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Offshore Outsourcing and the Globalization of US Services: Why Now, How Important, and What Policy Implications

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US services are globalizing at a rapid rate, are increasingly in trade surplus, and, through foreign investment and affiliate sales abroad, are deepening the global integration of the US economy. There is even a new term for the phenomenon—"offshoring"—that is, the offshore outsourcing of service activities. While outsourcing is not new—the breakdown of the process of goods production to local and global locations is well advanced—the rapid pace of globalization of services has given new life to the outsourcing term and to the debate about the gains and costs of global engagement of the US economy. What changed to speed up this pace and expand the set of services that can be traded across borders? To what extent is this globalization of services different from or similar to the globalization of goods? How important is globalization of services for US productivity and growth? Do workers, firms, and the US economy face new challenges from this kind of offshore outsourcing? Is there any natural stopping point for globalization of services? Does the globalization of services yield new policy recommendations?

Since global integration of services is just beginning, assessment of its impact on US economic performance necessarily relies on existing research on globalization, which focuses primarily on international trade in

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goods. However, the information technology (IT) sector offers an explicit example of the real and potential gains to the US economy from globalization of both goods and services. This sector is one where the synergies and dynamic interaction between technological and global forces are particularly pronounced and where firms are rapidly changing products and activities, with both positive and negative effects on the US economy.

IT also offers a specific example of the channels through which technological change and globalization affect the US economy. Dramatic price declines for IT hardware come mostly from domestic innovation that supports technological change. But globalization has furthered these price declines. Overall, capital investment in IT responds more than one-for-one with price declines. The resulting widespread (although incomplete) diffusion of IT investment throughout the US economy has transformed business processes, altered workplace practices, and created new products (goods and services). While disruptive, these changes spurred by technological as well as global forces have led to significant macroeconomic gains in terms of productivity, output growth, and employment.

IT hardware was at the root of the first wave of productivity growth and employment gains. Going forward, a second wave of technology-based investment and economywide transformation is possible as technology allows the breaking down of the production process of software and IT services and enables their globalized production, just as the production of IT hardware was so globalized in the 1980s and 1990s. Breaking down the production process and global sourcing will lower prices of software and services, which can help diffuse technology into the sectors that lagged in productivity performance during the 1990s, such as health services. As before, innovation at home to meet the needs of US customers will be the most important factor in driving productivity and job creation, but global sourcing will play an important supporting role.

Because services account for a larger and growing share of the US economy, both productivity gains and adjustment challenges from the technological changes that advance the globalization of services are likely to be greater than has been the case for globalization so far. Policymakers need to more effectively leverage these greater productivity gains that accrue to the US economy as a whole to ameliorate the potentially more widespread job dislocations and skill mismatches that result from the interaction of trade and technological change. Initiatives on international economic policy and domestic labor policies need to be more tightly integrated.

On the international front, empirical research indicates that US exports of services are even more dependent on foreign growth than are US exports of goods. In addition, the share of US exports of services in total exports rises with the level of economic development. Yet the markets for services abroad have been liberalized far less than those for goods. Hence promoting robust growth in markets abroad and focusing trade negotia-

tions on opening those markets are particularly important to ensure that growth in global services markets translates into exports and sales for US producers and gains to the US economy.

Trade and technological change affect the type of skills being demanded by firms in the United States. On the domestic front, a commitment to and funding of new ideas that promote labor-market adjustment are crucial. Otherwise the US economy will not maximize the potential gains of this new globalization of services. Such policies include wage insurance, portability of social insurances, and importantly education and training tax credits built around partnerships between workers and employers along with local educators and governments.

Gaining from globalization of services requires that businesses and workers change what they do. These changes in activities and resource reallocations are a prerequisite for fully enjoying the productivity gains from technological change and globalization. A combined outward-looking and domestic policy effort is needed to maximize the gains and best adapt to the pace of change.

Globalization of Services: How New? How Different?

International trade in services has always existed. Transportation and communications services bridge the physical distance between a buyer and seller of a good. Tourists travel to experience new cultures, students go to school abroad, and temporary immigrant workers send money home. However, in most economic models of international trade, services have been called "nontradable" because, as a matter of fact, high international *transactions costs* (measured in time, distance, or otherwise) prevented the close proximity between a buyer and seller deemed necessary for the service activity to take place. For archetypal services—e.g., the haircut—it is still not cost-effective to make an international trip. But beyond transportation, culture, custom, and regulation also often required proximity between a buyer and seller and limited international trade in services: Financial, legal, or administrative services have required handshakes, physical presence to sign papers, or licensure examinations that are unique to a jurisdiction (such as accounting or law).

In addition to transactions costs, the "production" of certain services has been *functionally integral* to an organization's business activity or product and therefore not easy to separate from the main activity of the firm: for example, reading a radiological image at the hospital as part of the diagnosis; iterating through blueprints as part of designing a building; and reviewing of mortgage applications by the local bank manager before processing a loan.

How New?

Technological change, as well as policy change and changes in customer and business attitudes over time, has eroded these attributes of services—transactions costs and functional integration—that heretofore made them "nontradable." However, for *offshore* outsourcing to take place, it is not just the response of firms in the United States that matters. Globalization of services through trade and direct investment requires that firms in other countries also can react to reduced transactions costs and functional disintegration. That is, globalization of services is limited unless both sides of the transaction can participate.

What are the key technological changes? First, the raw technology of the internet in conjunction with international telecommunications networks and IT hardware (such as personal computers) create the potential for linkages between countries and businesses that simply did not exist before. For example, the average price of an international call between the United States and India dropped in half between 1996 and 2001, making offshore call centers much more attractive in terms of telecommunications cost. The penetration of personal computers into the Chinese marketplace increased nearly sevenfold over the same period, making this marketplace more accessible to fast-paced technology-based businesses (World Bank data).

Second, digitization of services activities further reduces transactions costs of trade. With digitization, information, software, or advice need not be put on paper, or transported by a person, or be embedded on a hard disk to be traded. All these activities can be digitized—consultants can provide advice via video, and software can be downloaded—in order to trade internationally. In fact, international trade around the world in such business and professional services grew nearly 40 percent between 1996 and 2002 (IMF data).

Third, codification of information puts information into an ordered format, which reduces the need for specific knowledge to perform skill- and information-intensive tasks. For example, computer-based so-called expert systems in customer-service centers replicate some aspects of the process by which an expert reaches a decision on a question. This expert system allows people with less expertise to, step by step, follow the on-screen menu to work through complex problems. Or, for example, the ability to download data into spreadsheet software that has embedded equations allows people with only modest financial training to prepare financial reports and presentations. And computer programming increasingly is modularized so that the design of a program can be separated from the implementation in computer code, which is itself globally standardized in computer languages such as C++ or Java.

Networked information technology, digitization, and codification can also create new products and activities inside firms, which add to domestic output and job creation, and can be internationally traded if markets are

open abroad. For example, using IT to monitor quality of products on the factory line may be a task that a firm initially does for its own reasons but then sells it as an information services product to other firms. Or, a comprehensive database of financial relationships can yield new financial instruments (such as derivatives) or new sources of revenue (for example, collecting small-value past-due accounts-receivables). Using IT to integrate health information about a patient can reduce life-threatening drug interactions, and a database that includes information about many patients and their therapies can help determine which procedures yield the best outcomes. Creating these new products demands workers not only skilled in technology but also knowledgeable of the specific business or sector.

