Jobless Recovery?" Federal Reserve Bank of New York, *Current Issues in Economics and Finance*, August.
- Hall, Robert E. 1979. "A Theory of the Natural Unemployment Rate and the Duration of Employment," *Journal of Monetary Economics*, April.

- Hilsenrath, Jon E., and Rebecca Buckman. 2003. "Factory Employment Is Falling World-Wide—Study of 20 Big Economies Finds 22 Million Jobs Lost; Even China Shows Decline," *Wall Street Journal*, October 20.
- Hines, James R. 1999. "The Case Against Deferral: A Deferential Reconsideration," *National Tax Journal*, September.
- Hubbard, Glenn. 2002. "Tax Policy and International Competitiveness," speech to the International Tax Policy Forum, Washington, December 9.
- Hufbauer, Gary, and Tony Warren. 1999. "The Globalization of Services: What Has Happened? What Are the Implications?" Institute for International Economics, Working Paper no. 99-12, October.
- Hufbauer, Gary Clyde, and Ben Goodrich. 2003. "Next Move in Steel: Revocation or Retaliation?" Institute for International Economics, *International Economics Policy Briefs*, no. PB03-10, October.
- Hummels, David, Dana Rapoport, and Kei-Mu Yi. 1998. "Vertical Specialization and the Changing Nature of World Trade," Federal Reserve Bank of New York, *Economic Policy Review*, June.
- International Telecommunication Union. 2002. "International Internet Bandwidth in Asia-Pacific," *ITU News*, December.
- Irwin, Douglas A. 2002. *Free Trade Under Fire*, Princeton, N.J., Princeton University Press.
- King, Julia. 2003. "IT's Global Itinerary: Offshore Outsourcing Is Inevitable," *Computerworld*, September 15.
- Kletzer, Lori G. 2001. "Measuring the Costs of Trade-Related Job Loss," testimony prepared for the Committee on Finance, United States Senate, July 20.
- Kletzer, Lori G., and Robert E. Litan. 2001. "A Prescription to Relieve Worker Anxiety," Institute for International Economics, *Policy Brief*, no. 01-2, February.
- Kohn, Donald L. 2004. "The United States in the World Economy," speech to the Federal Reserve Bank of Atlanta's Public Policy Dinner, Atlanta, January 7.
- Krueger, Alan. 2003. "Rapid Productivity Growth Probably Did Not Cause Slow Post-Recession Job Growth," *New York Times*, November 13.
- Leamer, Edward E., and Michael Storper. 2001. "The Economic Geography of the Internet Age," *Journal of International Business Studies*, December.
- Liesman, Steve. 2004. "U.S. Tax Code Provisions Encourage Offshore Jobs," *Wall Street Journal Online*, March 12.
- Maher, Kris. 2004. "Offshoring Takes a Growing Toll," *Wall Street Journal*, March 23.
- Mankiw, N. Gregory. 2003. *Macroeconomics*, 5th ed., New York, Worth Publishers.
- Mann, Catherine L. 2003. "Globalization of IT Services and White Collar Jobs: The Next Wave of Productivity Growth," Institute for International Economics, *International Economics Policy Briefs*, no. PB03-11, December.
- McCarthy, John C. 2002. "3.3 Million U.S. Services Jobs to Go Offshore," Forrester Research, *WholeView TechStrategy Research*, November 11.
- McCarthy, John C. 2004. "Near-Term Growth of Offshoring Accelerating," Forrester Research, *Trends*, May 14.

- Organization for Economic Cooperation and Development. 2001. "Open Services Markets Matter," Trade Directorate Report, December 11.
- Pollack, Andrew. 2003. "Who's Reading Your X-Ray?" *New York Times*, November 16.
- Rissman, Ellen R. 2003. "Can Sectoral Labor Reallocation Explain the Jobless Recovery?" Federal Reserve Bank of Chicago, *Chicago Fed Letter*, December.
- Schneider, Greg. 2004. "Anxious About Outsourcing," *Washington Post*, January 31.
- Schroeder, Michael, and Timothy Aepfel. 2003. "Skilled Workers Mount Opposition to Free Trade, Swaying Politicians," *Wall Street Journal*, October 10.
- Schultze, Charles L. 2004. "Offshoring, Import Competition, and the Jobless Recovery," <http://www.brook.edu/views/papers/schultze/20040622.htm>.
- Sichel, Daniel E. 2003. Comments on Robert J. Gordon, "Exploding Productivity Growth: Context, Causes, and Implications," *Brookings Papers on Economic Activity*, no. 2.
- Silvia, John E. 2003. "Growth Without Jobs? A New Style of Economic Recovery in the New Economy," *Wachovia Economic Watch*, August 7.
- Tilton, Andrew. 2003. "Offshoring: Where Have All the Jobs Gone?" Goldman Sachs, *U.S. Economics Analyst*, September 19.
- U.S. Bureau of Labor Statistics. 2003. "Employer Costs for Employee Compensation—September 2003," November 25.
- U.S. Department of Commerce. 2004. "U.S. International Trade in Goods and Services—December 2003," February 13.
- Wilson, Dominic, and Roopa Purushothaman. 2003. "Dreaming with BRICs: The Path to 2050," Goldman Sachs Global Economics Paper no. 99, October 1.
- Zandi, Mark. 2003. "Off-Shoring Threat," corporate.dismal.com/dismal/prof/article.asp?p=1&aid=2460, October 24.

Offshoring – the importing of intermediate materials and services – has expanded rapidly in most industrialized countries and its impact on the labor markets in these countries has been the source of enormous debate in both scholarly and popular circles. That is, every sector is assumed to import inputs of each material and service in the same proportion as its economy-wide use of that input. German input-output data differentiate between domestically purchased inputs and imported inputs, which permits us to calculate a direct measure of sectoral imported input use. They indicate that researchers must be cautious about drawing policy conclusions from estimates using the proxy-based measure of offshoring. [View](#). [Show abstract](#). This article examines the economic effects of offshoring and possible policy responses. The first section summarizes recent trends and the outlook for service-sector offshoring. The second section explains the economic, technological, and regulatory factors driving the process and identifies characteristics that make a service job susceptible to offshoring. Service-sector jobs have taken much longer to rebound from the 2001 recession than from previous recessions, a phenomenon that some commentators have blamed on offshoring (Chart 1). However, service-sector jobs have held up much better than manufacturing jobs during the current recovery. [SUBSCRIBE TODAY!](#)