

## Restructuring information technology: is offshoring a concern?

*Employment trends by industry  
and occupation suggest that offshoring  
in the information technology sector  
occurs, but not to a great extent*

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**T**he immunity from global competition that U.S. white-collar workers have enjoyed for so long has seemingly started to vanish. There is an increasing concern the next great wave of globalization will come in services—in particular, white-collar services. Numerous articles have described the concerns of computer programmers, software engineers, and other workers in the information technology (IT) field—about losing their jobs as companies move service jobs overseas to take advantage of lower labor costs. This article discusses restructuring in the IT sector in the United States and the number and likelihood of IT jobs moving offshore.

Historically, the U.S. economy and labor market have been marked by change. In the latter part of the 17th and into the 18th centuries, many workers began moving off farms to factories as the ‘industrial revolution’ began to take hold. Factory pay was higher, and farming techniques were improving and getting more mechanized. Buoyed by an increasing standard of living, growing labor force participation of women, and expanding technology, the U.S. economy and labor force continued to evolve in the 20th century. In terms of job growth, jobs producing goods were continually outpaced by jobs providing a service. This trend continued, even in many factory jobs. Often referred to as economic restructuring, these shifts reflect the continued pressures on farms, factories, and companies to remain competitive.

Much like these past shifts, the U.S. economy and labor market seem to be reinventing them-

selves again. Service-based companies are hiring workers in other countries to do work previously done by their domestic staff, and manufacturers have been locating plants offshore for the past 25 years.<sup>1</sup> Now, companies in the IT sector, typically thought of as a high-wage sector, are relocating jobs to other countries. Declining communication costs has opened up the path for them to take increased advantage of lower wages abroad in countries such as India and China. This has raised the issue’s visibility because of the apparent shift in ‘job losers’ from international trade: from blue to white collar. For example, a recent article explored this phenomenon—listing computer programmers, call-center operators, and travel agents as examples of professionals whose jobs might be performed in India or other countries with large numbers of highly educated workers but with relatively low labor costs.<sup>2</sup> However, no one has been able to pinpoint precisely how many white-collar jobs have moved overseas. What is fact and what is fiction with regard to offshoring? What do we know and what do we need to know to get a firm grasp of this phenomenon? This article reviews and examines the evidence, including recent trends in the labor market, to answer these questions.

Because there are several definitions of offshoring and outsourcing, a quick review of them is provided to distinguish what offshoring means in this article. This review includes the *composition* of the IT sector, another definition that varies widely in the literature. What industries and occupations are

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included? It is also important to establish *perspective*. How large is the U.S. IT sector? What is its share of all jobs and is it getting bigger? That is, what is the base level of IT jobs? Employment and unemployment trends in individual IT industries and occupations are also examined. Several studies have estimated and forecasted the number of IT-sector jobs that have moved offshore. A synthesis of them is provided.

### Definitions—offshoring and IT

Because this article examines the effects of offshoring on the U.S. IT sector, we must define both what is meant by offshoring and what exactly the IT sector encompasses. Perhaps due to the emerging nature of the concept, no commonly accepted definition of offshoring exists. It is often used interchangeably with outsourcing. Outsourcing typically refers to the practice of one company hiring another company to perform tasks that used to be done in-house. If that task is located in another country, it is sometimes referred to as international outsourcing. For example, if a car manufacturer buys tires from another domestic firm (domestic outsourcing) or a firm in another country (international outsourcing) instead of making the tires itself. The intention here is for the product to be shipped to the manufacturer for assembly.

Offshoring is a little different. Principally, it refers to the practice of replacing domestically supplied services with imported services. Foreign workers are substituted for American workers while remaining in their country. However, not all the service these foreign workers produce may be imported back to the United States. They may also produce services for foreign markets. The key question is to what extent offshoring leads to displacement of U.S. workers. However, there could be other adverse labor market effects. As output grows abroad, U.S. firms could recruit workers in the foreign country, which could lead to decreased domestic hiring. Moreover, market shares could shrink for U.S.-based companies, as their affiliates in other countries capture more of the market. This could lead to a negative employment impact on U.S. export industries.

The dynamic aspects of the U.S. labor market are an important factor. New firms are born, others go out of business, and existing firms expand and contract on a regular basis. That is, restructuring can be commonplace. Further impetus to restructure comes from companies trying to become or remain competitive by increasing productivity through the introduction of new technology or by reorganizing work at home as well as overseas. Finally, we have the natural ebb and flow of the business

cycle. The recent recession devastated the dot-com and other high-paying IT jobs. Many of the jobs identified in the popular press as being offshored are prevalent here. How can we sort this out to get a reasonable estimate of offshoring's impact on the labor market? Offshoring of IT services can lead to job losses due to imports of services in the United States from foreign suppliers and foreign affiliates; increased foreign market share by affiliates leading to a decline in U.S. service exports; and decreased domestic hiring. To quantify these effects, they must be separated from domestic labor market restructuring, productivity growth, and recessionary impacts.