All told, cheaper internet and information technology, digitization, and codification of information allow many tasks to be separated from the main activity of a business and also creates the potential for many new products and activities within a business. While some of these activities and products can be separated from a firm's core activities, others become core products. What becomes "outsourced" or "offshored" depends in part on the activities of the US firm, and the characteristics of US labor, and in part on whether the foreign location has the needed technological infrastructures and worker and firm characteristics.

How Different?

To a great degree, the forces promoting tradability and hence globalization of services—reduced transactions costs and fragmentation of production and separability of business functions—are the same forces that underpin globalization of goods. So, in what ways is the globalization of services different from the globalization of goods?

First, the pace of change in the globalization of services is more rapid than globalization of goods and has greater potential to accelerate. Global international trade in services doubled over the last 12 years compared with growth of goods trade (WTO data). Global foreign direct investment (FDI) in services accelerated over 1990–2002, increasing fourfold to account for about 60 percent of the global stock of FDI in 2002, up from 50 percent in 1990 (UNCTAD data). Going forward, trade and investment in services worldwide will increase because the share of services in consumption tends to rise with the level of income and development.

Second, with both trade and direct investment in services increasing, the share of labor exposed to international market forces is rising. In industrial countries, where services account for the majority of output and employment, rapid globalization of services means that a large and increasing share of the labor force and the economy face international competition. At the same time, in developing countries, more workers are being drawn into the services sector. Consequently, an increasing share of the global labor force is engaged in activities that are exposed to techno-

logical change and will need to respond to global competition and the resulting international division of labor. In contrast, the shares of agricultural and manufacturing employment have been declining in both industrial and developing worlds as technological change increases productivity in these sectors and labor's share falls.

Third, synergies between the skill profile demanded by globalized services and the policy changes in key developing countries may enhance globalization of services. The educational demands for internationally traded services range from low (e.g., call-center and transcription services) to high (engineering design and computer programming), but underlying both is a generalized set of skills that are not industry- or firm-specific (Autor, Levy, and Murnane 2003). In contrast, workers in goods production are often characterized by industry- and firm-specific skills gained through on-the-job training that are less applicable to a different factory or product.

Although educational attainment overall remains higher in industrial countries, research suggests that they have been spending less on education than the developing countries (Siqueira 2003). As a result, educational attainment in broad-based skills in developing countries has increased relatively faster. In the United States, for example, the share of the labor force with the level of educational attainment that pits them against workers in developing countries (e.g., a high school degree or less) is expected to *increase* over the next 15 years (Ellwood 2001). So the skills gap is narrowing. At the same time, wage differentials between the industrial and developing worlds remain large. Together, the narrowed education gap, the wide wage differential, and the technology drivers of digitization and codification enhance the incentives for international trade in services. Moreover, targeted policies in some countries (for example, Ireland and India) that offer attractive combinations of infrastructure, human skills, and tax arrangements have been important factors driving the pattern of international trade in services.

Fourth, globalization of services and globalization of goods may differ in how easily firms can change the location of their activities to take advantage of better capabilities in another country. Digitized and codified knowledge of a service activity requires little complementary capital compared with producing goods in a factory. Firms that focus on an intermediate segment of the international value chain in services production (and do not serve the domestic market) may be more footloose than factories because their links to the local economy are fewer and physical investment is low.

In sum, a broad range of services increasingly can be separated from a firm's central activity. These activities are coming to be known as information technology–enabled services (ITES). This name acknowledges first that the information and communications technologies (both data transmission—the hardware—as well as data manipulation and classification—the software) are what enables these services to be digi-

tized and codified and therefore fragmented and separated, and therefore undertaken at any distance from the core business and final customer. Second, it acknowledges that the services activities are not just narrowly IT-related (e.g., computer programming or database administration) but range broadly to include accounting, financial analysis, call-center services, architectural drafting, and health-record transcription, among other services activities. Technology drives the potential globalization of these activities. The extent of globalization is limited by the characteristics of the trading countries and the degree of potential digitization and codification of the activity.

How Important Is Globalization of Services for the United States?

There are several approaches to measuring the importance of services in the US economy and in international engagement: production, job occupations, international trade, and foreign investment. Taken together, without a doubt, services are increasingly important in the US economy and in international engagement. Yet, despite the numerous measures, there is not a crystal clear picture of the path and implications of globalization of US services. Nevertheless, because of the pace of change, and even as additional data are collected, policy initiatives must rely on the imperfect picture of the implications of technology and globalization of services on the US economy and jobs.

Services in the Domestic Economy

The importance of services for the domestic economy can be viewed from three perspectives: national accounts decomposition into major spending groups (consumption, investment, government spending, and net exports); production groups, as measured by GDP decomposed by industry of origin; and characteristics of the labor force, as measured by sector or occupation.

First, consider the spending groups. Services account for about 60 percent of real personal consumption expenditure. In real gross domestic investment, there is no breakdown for services, but if treated as a service, software accounts for about 16 percent of real nonresidential gross private domestic investment.[1] In international trade, net exports of services con-

1. Treating software as a service in the national accounts is not standard practice. However, international trade data sometimes classify software as a service and sometimes embed it with a good, which points out the challenges and difficulties to be observed in the national and international accounts.

tribute in a positive accounting fashion to GDP; services account for about 30 percent of exports and about 15 percent of imports. When one adds up these spending categories on services and divides by real private GDP (real GDP less government spending[2]), one finds that around 50 percent of real private GDP comes from services that can be relatively straightforwardly identified in the national accounts.

On the production side, services (including transportation; wholesale and retail trade; finance, insurance, and real estate; and other services) add up to 84 percent of private industry product, much larger than on the spending side. The difference between the spending percentage and the production percentage suggests that measurements on spending bundle together spending on services and goods (which are easier to track and measure), which tends to underestimate the share of spending on services.

In terms of private employment, a sectoral breakdown shows 80 percent of labor is employed in the services sector and 13 percent in the manufacturing sector (the remainder is in mining, farming, etc.). However, many people employed in the manufacturing sector are not production employees but have service-type jobs. Analyzing the US private labor force from the standpoint of occupations, only 8 percent are in "production" occupations, leaving 92 percent in services occupations.

Taking all these measures together, services account for a majority of spending, are larger in terms of output measures, and account for almost all the employed. No wonder globalization of services has generated concern.

US Services in Global Engagement

Table 9.1 displays data on global engagement of the US economy comparing goods and services. Global engagement comes through three channels: cross-border international trade, direct investment by US firms abroad and by foreign firms into the United States, and sales by affiliates of those firms. US global engagement in services through cross-border trade, direct investment, and affiliate sales is large, positive, and growing faster than almost all the channels of global engagement in goods.

With respect to the first channel of global engagement, data on cross-border services trade includes three distinct types of transactions: transactions related to moving people, products, and government activities; transactions in so-called other private services, which include education, insurance, finance, business and professional services, and so on; and cross-border accounting for trade in intellectual property.

The first category of services trade—transportation-related and military services—has moved significantly into deficit in recent years, due to gov-

2. The rationale for using private GDP is that it is even more difficult to determine the nature of spending or production for the government sector.