There are several definitions of the IT sector, ranging from narrow to broad. The Organization for Economic Cooperation and Development (OECD),<sup>3</sup> the U.S. Department of Commerce,<sup>4</sup> and the Information Technology Association of America (ITAA)<sup>5</sup> all provide a broad categorization of the IT sector. Other organizations and agencies, such as the U.S. Bureau of Labor Statistics (BLS)<sup>6</sup> and Global Insight<sup>7</sup> use narrower definitions.

Defining the IT sector presents a challenge because most IT workers are in non-IT companies.<sup>8</sup> Moreover, there have

**Exhibit 1. IT-sector occupational and industry definitions**

Occupation or industry	Code
<b>Standard Occupation Classification (soc) <sup>1</sup></b>	
Computer and information systems managers .....	11-3021
Computer programmers .....	15-1021
Computer and information scientists .....	15-1011
Computer systems analysts .....	15-1051
Computer hardware engineers .....	17-2061
Computer software engineers, applications .....	15-1031
Computer software engineers, systems software .....	15-1032
Computer support specialists .....	15-1041
Database administrators .....	15-1061
Network and computer systems administrators .....	15-1071
Network systems and data communications analysts .....	15-1081
Computer operators .....	43-9011
Date entry keyers .....	43-9021
Computer, auto-teller and office machine repairers .....	49-2011
<b>North American Industry Classification System (NAICS)</b>	
Software publishing .....	5112
Computer systems design and related services .....	5415
Internet service providers and web search portals .....	5181
Data processing, hosting and related services .....	5182
Computer and electronic product manufacturing .....	3341
Communications equipment manufacturing .....	3342

<sup>1</sup>2002 Census Bureau classification system introduced into the Current Population Survey (cps) in January 2003. Derived from the 2000 soc system.

**Table 1. Employment and hourly average wages in the economy and IT sector by industry, selected years, 1994–2004**

[In thousands]

Industry	1994		2000		2004	
	Jobs	Wages	Jobs	Wages	Jobs	Wages
Total .....	114,291	\$11.32	131,785	\$14.00	131,481	\$15.67
IT .....	2,805	–	4,093	–	3,253	–
<b>Manufacturing IT</b>						
Computer equipment manufacturing .....	1,651	12.19	1,820	14.73	1,326	17.28
Communications equipment manufacturing .....	218	12.13	248	14.39	151	16.86
<b>Services IT</b>						
Software publishing .....	139	20.50	261	28.48	239	36.90
Computer services .....	531	20.39	1,254	27.13	1,148	30.14
Internet services .....	41	23.39	194	25.60	118	21.58
Data processing .....	227	13.32	314	16.97	271	19.95
Non-IT .....	111,486	–	127,692	–	128,228	–

NOTE: Dash indicates data not available.

been major changes in the Government’s statistical occupation and industry classification series, making historical comparisons difficult. For these reasons, two definitions of the IT sector are adopted: an occupation-based one because of the wide spread of IT workers across companies, and an industry-based definition to obtain a longer historical series. BLS uses an occupational-based definition of the IT sector, which includes the core computer-related occupations.<sup>9</sup> Global Insight adopts a very similar definition, citing modeling and also commenting that “most of the IT software and service occupations that are offshored tend to fall into the core group definition.”<sup>10</sup> Discussions with BLS led to the adoption of the industry-based definition used here.<sup>11</sup> Exhibit 1 on page 12 provides a list of the occupations and the industries encompassed in these two IT-sector definitions. Although both the occupation and industry classification systems have recently been revised, BLS has restored the historical series for occupations back to 2000 and for industries back to 1994. As noted earlier, the reason for having an industry IT definition is to have a slightly longer time series to examine trends.

### Employment in the IT sector

Technology has contributed to long-term economic growth in the United States. Information technology’s (IT) share of the U.S. economy doubled between the late 1970s and the turn of the century.<sup>12</sup> Gaining momentum in the 1990s, digital technologies and the transformation to a knowledge-based economy led to a robust demand for highly skilled workers. IT job growth was strong in the 1990s before tapering off when the 2001 recession took hold.

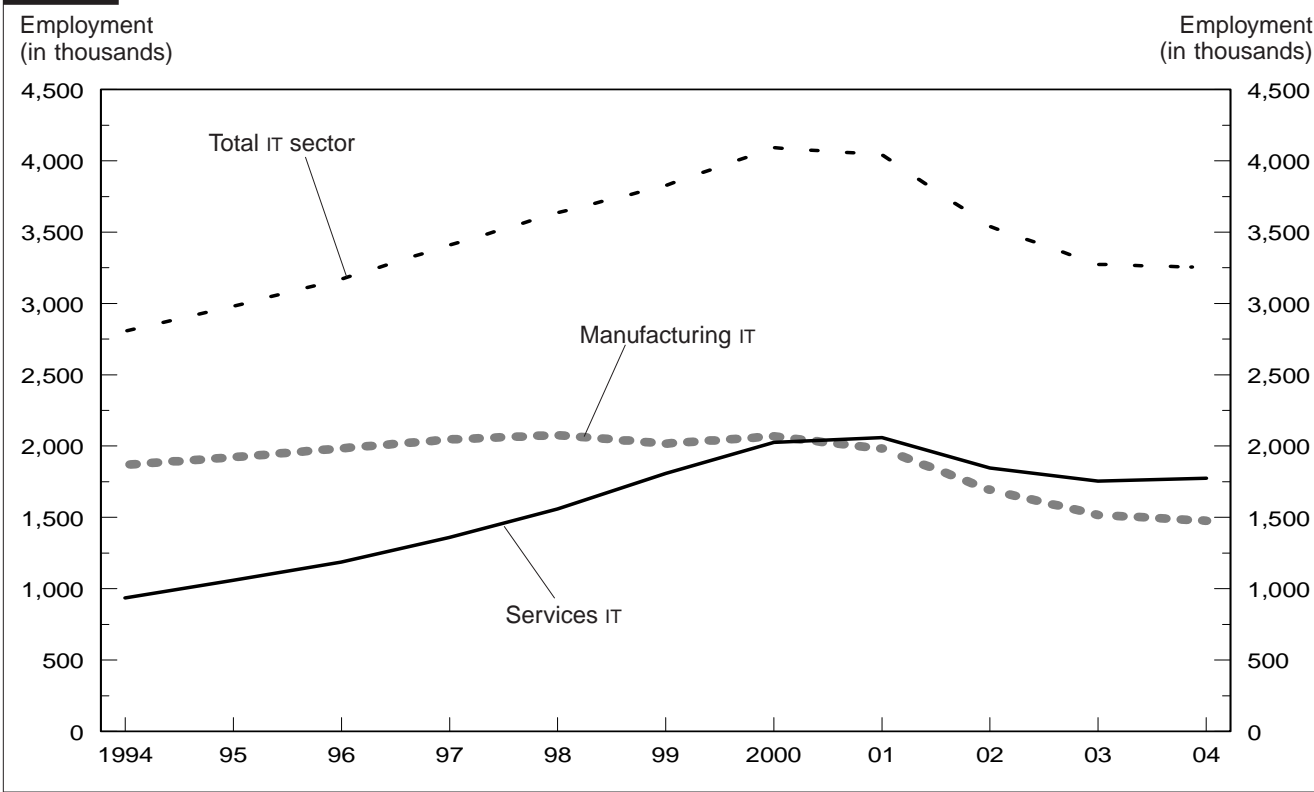
The number of jobs in the IT sector now stands at around 3.3 million, or 2.5 percent of the total number of jobs. (See table 1.) Prior to the recession in 2001, the IT sector had more than 4 million jobs and accounted for more than 3 percent of all jobs. How much of this loss is due to the business cycle downturn and how much to offshoring is not really known. Nonetheless, some clues are provided by digging deeper into the data available.

Because business cycles are more likely to affect manufacturing jobs, while offshoring in the IT sector is more likely to affect service-sector jobs, the IT sector will be divided into manufacturing and service jobs. Over the 1994–2004 period, the share of service jobs in the IT sector jumped from 33 percent in 1994 to 50 percent in 2000 and 55 percent in 2004, indicating perhaps that extensive offshoring is not occurring. Table 2 shows a steady, gradual shift within the IT sector from manufacturing to service jobs. Moreover, the lower paying manufacturing

**Table 2. Percent distribution of IT-sector employment in manufacturing and services, 1994–2004**

Year	Manufacturing	Services
1994 .....	66.6	33.4
1995 .....	64.5	35.5
1996 .....	62.6	37.4
1997 .....	60.1	39.9
1998 .....	57.1	42.9
1999 .....	52.7	47.3
2000 .....	50.5	49.5
2001 .....	49.0	51.0
2002 .....	47.8	52.2
2003 .....	46.4	53.6
2004 .....	45.4	54.6

**Chart 1. IT-sector employment in manufacturing and services, 1994–2004**



component accounted for a disproportionate 70 percent of the job losses from 2000 to 2004. Chart 1 illustrates the continued downturn in IT-sector employment since the recession hit, especially in IT manufacturing.

Of course, not all jobs in the industries identified as IT industries are IT jobs. For this reason, the primary focus is on our occupational-based definition of the IT sector. Table 3 confirms the relative magnitude of the IT sector of just more than 3 percent of the U.S. workforce and its dip during the recent recession.

The total number of workers employed in IT occupations was 4.5 million, on average, in 2004. This is somewhat higher and perhaps more accurate than the estimate based on the industry-based definition. More importantly, from an

offshoring standpoint, what is the trend? Are any of the detailed occupational group’s employment levels trending downward? Since peaking in 2001, the total number of workers employed in the IT sector declined through 2003, but held steady between 2003 and 2004. Losses in the following occupations are mainly responsible: computer programmers; system analysts; hardware engineers; computer support; network administrators and analysts; computer operators; and data entry keyers. All of these illustrate continuous employment declines or have not bounced back much from the recent recession. (See table 4.)