Table 9.1 Measures of global engagement (billions of dollars)

	1992	Latest data	Change
Cross-border net trade[a]	–39.1	–593.4	–554.2
Goods	–96.9	–641.4	–544.5
Services:	57.8	48.1	–9.7
Of which:			
Other private services	25.0	48.0	23.0
Intellectual property	15.7	27.8	12.2
Foreign direct investment, net position[b]	78.9	410.9	332.0
Of which:			
Financial services	90.4	90.3	–0.2
Professional services	–50.4	–80.4	–30.0
Affiliate sales (net)[c]	69.0	505.1	436.1
Affiliate services sales (net)	12.6	14.4	1.8
			Growth (percent)
Cross-border exports	616.8	1,133.0	84
Goods	439.6	797.1	81
Services:	177.3	335.9	89
Of which			
Other private services	50.3	141.7	182
Intellectual property	20.8	50.6	143
US foreign direct investment	502.1	1,789.0	256
Of which:			
Financial services	161.8	363.5	125
Professional services	17.2	115.0	568
US affiliate sales abroad	1,291.6	2,548.6	97
Affiliate services sales abroad	140.6	401.1	185
Cross-border imports	656.0	1,726.4	163
Goods	536.5	1,438.6	168
Services:	119.4	287.8	141
Of which			
Other private services	25.3	93.6	271
Intellectual property	5.2	22.8	342
Foreign direct investment in the United States	423.1	1,378.0	226
Of which:			
Financial services	71.4	273.2	283
Professional services	67.6	195.5	189
Foreign affiliate sales in the United States	1,222.7	2,043.5	67
Foreign affiliate services sales in the United States	128.0	386.7	202

a. Latest data are annualized from data from 2004 Q1, Q2, and Q3. Data are from the BEA International Transactions table 1.

b. Latest available data are for 2003(p). Data are from BEA detailed annual balance of payments and position estimates.

c. Latest available data are for 2002. Data are from "Majority Owned Affiliate Sales From BEA" detailed estimates at www.bea.doc.gov/bea/di/1001serv/intlserv.htm and www.bea.doc.gov/bea/ai/ iidguide.htm#SRVS.

ernment spending on services abroad and to increasing costs of transporting the large volume of imported goods. Technology as discussed in this chapter is not the main driver of these trends.

The second category of services trade—other private services—is growing faster than cross-border trade in goods and increasingly is in surplus. Exports of other private services are growing more than twice as fast as goods exports, and imports of other private services are growing about 50 percent faster than goods imports. These services account for about 10 percent of total exports and about 7 percent of total imports. The net positive trade balance in other private services has increased over the last 12 years and stands in contrast to the large and increasingly negative balance of trade in goods. Because cross-border trade in goods often bundles in other private services (such as maintenance and repair services embedded in merchandise exports), the positive services trade balance could be underestimated.

Technology may well be increasing two-way trade in these services, but these data do not corroborate the concern that technology-enabled cross-border trade will disproportionately favor services imports over exports. In fact, the robustness of these exports even in the face of slow growth in major industrial markets abroad suggests global competitiveness of US providers of these private services (Mann 2004a).

The third category of cross-border trade, intellectual property receipts and payments, also shows a doubling of the trade surplus, as well as rapid growth.

The next main channel of global engagement is direct investment. As was observed in the global data, the services sector accounts for an increasing share of US direct investment abroad and direct investment into the United States.

Direct investment abroad in the activities where technology is enabling trade (such as finance and insurance, business and professional services, and information services) accounted for about one-third of the stock of US investment abroad in the 1992, but a smaller share in 2003. Foreign investment in these activities into the United States stayed stable at about one-third. Consistent with these stock data, in terms of the flows of investment, the foreign inflow is trending much more toward these private services, such as finance and business services with 60 percent of the foreign investment inflow into the United States in these services activities. US direct investment outflows in these activities were only about a third of total outflows of direct investment. Looking at the whole picture, direct investment in private service activities is growing more important on the inbound side, rather than US service-sector multinationals investing more and more abroad.

Finally, the third channel—affiliate sales. Even with information technology, digitization, and codification, many aspects of the production and delivery of services require local proximity (knowledge of local regula-

tions and tastes, for example). US direct investment abroad (and foreign investment in the United States) is the platform to tailor and deliver services to the local marketplace. This channel of global engagement has been growing much more quickly than the channel of international trade transactions, and the growth of affiliate sales of services swamps affiliate sales of all goods and services. But, just as for direct investment, affiliate sales of services in the US by foreign multinationals is a higher share of their total affiliate sales than is the comparable share of services sales for US affiliates abroad.

Trade and Investment Links: US Versus Foreign Multinationals

Examining the linkages between the three channels of global engagement—trade, direct investment, and affiliate sales—is important for a number of reasons. First, to what extent is direct investment a complement or substitute for trade? To what extent is direct investment a prerequisite for foreign sales? How do these relationships play out for macroeconomic measures of the United States in global trade? These questions have been researched in the context of trade and investment in goods but are only now beginning to be examined in the context of services (Helpman, Melitz, and Yeaple 2003; Van Welsum 2004).

Do the linkages between direct investment and trade differ between manufacturing and private services? At first blush, no. But looking deeper the answer is yes, perhaps with consequences for the US going forward. Consider the large categories: For manufacturing, intrafirm trade—that is, cross-border trade between the parent company and its affiliates in the other country—accounts for about 30 percent of imports and about 40 percent of exports. For private services as a whole, intrafirm trade is about the same—40 percent for both imports and exports. However, this apparent similarity masks very different intrafirm trade shares for individual categories of private services.

Drilling down further into the data on other private services to sectors where information technology may be playing a leading role in driving international trade reveals the following: In finance, the intrafirm share of imports rose from 46 to 60 percent (1997–2002) whereas the intrafirm share of exports was substantially lower and held nearly constant at 20 percent. In business and professional services, the intrafirm share of imports held steady at 70 percent whereas the intrafirm share of exports rose from 50 to 58 percent (BEA data). From 1997 to 2002, the increase in direct investment in these services activities was about the same amount for US firms abroad and foreign firms in the United States. Collecting the data on cross-border trade and direct investment in these services sectors most affected by information technology suggests a complementarity between

direct investment and trade that is stronger for US imports than for exports. US direct investment abroad in private services may be limited by restrictions in foreign marketplaces, so that US firms satisfy market demand via arm's-length exports to these markets. In contrast, foreign firms apparently are less restricted in investing in the US marketplace and thus satisfy local demand relatively less through arm's-length imports.

Pulling together the data on the private services share of direct investment, affiliate sales, and cross-border trade, and comparing the behavior of US and foreign multinationals in these activities, it appears that foreign firms in private services use the direct investment platform for a higher percent of their sales in the US market. But, since they have a higher percentage of *intrafirm* trade in these sectors, they, in some sense, are less effective at turning their investment platform into value-added in the United States. That is, although foreign firms have a high share of affiliate sales, they also have a high share of intermediate imports to produce those affiliate sales. Hence, foreign multinationals generate relatively lower value-added in the US marketplace.

In contrast, US firms export more services directly, have looser ties between direct investment abroad and trade (reflected in a lower share of intrafirm trade), and generate an equally high share of affiliate sales in the destination market for private services. Thus US firms generate relatively more value from their investment platforms abroad.