Dividing the IT sector into high- and low-wage occupations is revealing. It shows a gradual shift away from low-wage jobs that appears to have started prior to the recent recession. (See table 5.) Recall that the industry-based definition of the IT sector showed the same shift. This is consistent with Mary Amiti and Shang-Jin Wei’s findings that U.S. service outsourcing reduced manufacturing employment by about 0.5 percent a year over the 1992–2001 period,<sup>13</sup>—and with the trade theorists’ contention that jobs lost in the United States from offshoring would be mainly low skilled and low paid.<sup>14</sup> Moreover, the 4.8-percent unemployment rate for IT workers in 2004 was 6.1

**Table 3. Percent distribution of employment by IT sector, 2000–04**

Sector	2000	2001	2002	2003	2004
IT sector .....	3.2	3.5	3.3	3.3	3.2
Non-IT sector .....	96.8	96.5	96.7	96.7	96.8

NOTE: Based on occupations in exhibit 1.

**Table 4. Employment in the IT sector, by occupation, 2000–04**

Occupation	2000	2001	2002	2003	2004
Total – IT sector .....	4,718	4,795	4,510	4,494	4,495
Computer and information system managers .....	228	316	323	347	337
Computer programmers .....	745	689	630	563	564
Computer and information scientist and systems analysts .....	835	734	682	722	700
Computer hardware engineers .....	83	100	76	99	96
Computer software engineers .....	739	745	715	758	813
Computer support specialists .....	350	355	353	330	325
Database administrators .....	54	66	84	72	94
Network and computer systems administrators .....	154	185	179	176	190
Network systems and data communication analysts .....	305	353	328	359	312
Computer operators .....	313	324	283	191	191
Data entry keyers .....	632	623	542	581	504
Computer auto-teller and office machine repairers .....	280	305	315	296	369

percent for those in low-wage occupations and only 3.6 percent for those in high-wage occupations.

Trends in unemployment support the employment figures. This is not always the case because of the dynamism of labor markets. The employment change between two time periods is a net figure made up of new employment entrants as well as workers who lost their job or just quit. Not all employment losers or leavers become unemployed; some may retire or leave the labor force for other reasons, such as to return to school. In the IT sector it does appear, however, that employment cutbacks have led to increased joblessness. The unemployment rate in the IT sector had climbed to 6 percent in 2003, before showing improvement in 2004. Moreover, five of the IT occupations that experienced employment reductions also showed steady rising joblessness over the 2000–03 period and only little or no improvement in 2004—computer programmers, systems analysts, computer support, network analysts, and data entry keyers. (See table 6.) This could be consid-

ered light evidence of offshoring, at least to some extent, in these specific IT-sector occupations—certainly it raises suspicions. To put the magnitude of this in perspective, adding the number unemployed in each of the five occupations together yields 149,000 workers. If they were all employed, it would have reduced total unemployment from 5.5 to 5.4 percent in 2004.

How can we sort out the recessionary job losses from those due to offshoring in the 2000–04 period? Examining a few of the underlying dynamics of labor market behavior by looking at labor force flows might be revealing.

Job growth is a combination of new companies opening for business (births) plus existing companies hiring additional workers (expansion); this is offset by companies going out of business (deaths) and companies losing workers through layoffs, quits, retirements, and so forth (contractions). The rate of gross job creation is the sum of births and expansions as a percentage of total employment. The rate of gross job destruction is analogously the sum of deaths and contractions as a percentage of total employment. Over the U.S. postwar period, gross job creation has exceeded gross job destruction except during recessions. As expected, in the recent business cycle the rate of job destruction increased during the recession and then declined during the recovery to its pre-recession rate. However, the pattern for job creation has been unusual, or off the typical trend. (See chart 2.) It began to fall well before the recession and continued to fall during the economic recovery until turning upward in 2004. That is, the unusually low rate of job growth in the current expansion stems from a lack of job creation, not from a high rate of job destruction. Has offshoring played a role in this atypical trend? To help figure this out, it is possible to examine gross job creation and destruction rates in the professional and business services industry, where many jobs are thought to

**Table 5. Percent distribution of IT-sector by high- and low-wage occupations, 2000–04**

Year	High-wage <sup>1</sup>	Low-wage <sup>2</sup>
2000 .....	64.4	35.6
2001 .....	66.5	33.5
2002 .....	66.9	33.1
2003 .....	68.9	31.1
2004 .....	69.1	30.9

<sup>1</sup> Computer and information systems managers, computer programmers, computer systems analysts, computer hardware and software engineers, network computer system administrators and analysts.

<sup>2</sup> Computer support specialists, computer operatives, data entry keyers. Computer auto-teller and office machinery repairers.



**Table 6. Unemployment rates in the IT sector, by occupation, 2000–04**

[In percent]					
Occupation	2000	2001	2002	2003	2004
Total, IT sector .....	2.7	4.0	5.5	6.0	4.8
Computer and information system managers .....	1.6	3.3	5.6	5.0	4.0
Computer programmers .....	2.0	4.0	6.1	6.4	5.8
Computer and information scientist and systems analysts ...	2.3	2.8	4.4	5.2	3.9
Computer hardware engineers .....	1.8	2.9	6.5	7.0	2.1
Computer software engineers .....	1.7	4.2	4.7	5.2	3.3
Computer support specialists .....	3.4	4.2	5.4	5.4	4.6
Database administrators .....	3.0	2.6	2.9	6.6	2.0
Network and computer systems administrators .....	1.3	2.1	6.0	5.3	3.4
Network systems and data communication analysts .....	2.8	4.6	4.3	6.5	5.8
Computer operators .....	3.2	4.2	4.9	5.0	3.1
Data entry keyers .....	5.5	5.8	7.9	7.6	9.0
Computer auto-teller and office machine repairers .....	2.6	3.8	5.0	8.3	4.7

**Table 7. Average employment and gross domestic product (GDP) growth in postwar recoveries in the United States**

Dates	Length (months)	Average employment growth	Average GDP growth (percent)	Average productivity growth (percent) <sup>1</sup>
October 1945 to November 1948 .....	37	178,000	—	—
October 1949 to July 1953 .....	45	169,000	6.3	3.1
May 1954 to August 1957 .....	39	107,000	3.7	1.5
April 1958 to April 1960 .....	24	158,000	5.4	3.9
February 1961 to December 1969 .....	106	167,000	4.8	3.0
November 1970 to November 1973 .....	36	208,000	4.5	2.6
March 1975 to January 1980 .....	58	244,000	3.9	1.7
July 1980 to July 1981 .....	12	147,000	3.4	2.2
November 1982 to July 1990 .....	92	229,000	4.1	2.1
March 1991 to March 2001 .....	120	200,000	3.5	2.2
November 2001 to February 2005 .....	39	50,000	3.3	4.1

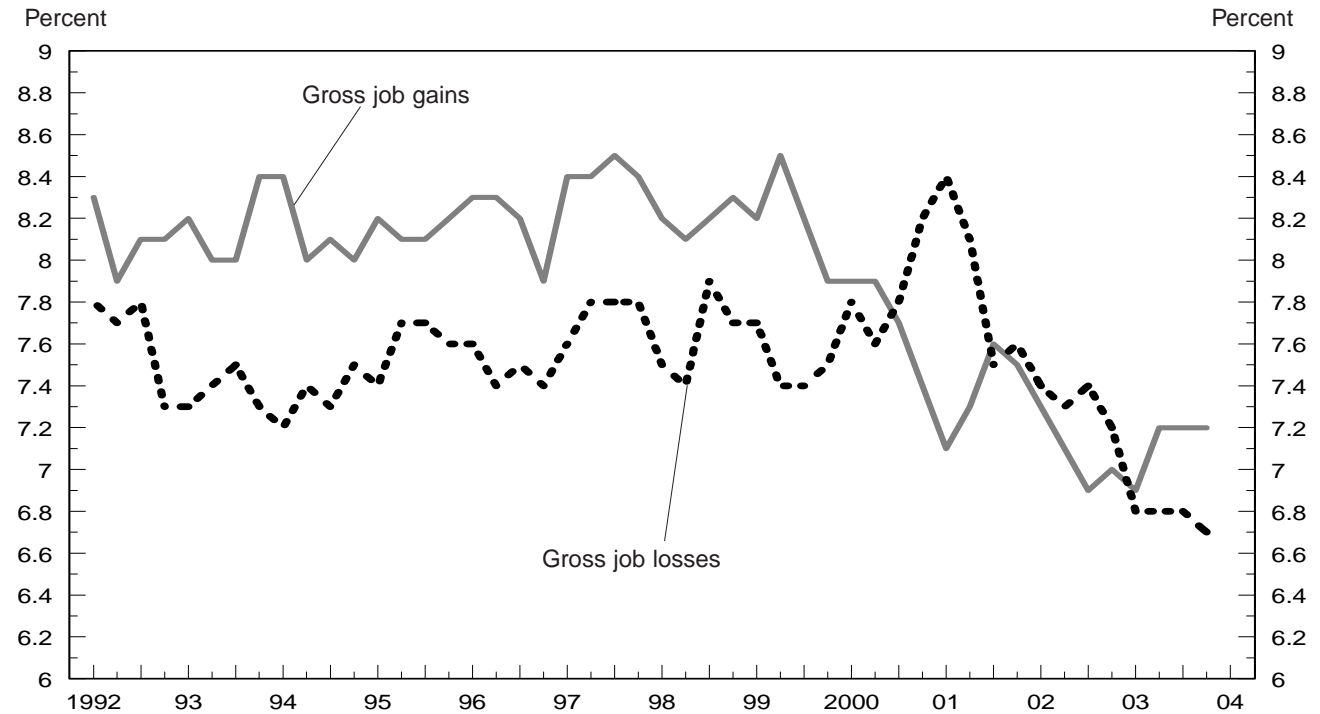
<sup>1</sup>Average change in each quarter at an annual rate in output per hour in nonfarm business.