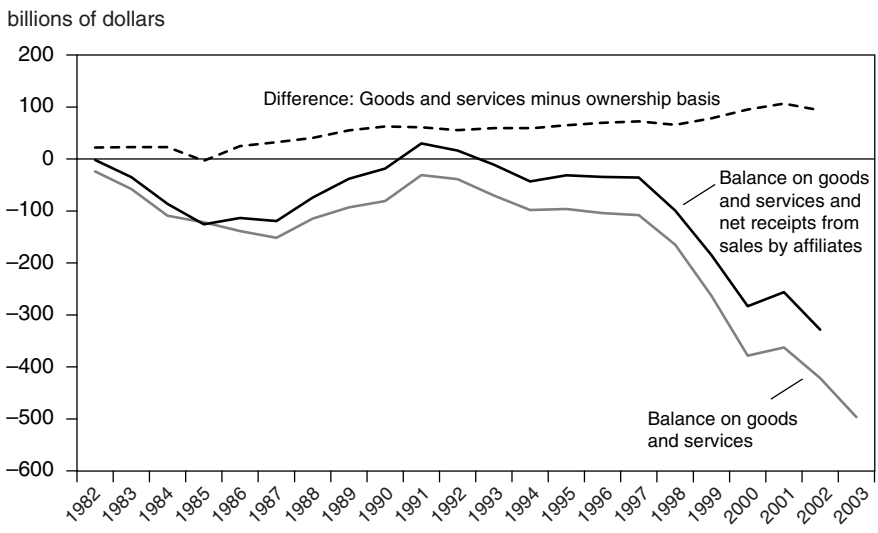
What economic value accrues to the United States through direct investment and increased affiliate sales in marketplaces abroad? US multinational profits on the overall relationship of trade, direct investment, and affiliate sales will be greater. And to the extent that US affiliates abroad sell products (such as software) that are protected by intellectual property rights, such sales contribute positively to the balance of payments through net receipts on intellectual property.

Figure 9.1 shows one way to assess, in the macro context, the benefits of global engagement beyond cross-border trade. The goods and services trade balance is the traditional presentation. The ownership-based balance sums the trade balance with net receipts—that is, value-added—from sales by affiliates (US affiliates abroad less foreign affiliates in the United States).

The ownership-based balance mimics the traditional account, but with a positive difference. The positive difference reflects, apparently, the ability of the US firms to effectively and efficiently combine US management and other assets with foreign inputs to create greater value in markets abroad than that created by the reverse combination of foreign management and US resources in the United States for foreign affiliates (Kravis and Lipsey 1988, the first in a long line of research).

The positive difference identified between the standard measures of cross-border trade and the ownership-based measure of the current ac-

Figure 9.1 Measures of US external balance and global engagement



Source: Bureau of Economic Analysis, International Transactions table 1, Survey of Current Business October 1995, January 2003, and January 2004.

count is about $100 billion and has increased modestly over the last 20 years, with a widening since about 1998. This widening in recent years could suggest an increasingly important competitive edge enjoyed by US firms in their global relationships, which may be related to the increased role of private services in trade, direct investment, and affiliate sales. Although these net receipts do not represent a cross-border flow of goods or capital, they do suggest the importance of international integration of production and distribution for US corporate fitness and dynamism, which is part of the underpinnings of continued productivity growth and US economic performance.

Globalization of Services and Jobs: The Numbers for the United States

By themselves, the offshore activities of firms and development of cross-border trade in services might not have garnered much attention. But domestic jobs, particularly white-collar jobs, have become the focus of much concern against a backdrop of a modest technology turnaround, a business cycle that has not yet yielded sustained robust job creation, a trend decline in manufacturing employment that has spread to white-collar

manufacturing employees, and an international environment of tepid growth in key markets abroad and, until several years ago, an appreciated dollar that has limited exports and hence exacerbated the domestic situation. Workers, both blue- and white-collar, see substantial threats to their jobs coming not only from goods produced abroad but also from the technology that allows white-collar jobs, ranging from back-office to research and development, to be done abroad rather than in the United States.

Data on the dynamics of the US labor market from the Bureau of Labor Statistics (BLS) are quite comprehensive but do not disentangle the many factors (domestic, international, and technological) that affect job creation and job loss. The ability of the data to specifically address how many jobs have been lost to increased global activity of US firms in general or to offshore outsourcing of ITES in particular is quite limited (GAO 2004).

It is even more challenging to project forward in time the implications for US labor of changes in technology, trade, or global business strategies. Theory helps outline the long-run effect of increased international trade and global engagement in services on income distribution, but the short-run dynamic effect on jobs may be more germane for immediate policy purposes.

Overview of the Current Employment Situation

Official data are difficult to wade through and interpret, so there has been a tendency to answer questions about offshore outsourcing of jobs using anecdotes and proprietary surveys. With respect to jobs lost, several consultancies estimate that around 500,000 to 1 million jobs may have been lost to trade roughly since the technology boom peaked and recession started around the end of 2000 and early 2001. Using a methodological decomposition and input-output matrices, Martin Baily and Robert Lawrence suggest that 314,000 jobs were lost on account of trade (2000–03)—with the drop in exports more than accounting for all the job losses. By either estimation survey or anecdote, these job losses are not large for an economy where 130 million are employed and where "job churn" is quite high in both good and bad economic times.

One problem with many analyses is that they take the peak of the business cycle and technology cycle as the benchmark performance of the US economy. While 3.9 percent unemployment without inflation is enviable, using a generational low as benchmark economic performance will exacerbate any estimate of job loss. Moreover, manufacturing job loss, white-collar job loss, and the causes of job loss are often conflated. Finally, classification changes in the official data in 1999 and 2000 correspond with the exact timing of economic fluctuations, making it even more difficult to discern a clear picture of US labor market dynamics.

Despite the difficulty in interpretation, it is important to return to the BLS data. First, offshore activities cut across industries so that it is impor-

tant to look at employment data categorized by occupation (software programmer) rather than sector (information publishing). Second, it is important to cut through the boom and bust period and start the assessment before the end of 2000. (For a detailed discussion of alternative BLS data, see Kirkegaard 2004.) What do these data say about the evolution of US employment, particularly in those services occupations thought to be most affected by information technology, digitization, and codification and therefore most at risk for offshoring? (See table 9.2.)

The employment situation has not recovered to its prerecession peak, but the mix of jobs has moved relatively more *toward* those services activities thought to be most affected by globalization and technological change, rather than away from them. (A detailed discussion of the IT sector and occupations is in the next section.) Over the whole economy, the main decline in jobs has been in the manufacturing sector, although a substantial share of the jobs lost (20 percent) are services occupations within manufacturing. Jobs in the private services–providing sector have more than fully recovered to the prerecession level. Among three categories of jobs thought to be most at risk for technology to drive the jobs offshore, occupations in business and financial occupations never declined even through the recession, architecture and engineering (mostly engineering occupations) and computer and math occupations (mostly computer occupations) are recovering and are very near or have exceeded their technology-boom peaks.

Another perspective is to examine recent job performance in the context of ongoing creation and destruction of jobs in the US economy. In the US economy, there is remarkable *job churn*—that is, the constant creation and destruction of jobs, where "destruction" measures job losers and job *leavers* (figure 9.2). Between 7 and 8 percent of all private jobs in the United States are created and destroyed every quarter. During the boom years of the late 1990s, an increasing number of jobs were created and lost every quarter in the United States. Of course, in those boom years more jobs were created than lost, so the unemployment rate fell.

One of the notable features of the difficult job situation since the recession has been the dramatic drop in job churn. Even now, well after the official end of the recession, the job churn rate has barely turned up. An increased rate of job creation is key for lowering the unemployment rate. But an increased rate of job destruction may also be a measure of a healthy economy to the extent that it indicates that individuals leave jobs by choice to get new ones.

Several researchers have investigated the nature of job churn and job change in recent years (Figura 2003, Groshen and Potter 2003). The research suggests that structural changes in the distribution of jobs and firms in the economy help to explain recent job market behavior. Permanent job destruction—for example, associated with structural increases in the demand for more skilled workers throughout the economy, a

Table 9.2 The current employment situation (millions at end of period)

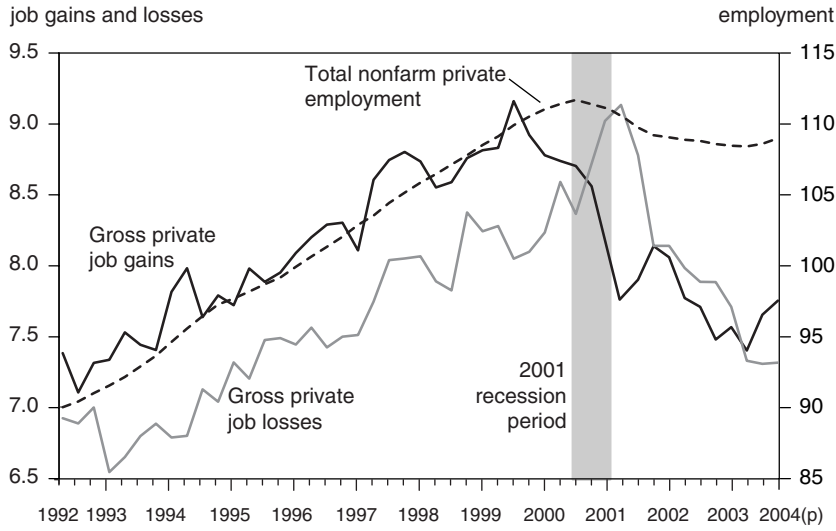
	1999	2000	2001	2002	May 2003	November 2003	November 2004
Total nonfarm private employment	110.0	111.6	109.3	108.5	108.3	108.5	110.4(p)
Manufacturing	17.3	17.2	15.7	14.9	14.6	14.3	14.4(p)
Of which:							
Production workers	12.5	12.3	11.1	10.5	10.2	10.1	10.1(p)
Nonproduction workers	4.8	4.9	4.6	4.4	4.3	4.3	4.2(p)
Private service providing	85.4	87.1	68.2	86.3	86.5	86.8	88.4(p)
Business and financial occupations	4.4	4.6	4.7	4.7	4.9	5.0	5.4[a]
Computer and mathematical occupations	2.6	2.9	2.9	2.7	2.9	2.8	2.9[a]
Architecture and engineering occupations	2.5	2.6	2.5	2.4	2.4	2.4	2.5[a]

a. The November 2004 number has been generated using the rate of change from November 2003 to November 2004 in the unseasonally adjusted data from the BLS Current Population Survey (CPS), series LNU02032454 (Business and Financial Occupations), LNU02032455 (Computer and mathematical Occupations), and LNU02032456 (Architecture and Engineering Occupations).

Note: All data seasonally adjusted from BLS Current Employment Statistics (CES) 1999–2002 end of period, 2003, and 2004 monthly data. Occupational data are from BLS Occupational Employment Statistics (OES) National Occupational Survey.

Source: BLS CES, OES, and CPS surveys.

Figure 9.2 US job turnover, 1992–2004 (millions)



Note: Data are for March, June, September, and December of the years indicated.

Source: US Department of Commerce, Bureau of Labor Statistics, Current Establishment Survey data and business dynamics data.

structural shift away from manufacturing toward services, and a structural reduction in unionization—has a larger and more extended effect of raising unemployment than permanent job creation has to reduce unemployment. This is because job loss is permanent and job gains are delayed. These same structural factors also contribute to slow job creation. Hence, the pace of technological change and its impact on globalization of services may be part of the reason behind lower job churn.

Technology Driver and Potential for Job Creation

How might technology and globalization of services affect job creation and destruction going forward? Numerous consultancy reports detail how companies are outsourcing services activities to domestic or foreign locations, what the growth of the markets here and abroad might be, and the implications for job growth and loss. Some offer a more generalized framework for how information technologies that lower transactions costs, allow production fragmentation, and promote separability of services activities might have different effects on the types of jobs to be created in the United States and abroad (Bardhan and Kroll 2003).

A key consideration when evaluating these projections is not just the potential for increased international trade in services but also the corre-

sponding growth in demand for services in the US market. Many analyses assume a fixed demand for services and a one-for-one replacement of jobs in the United States with jobs abroad. But in a world where the demand for services is both income and price elastic, the future for services output (and the jobs that go with that) is very bright. The fragmentation of production and the local specialization of services activities enabled by IT yields rising demand for internationally traded services production as well as rising demand for domestically sourced services activities. What is at issue is not the number of jobs but the kind of jobs in the services sectors where technology is enabling international trade.

The BLS offers projections for growth in occupations. In February 2004, the BLS issued a new *Occupational Outlook Handbook* for 2002–12. In this recent outlook, three of the top 10 and seven of the top 30 fastest-growing occupations are IT-related occupations—the same type of jobs as those considered to be at risk for being done abroad. In the November 2001 handbook, 8 of the top 10 and 10 of the top 30 fastest-growing occupations were IT-related. Does the difference in projections warrant concern about job creation in IT-related occupations and point to the pressures on US job creation from technology-enabled international trade in services and offshore job creation? Not really.

The main difference between the two projections is a reduction of the projected growth rate of what were the top growing IT occupations from 100 percent projected growth to 45 percent projected growth. That drops the IT occupations from the top 10 to the next 20. It appears that the BLS employment outlook in November 2001 suffered from a technology bubble of its own! On the other hand, projected growth of 45 percent for IT occupations is still three times the projected growth of jobs overall in the economy. Hence, even with increased tradability of services, the demand for workers with skills to match jobs in IT-enabled services in the domestic marketplace is huge. Moreover, based on average wages now, these IT jobs pay more than twice the average wage. Indeed, some have wondered whether there are sufficiently skilled workers to match the demand in the United States.

Economic theories of the effect of international trade offer another look at the future. International trade theories assume full employment, so the impact of global engagement comes through wages of certain workers, not the overall number of jobs. The simplest models of international trade (Ricardo and Heckscher-Ohlin) show that the wages of the scarce factor (US manufacturing workers in the context of a US–China comparison, for example) decline when trade opens up. This story, albeit about wages, is consistent with the observed decline in manufacturing employment already experienced. Rybczynski's model of international trade with expanding resources shows that a new supply of white-collar workers made available in the world economy (well-trained Indian English speakers, for example) should reduce the wages of that type of factor—workers in the

sectors where technology enables international trade. But jobs have increased since the recession for the three main occupational categories thought most at risk and wages are rising.

These simple theories ignore key realities that are particularly important when modeling globalization of private services: how *demand* for activities and workers changes with the price of services and the income level of the consumer, and how technology of digitization and codification allows the *fragmentation of production* and international division of labor. Specifically, these simple international trade models assume a price and income elasticity of one (rather than the estimated income- and price-elastic nature of services discussed earlier) and assume unchanging technology of production (which misses the whole point). These assumptions do not match the reality of technology and trade in private services.

In contrast to the other theories, for Bhagwati, Panagariya, and Srinivasan's model the ability to trade skilled services internationally is an innovation. Trade increases economic well-being in both countries because the newly tradable product acts as a productivity-enhancing intermediate to the overall production process. In the context of the United States, the increased tradability of private services is a concrete example of this model. Empirical evidence in support of this model will be discussed in the next section, which focuses explicitly on international trade in IT products.

Globalization of IT and US Performance

The benefit achieved through globalization of IT hardware is a model for the potential benefits of globalization of private services.