be offshored. The same unusual trend prevails. (See chart 3.) Gross job creation in the professional and business services industry also began falling prior to the recession—and continued to do so until turning upward recently. Thus, jobs are no longer being lost, but they are also not largely being created. Several studies have noted the possibility of decreased domestic hiring as an outcome of offshoring.<sup>15</sup> Thus, it could be assumed that offshoring services contributed modestly to poor employment recovery in the United States.

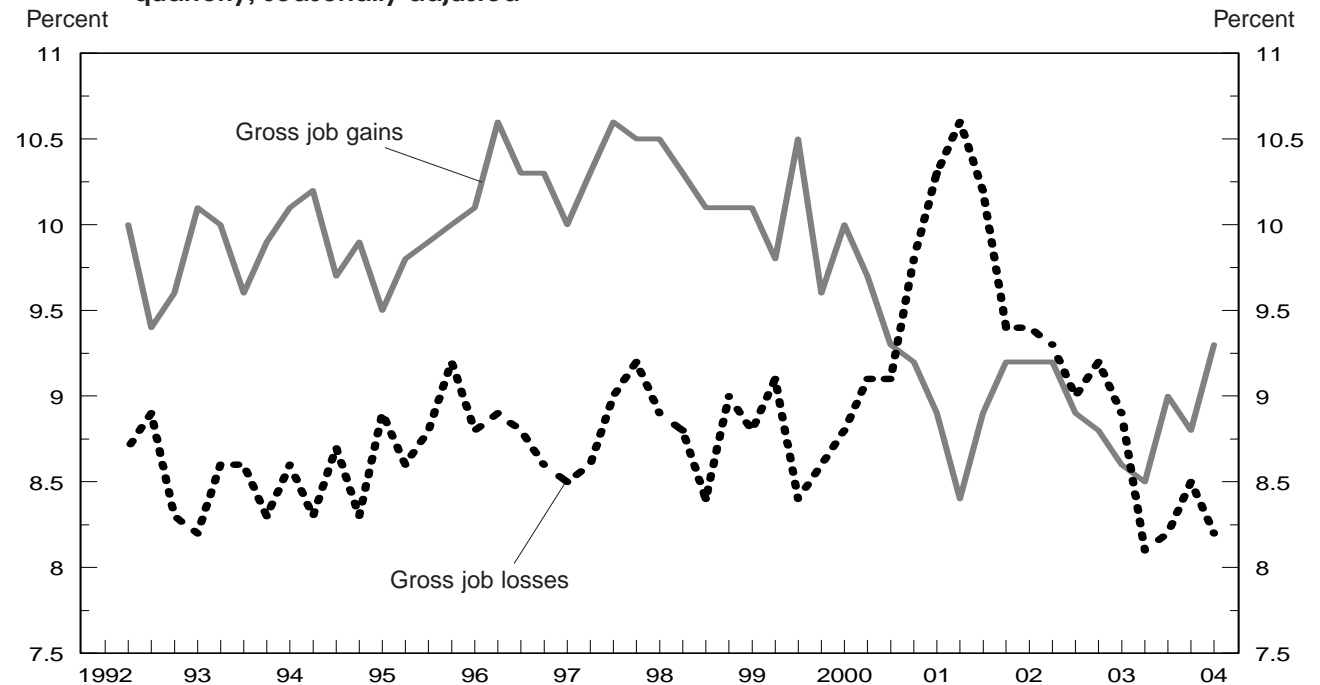
What is the driving force behind the anemic U.S. recovery? It is instructive to compare the recent recoveries with past recoveries to see what differences, if any, may be revealed. Table 7 illustrates the average employment, gross national product (GDP), and productivity growth in U.S. postwar recoveries. The number that stands out is the very weak employment growth in the current recovery to date, even though GDP growth is only a little below average compared with past recoveries. This requires an explanation—and high productivity growth appears to be

standing out as part of the answer. Productivity has grown at an annual rate of 4.1 percent in the current recovery, the highest ever recorded in a postwar recovery. Why have firms chosen to respond to higher demand almost entirely through higher productivity rather than increasing employment? A good analysis of this question is provided by the Federal Reserve Bank of Boston<sup>16</sup>—which believes that firms are uncertain about current economic growth and the demand for their products, especially in the short run; thus, they are reluctant to hire workers.<sup>17</sup> Companies view further productivity gains as a safer, less costly strategy to the recent economic growth spawned mainly by monetary and fiscal policy.<sup>18</sup> Conceivably viewing this growth as transitory, they meet it with transitory increases in productivity.<sup>19</sup> Whether offshoring is also playing a role in this through reorganizing work by sending it offshore is unknown. However, an examination of trade flows in services should provide some insights into the involvement of offshoring in this scenario.