Gains from Global Sourcing: The First Wave Based on IT Hardware

Hard evidence on the gains from global sourcing comes from looking at patterns of production, investment, and use of IT. In the United States in the 1990s, globalization of IT hardware resulted in IT prices some 10 to 30 percent lower than they would have been based on domestic production and domestic technological advances alone (Mann 2003). Lower prices increased investment and use of IT hardware. Because the price elasticity of demand of IT is greater than one (Bayoumi and Haacker 2002), price declines spurred a greater than one-for-one increase in investment throughout the economy. Also, lower prices freed up resources for other activities within firms, including the important reorienting and transforming of business activities within the firm and changing workplace practices to use IT more effectively (Black and Lynch 2004; Bresnahan, Brynjolfsson, and Hitt 2002).

The increased IT investment and transformation of business activities and workplace practices raised productivity and real GDP growth in the United States. Altogether, IT accounted for well over half of the accelera-

tion of structural productivity growth of the 1990s, which supported both the higher GDP growth (4 percent) and lower unemployment (3.9 percent) enjoyed by the US economy in the second half of the decade.

The diffusion of IT capital through the US economy was uneven, with some sectors leading in IT investment and productivity growth and others lagging the average. These different experiences offer important contrasts that help to understand the future role of global sourcing of IT services and software. Some sectors, such as wholesale trade, electronic products, and financial institutions, invested relatively more in IT, whereas other sectors such as health services, business services, and construction invested relatively less. Productivity performance at the sector level is similarly uneven, with the sectors with the highest investment having the highest productivity growth (figure 9.3).

IT investment throughout the economy prompted an increase in demand for IT workers throughout the economy. The diffusion of IT investment throughout the economy is reflected in a similar diffusion of workers in IT occupations. As of mid-2003 (latest available data), more than two-thirds of the people employed in IT jobs did not work in the IT sector, but rather designed, modified, and integrated IT for companies outside the IT sector. Not surprisingly, there is a positive correlation between the leading sectors in terms of IT hardware investment and the sectors that hired the most IT professionals: IT investment and IT jobs go hand in hand (Mann 2004a).

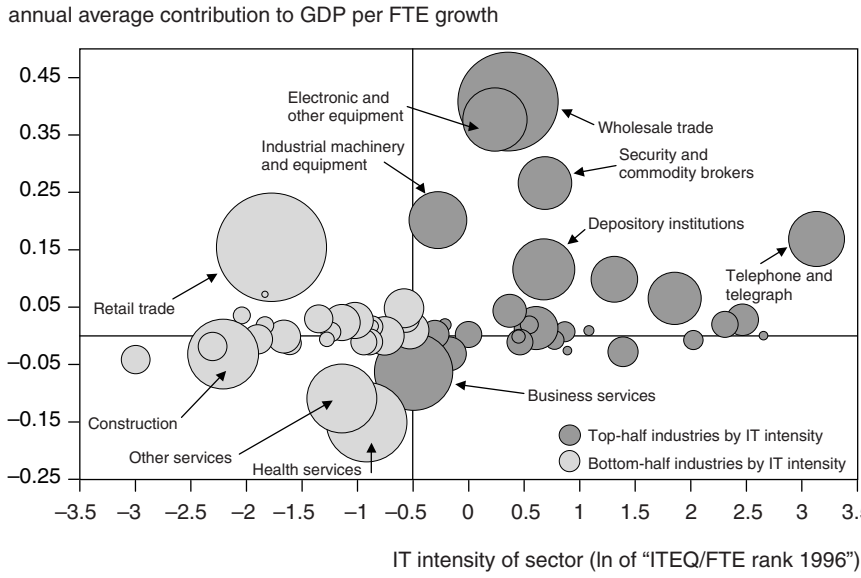
As is well known, the structural change in the US economy toward IT has not been without bumps. Figure 9.4 shows that the technology boom and crash have been felt in both investment and occupations. The complementarity between IT capital and IT workers, described above with the detailed sectoral data, worked to increase IT occupations during the technology boom, but has been a drag on IT job creation recently. Nevertheless, as shown here, and noted in the job performance data in table 9.2, as IT investment has rebounded, so too has the demand for IT workers.

Software and IT Services: The Next Wave of Global Sourcing

Going forward, the United States is poised for (indeed, perhaps is in the midst of) a second wave of IT investment, growth in IT jobs, and faster overall productivity growth, as components of software and IT services are produced more cheaply abroad as part of a digitized, codified, and therefore fragmented international production of private services. A key source of the gains to investment, jobs, and productivity will be the diffusion of IT into the sectors that did not take up IT during the 1990s, as well as a deepening of investment in the leading sectors.

How does globalization of services meet the challenges of lagging sectors? Despite the technology boom of the 1990s, large sectors in the US

Figure 9.3 IT intensity and contribution to GDP per FTE growth, 1989–2000 (size of bubbles indicate shares of GDP by individual sector)



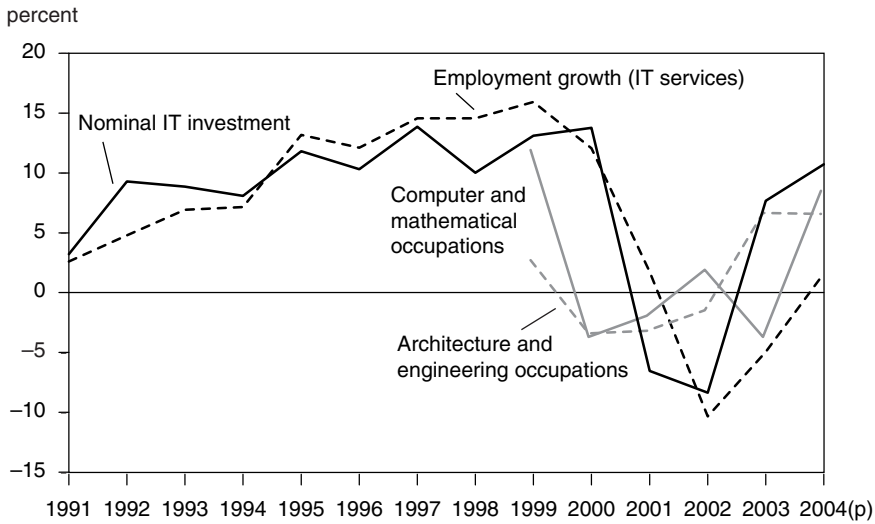
ITEQ/FTE = information technology equipment/full-time equivalent (worker).

Source: US Department of Commerce, Economic and Statistics Administration, *Digital Economy 2002*, table A4.4.

economy—such as health services (5 percent of GDP) and education (2 percent of GDP)—and many small and medium-sized enterprises (SMEs) do not use IT very intensively. Reasons range from cost to culture to regulatory constraints. For example, SMEs are very cost-conscious, often need tailored (rather than cheaper off-the-shelf) software, and demand proximity for customer care and other IT services. In health services, regulatory issues are quite important for software and services design as is the complexity of the relationships in health services delivery (between doctors, hospitals, and pharmacies).

These issues have interacted with the higher relative cost of software and services to put IT further out of reach of these firms. That is, as hardware prices fell in the 1990s, the importance of software and IT services rose in overall spending on the IT package of hardware, software, and services. In 1993, for each $1 spent on hardware, firms in the United States spent $1.40 on software and services. But by 2000, the ratio was $2.20 on software and services per $1 on hardware (World Information Technology and Software Alliance [WITSA] data).

Figure 9.4 IT investment and IT services employment (annual growth)



Note: IT services consists of software publishing (NAICS category 5512), internet service providers, search portals and data processing (NAICS 518), and computer systems design and related services (NAICS 5415). Does not include IT employment outside these sectors. 2004 data for IT investment are the average of Q1, Q2, and Q3 final data. 2004 IT services employment data are last available data for September 2004(p). Computer and Mathematical Occupations and Architecture and Engineering Occupations are annual OES data benchmarked to the last quarter of 1999, 2000, 2001, and 2002. 2003 data refers to May 2003, whereas 2004 data have been created by growing the May 2003 OES data point by the rate of change from the CPS monthly data from May 2003 to September 2004.

Source: Bureau of Labor Statistics and author's calculations.

The United States gains from cheaper globally sourced components in software and IT services production because doing so will reduce the price of customized software and tailored services. Econometric estimates show that the demand for software and services increases more than one for one with reductions in price to an even greater degree than IT hardware (Bayoumi and Haacker 2002). Therefore, as prices fall, demand for services and software will rise more than one for one, helping to diffuse IT into the lagging sectors, deepening the use of IT in the leading sectors, raising productivity growth throughout the US economy, and increasing the demand for workers with integrative IT skills in all sectors.

What are "integrative skills"? Demand will increase for workers with the IT skills necessary to design, customize, and integrate IT applications and services, particularly for the lagging sectors and SMEs. These workers, although they may be classified in the occupational category of "IT occupations," will have a wealth of sector-specific knowledge that is absolutely crucial. Although the technology skills may be importable, the local knowledge specific to a customer need is unique to the United States. Jobs that mesh the

technical and the locality-specific knowledge will be the ones that stay in the United States.

In fact, data point in this direction to how technology and globalization are affecting the mix of skills being demanded in the United States (table 9.3). Between 1999 and November 2003 (time period for which data are available), the number of "programming" jobs, earning on average $64,000, fell by about 125,000. But, jobs held by applications and systems software engineers, database analysts, and network engineers earning on average $74,000 increased by some 425,000. Overall jobs for high-wage IT occupations increased some 10 percent against the increase in jobs of just 1 percent in the US economy overall. Thus global sourcing of software and services, even as it increases the number of IT jobs, changes the mix of IT jobs—with a greater emphasis on creating products that use IT to meet the needs of US businesses.

On the other hand, the combined effect of technology and international trade can also be seen in occupations that use IT but are less highly skilled and pay lower wages—around $25,000. These occupations—telemarketers, switchboard operators, telephone operators, computer operators, data entry keyers, word processors and typists, and office machine operators—experienced very large job losses (545,000) over the entire period of available data (from 1999 to November 2003)—a decline of 30 percent employment. These jobs are not likely to return to the United States or indeed anywhere, to the extent that they have been replaced by technology itself.

Broader Implications

Examining the IT sector alone is a useful model for considering the broader implications for the United States of technology and globalization of services. First, IT investment is price elastic. Lower prices obtained in part through the fragmentation and global sourcing of IT raised the demand for these products in the United States and increased jobs and wages for workers with complementary IT skills. IT investment alone, and through the way it transformed business activities and promoted new workplace practices, raised productivity and growth in the United States. The process of technological change and globalization of software and services is just beginning but has the same characteristics as IT hardware where the process and implications are well in train.

Private services such as finance and professional services are a broader set of activities where technology is lowering transactions costs of trade as well as allowing the fragmentation of production and separation to locations remote from both core business and final customer. But, the demand for these services is price elastic, just as for IT hardware and IT services and software. Hence globalization and technological change reduce prices

Table 9.3 Selected US technology occupations, 1999–November 2003

	1999–November 2003		November 2003	
	Absolute change in employment	**Percent change**	**Employment** (number of workers)	**Wages** (dollars)
Call-center type occupations[a]	–126,110	–22	444,500	~25,000
Low-wage technology workers[b]	–419,140	–33	856,720	~24,000
Total call-center and low-wage technology workers	–545,250	–30	1,301,220	25,191
Comparable: Production workers in the manufacturing sector		–20		
High-wage technology workers				
Computer programmers, SOC 15-1021	–125,380	–31	403,220	65,170
Computer software engineers, applications, systems software analysts, SOC 15-1031, 1032, 1051	263,980	22	1,188,820	~73,000
Database administrators, SOC 15-1061	–3,920	–4	97,540	62,100
Network and systems administrators and data communications engineers and analysts, SOC 15-1071, 1081	137,800	21	645,490	~65,000
Computer hardware and electrical engineers, SOC 17-2061, 2071, 2072	34,430		350,890	~77,000
Total high-wage technology workers	264,470	11	2,465,120	69,992
Comparable: Total CES employment		1		

a. Call-center type occupations: Telemarketers and telephone operators: SOC 41-9041;43-2021
b. Low-wage technology workers: Switchboard, answering services, computer operator, data entry, and word processors: SOC 43-2011,9011, 9021,9022

Source: Bureau of Labor Statistics CES data, 1999, 2000, 2001, 2002, May 2003, and November 2003, National Occupational Employment and Wage Estimates.

and augment demand. In addition, private services are income elastic. Thus, income growth at home and abroad, as well as the process of market opening and development abroad, will increase the local and global demand for these services. Globalization of services is different from globalization of manufactured goods because of these two key elasticities.

Globalization of Services: Is There No End to It?

If the main motivator propelling international trade in private services is technology, along with lower wages in developing countries and a narrower education gap, is there nothing to stop all such services and jobs from going to lower-wage countries?

Several factors point to retained jobs in industrial countries (in addition to the market-expansion effect noted earlier). First and foremost, not all jobs can be codified and digitized. Face-to-face interaction is still required at many points in product development, marketing, delivery, and maintenance. Local knowledge is critical, for example, to understand the thicket of health care regulations or legal codes. Businesses of a certain size need more customer care and demand proximity of the service provider. At rock bottom, there are differences in tastes and preferences, such that some transactions and their jobs will remain local.

Another factor that may limit globalization of private services is the interface between the global marketplace and the local jurisdiction of policy. For example, there are no global rules specifying how cross-border transactions of data should be treated with respect to privacy rules or treatment of intellectual property (the Agreement on Trade-Related Aspects of Intellectual Property Rights [TRIPS] notwithstanding). Consumer and business attitudes toward the balance between market-oriented and government-legislated solutions in these issue areas are not homogeneous across countries (nor even within a country) (Mann 2001, 2002). The best that is likely to be achieved in the long run is mutual recognition agreements, but in general these agreements do not yet exist. With differing rules across countries, globalization of transactions in some fragmented private services could founder.

Responding to Global Sourcing: Maximizing Gains and Moderating the Backlash

The advent of the internet, along with codification, and digitization of knowledge, has separated services into components so that they do not need to be done contiguously and can instead be done globally. While this may contribute positively to job creation and productivity growth, as detailed earlier, the specter of immediate job loss, particularly in high-skill,

white-collar occupations, looms large. Although the market-expanding aspects of the globalization of private services points to more jobs overall, the skills demanded to do those jobs will change during this technologically volatile time, and some jobs will be lost. A framework for describing in general terms the kinds of jobs lost helps to structure policies to address the issue.