**Chart 2. Total private gross job gains and losses, 1992–2004, quarterly, seasonally adjusted**



**Chart 3. Professional and business services gross job gains and losses, 1992–2004, quarterly, seasonally adjusted**



Services that are offshored to other countries could return to the United States as imports. For example, a company hires software engineers in India to develop a new program to combat Internet viruses. When the project is complete, the company uses the new program in all its U.S. domestic facilities. This would be recorded as imports of services to the United States. Indeed, imports and exports of private services have been growing. (See table 8.) The main interest here is the trend in imports of business professional and technical services, which includes computer, data processing, and other information services. Imports of business services are rising as a share of total private services; this trend is also visible for India and China. Although the magnitudes of the imports are not large, the upward trend, especially from India, seems to support the notion that some offshoring of IT work is occurring.

In summary, offshoring in the IT sector appears to be occurring but not to a great extent.<sup>20</sup> A review of the U.S. literature describes where the offshoring issue has been examined extensively in recent years.

### What the literature shows

Economic theory suggests that offshoring is likely to provide overall gains to the U.S. economy, but some workers could suffer negative effects from job losses and/or wage reductions. The literature appears to bear this out. Offshoring has generated a number of studies on a wide range of topics such as its impact on GDP, inflation, trade, consumers, productivity, wages, and employment. Studies have also addressed the underlying reasons for offshoring, such as companies seeking cost savings and revenue growth. Much of the early effort has come from management consulting firms, most notably McKinsey Consulting<sup>21</sup> and Forrester Research.<sup>22</sup> McKinsey concluded that the United States gets more than it gives from

offshoring, due primarily to the new revenue it generates that flows back in the Nation.<sup>23</sup> Forrester provided the most widely cited job impact number from offshoring—3.3 million jobs lost by 2015.<sup>24</sup> This estimate is consistent with the sentiment in the literature that service outsourcing, although now very low, has been steadily increasing.<sup>25</sup> The focus of this literature review is primarily on studies exploring the impact of offshoring on U.S. employment and, to a lesser extent, U.S. productivity.

A recent report by U.S. Government Accountability Office (GAO) concluded that data on offshoring are extremely weak; there is just not much available.<sup>26</sup> With the exception of BLS data from the Mass Layoff Survey, which directly measures the magnitude and reasons companies move work offshore, most of the studies of the employment impact of offshoring use an indirect approach. When pulling the findings of these studies together, offshoring appears to have a small employment impact in the aggregate, but certain occupations and industries are hard hit. BLS surveys companies undergoing large layoffs—50 or more in a 30-day period—to determine the reason(s) for the layoffs. Although the survey has been around for a number of years, BLS only added questions pertaining to outsourcing and offshoring in 2004. If the reason companies give for the layoffs is other than seasonal or vacation, BLS asks whether the layoff was due to the company moving work geographically (but keeping it in the same company), and/or moving it to a different company. If work was indeed moved, a follow-up question is asked: Where was the work moved? Between January and September 2004, there were only 40,727 separations, of which 26 percent were due to overseas relocations—19 percent within the same company and 7 percent to a different company. Amiti and Wei found that service offshoring reduced manufacturing employment by a small amount, but when

**Table 8. Business professional and technical services share of total private services for selected year and country**

[In millions of dollars]

Country	Exports			Imports		
	1998	2000	2003	1998	2000	2003
All countries – total private services .....	\$244,748	\$284,410	\$294,080	\$166,226	\$208,560	\$225,216
Percent - business professional and technical services .....	18.6	19.4	23.7	13.6	14.7	18.1
India – total private services .....	\$1,880	\$2,535	\$3,720	\$1,542	\$1,896	\$2,184
Percent - business professional and technical services .....	10.6	8.6	9.5	8.6	10.9	19.2
China – total private services .....	\$3,958	\$5,201	\$5,916	\$2,302	\$3,268	\$3,869
Percent - business professional and technical services .....	16.0	15.1	12.1	3.1	3.4	3.5

SOURCE: U.S. Department of Commerce, Bureau of Economic Analysis, *Survey of Current Business*, October 2004.