One type of job loss comes, as it has in manufacturing, from technology itself. Automated teller machines, voice-answering technologies, and word-processing software are replacing bank tellers, answering services, and secretaries. A second type of job loss is at the low-wage, low-skill end of the services-job spectrum—jobs that are being replaced by cheaper workers abroad. A third kind of job loss comes as some higher-skill jobs are now codified and digitized and therefore can be separated from the core business activity (for example, computer programming and financial analysis) and may be done abroad. A fourth type of job loss is projected job loss: Although higher-paid jobs demanding IT skills are, by BLS projections, expected to grow very quickly, if workers in the United States do not have the requisite skills, then workers in foreign countries may get these jobs. Policy initiatives on the international and domestic fronts are needed to respond to these four types of real and potential job loss. On the international side, the potential for markets abroad should be maximized through macroeconomic stimulus and a focus on trade and investment negotiations. On the domestic side, domestic sourcing should be maximized through labor policies that promote skill upgrading and skill matching for the jobs being created in the United States by technological change and globalization.

International Dimension of Policy

As discussed earlier, data on international trade in services show that US providers dominate global trade. Econometric analysis shows that exports of these services rise disproportionately with increases in income abroad. The data also show the relatively lower US foreign direct investment in private services in markets abroad, which inhibits the growth of affiliate sales. Promoting foreign macroeconomic growth as well as engaging in trade negotiations to open the markets abroad for US services are key to growth in output, trade, and services-sector jobs at home.

Research on potential gains from trade negotiations makes clear that the United States (as well as developing countries) has much to gain from a Doha Round that moves beyond agriculture and market access for manufactures. Table 9.4 details just how dramatic these gains might be. For the world, the gain from liberalization of services alone is greater than liberalization of manufactures and agriculture put together—$390 billion versus $223 billion. For the United States, the gain from liberalization of all

Table 9.4 Estimated gains from trade and investment liberalization

	All sectors		Manufacturing only		Services only	
Region/country	Percent of GDP	Billions of dollars	Percent of GDP	Billions of dollars	Percent of GDP	Billions of dollars
World		613.0		211.0		390.0
United States	2.0	177.3	0.34	31.3	1.65	150.0
European Union & EFTA	1.5	168.9	0.58	63.3	0.94	103.4
Japan	1.9	123.7	0.89	57.8	0.85	61.7
China	1.5	13.6	0.54	4.9	0.79	7.1
Korea	2.8	14.1	1.40	8.0	0.91	5.2
Malaysia	2.8	3.4	1.99	2.4	0.54	0.6
Chile	2.4	1.9	1.29	1.0	1.17	0.9
Mexico	1.8	6.5	0.32	1.1	1.49	5.2

EFTA = European Free Trade Association

Note: Services coverage includes construction, trade and transport, other private services, and government services. Protection is measured by excess operating profits of firms listed on stock markets. Scenario shows liberalization of implied protection of 33 percent for all three sectors (agriculture, manufacturing, and services).

Sources: Brown, Deardorff, and Stern (2003, table 2, 25); see also Dee and Hanslow (2001).

services is five times greater than might be obtained from increased market access for manufactures.

Industrial-country exporters of services gain in these scenarios that liberalize trade in services. But the gains to GDP in the developing countries of allowing trade in services are nearly as large as the gains they would get if their trading partners reduced tariffs on the manufactured goods that these economies sell into global markets. How so?

Given the generally small size of the services sector in most developing countries, the empirical results mean that the multiplier effect to raise GDP must be larger for services liberalization than for increased exports of manufactured goods. This makes sense given that improved services-sector performance increases the competitiveness and efficiency of all other sectors in the economy. All told, the welfare gains throughout an economy from improving domestic services-sector performance are dramatic.

Domestic Dimension of Policy

On the domestic side, complementary strategies are needed to address labor market dislocation and change. Overall, technological change and globalization put an even higher premium on more education and higher skills (measured by formal schooling or trade apprenticeships, or other means). Policies are particularly needed to address two types of job losses in the technologically volatile marketplace. First, workers whose jobs have been permanently dislocated by technology or trade need to get

back to work quickly to avoid loss of job skills and labor-force attachment. Second, for some skilled workers, particularly in science and technology, technology does not eliminate the whole job category, but it might alter the career path by speeding up skill depreciation and by removing certain 'rungs' of the career ladder. In this case, market imperfections argue for a human-capital investment tax credit to promote skill upgrading within an organization and career path.

For the first set of workers, extended unemployment benefits (which provide more time for adjustment), training assistance, wage insurance, and portable social insurance (such as health and pensions) are all strategies to ease the transition to a new job and new career. In particular, policies that promote a move to a new job increase the likelihood that the worker will gain new skills, which will move the worker toward a permanent career path. For example, wage insurance replaces part of the earnings lost between a previous job and the new one but is available only after the person leaves unemployment to get a new job (Kletzer and Litan 2001; also see the chapter by Lori Kletzer and Howard Rosen in this book).

A human-capital investment tax credit is a policy designed to achieve a better-functioning pipeline of skilled technology workers. Two places in the pipeline are particularly exposed to technological change and globalization: the incumbent worker, whose skills depreciate with the rate of technological progress and openness to foreign labor competition, and the entry-level job, which may no longer be done in the United States because foreign workers have those skills and do the job at lower wages. This notion of a skill pipeline is applicable not only to IT-specific skills but also to other technical workers whose skills are depreciating quickly in the face of international trade enabled by technology.

An investment tax credit recognizes three realities of the marketplace for skills: free riders, incomplete information, and spillovers. First, firms that engage in substantial training of their own workers to move their skills up the ladder beyond the threat of outsourcing face the disincentive of "free riding" by other firms that do not train. "Incomplete information" about the whole career ladder could keep students from entering into high-skills training and mid-career workers from knowing which new skills they should train for. An internship credit and incumbent training credits recognize that the first job of the technical career ladder for a worker entering from school may be a job no longer done in the United States and that even highly skilled mid-career workers face technological skill depreciation. Finally, an investment tax credit recognizes the "spillover" benefits to the economy as a whole of having a technologically trained workforce that diffuses to all sectors of the economy. Investment tax credits to address these types of imperfections in the marketplace are routinely used for physical capital investment and for research and development—amounting to some $50 billion in tax expenditures, according to the Congressional Budget Of-

fice. In today's "knowledge economy," the most important asset is people, so an investment tax credit explicitly focussed on people makes sense.

In the end, globalization of services specifically and transformation in economic activities generally mean volatility in business, job churn, and differential returns to skills. To the extent that the government's social policy prevents these changes from taking place, the gains from transformation may not occur and the cost of smoothing them out could be quite high in terms of income support. Therefore, labor market policies to deal with this technologically driven globalization of services should focus on approaches that encourage and enable workers and firms to fill opportunities coming from change, rather than focusing on moderating outcomes and avoiding change.

Final Words

The positive effects of global sourcing are undeniably real and large but depend on an environment where public, business, and worker relationships are fostered. Breaking the links, by restricting technological change, by tempering global sourcing, or by failing to upgrade the skills of US workers, puts the prospects for higher US economic growth and job creation at risk.

Analysis of information technology shows that critical ingredients for the nation as a whole to benefit from outsourcing include business transformation, new workplace practices, and technically trained workers. Workers with technical skills combined with integrative skills need to be diffused even more widely through the economy, particularly into health care services and small and medium-sized enterprises. Lower prices of software and services will promote IT investment in these sectors and raise the demand for workers with both technical and integrative skills.

More generally, labor market policies to promote adjustment and to finance skill upgrading give workers and firms the ability to gain from the technological driver and global trade and investment. At the same time, opening markets abroad to two-way trade in private services is crucial to ensure that US firms and workers can tap into foreign markets to export as well as to invest in and develop products for sale in the marketplace abroad.

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