**Exhibit 2. Estimated employment impact on the IT sector of offshoring from the literature**

Author	Estimated annual employment losses	Methodology
Forrester	50,000	Survey
Global Insight, Inc.	34,000	Micro-simulation
Schultze	52,000–72,000	Import flows
Bardhand and Kroll	500,000	At risk
Bhagwati and others	65,000	Job growth in India, Ireland, Philippines

they aggregated their 450-industry sample to only 100 industries, the effect disappears.<sup>27</sup> They conclude that increased demand in other industries offset the small declines in manufacturing.<sup>28</sup>

A number of papers examined the IT sector. (See exhibit 2.) Despite their varied methodologies and definitions of outsourcing, the overall findings still indicate a small employment impact. Part of the reason there is an employment effect at all results from outsourcing’s positive effect on productivity, which in turn lowers the employment level needed to produce the same amount of goods or services. The GAO report, for instance, concluded that offshore outsourcing could hurt IT employment growth in the next decade.<sup>29</sup> Using a survey-based approach, Forrester Research released a follow-up report saying outsourcing overseas was accelerating, and forecasting that 542,000 IT-sector jobs could be lost by 2015; this is about 50,000 per year.<sup>30</sup> Using a micro-simulation approach, Global Insight Inc. estimated the IT sector would lose (or never create) 34,000 jobs per year as a result of offshoring.<sup>31</sup> Using import flows in business and professional services, Charles L. Schultze forecasted an aggregate job loss from offshoring of between 52,000–72,000 per year for 2000–03.<sup>32</sup> Using a direct approach, Ashok Bardhan and Cynthia Kroll developed a list of industries they felt were “at risk” of outsourcing to India and East Asia based upon how often they were noted in the media.<sup>33</sup> In 2001, the “at risk” group accounted for just more than 5 percent of total U.S. employment; moreover, they suffered disproportionate job losses between 2001 and 2003.<sup>34</sup> However, the authors did not acknowledge the importance of separating the 500,000 per-year employment decline in “at risk” industries into its cyclical and secular components, given the economic downturn in most of 2001.

A second strand of literature recently developed in the offshoring debate. It features a discussion among very

well-known economists about whether offshoring between the United States and countries such as India has changed our terms of trade.<sup>35</sup> This can be seen when viewing the role of outsourcing as vertical integration, whereby the production process is broken into steps, each located in a different geographical area depending on where it can be produced at the lowest cost.<sup>36</sup> That is, each step is produced where there is a comparative advantage for that step. This appears to be happening in IT-sector service functions. Paul Samuelson argues, for example, that tasks such as computer programming done increasingly in India and other low-wage countries for U.S.-based companies have the potential to change the terms of trade by raising the trading partner’s productivity in products they export.<sup>37</sup> Some of the services would be imported back into the United States. When asked in an interview if importing offshore services back into the United States would allow U.S. prices to drop generally to the benefit of consumers, as does the trade in goods, Samuelson replied, “being able to purchase groceries 20 percent cheaper at Wal-Mart does not necessarily make up for the wage losses.”<sup>38</sup> In other words, trade does not always work to all parties’ advantage, according to Samuelson.<sup>39</sup> Jagdish Bhagwati and others counter this argument by saying that the domestic impact of services trade does not apply broadly across the U.S. economy.<sup>40</sup> They agree with Samuelson that offshoring can enhance productivity growth, but emphasize, as does Catherine L. Mann,<sup>41</sup> that it will lead to faster U.S. GDP growth. Moreover, further gains will be garnered from increases in “intra-industry” trade.<sup>42</sup> Results from a 2001 study concluded that intra-industry trade in the service sector is probably of similar magnitude as intra-industry trade in goods.<sup>43</sup>

The trade theorist view of offshoring—as just another way of doing international trade—predicts job losses in lower skilled, lower-paid jobs. This appears to be borne out somewhat by the data presented earlier, although some

higher-paid service occupations are also suffering losses. Using data from India, Ireland, and the Philippines, Bhagwati and others estimate service offshoring to have cost the United States approximately 65,000 jobs per year, not far above the previous estimates presented.<sup>44</sup> The debate now turns to whether those service-sector workers who are displaced by outsourcing will be bumped down to lower-paying jobs. The conventional view is that trade replaces bad jobs with good jobs, but does this view hold for services where some good jobs are indeed being displaced? Some job losers have higher skills that help them get a new job, but they also demand higher wages that limit their re-employment possibilities. If service offshoring does create good jobs, while eliminating others, it would enhance the transition process. There is a lack of knowledge here. Bhagwati and others think that service offshoring will create services not previously available—when using cheaper workers abroad makes an

activity that uses higher-skilled workers in the United States financially feasible.<sup>45</sup> On the other hand, Lori Kletzer concludes that trade does dump some displaced workers into lower-wage jobs.<sup>46</sup> From 1979 to 1999, roughly 30 percent of the people who were unemployed as a result of cheap imports in sectors other than manufacturing had not found jobs a year later.

In summary, most studies find the extent of job losses from services offshoring relatively small in the aggregate, but somewhat concentrated in a few industries and occupations. The job losses stem from both a direct impact of offshoring, which displaces some workers, plus an indirect impact through the productivity enhancements that it provides. However, there are still unanswered empirical questions, including the just-mentioned productivity effect. Indeed, offshoring could raise productivity directly or indirectly by displacing low-wage jobs and creating high-wage ones, but it could also do just the opposite. □

## Notes

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<sup>1</sup> An estimated 5 million factory jobs were lost. See Griff Witte, “As Income Gap Widens, Uncertainty Spreads,” *The Washington Post*, Sept. 20, 2004, p. A01.

<sup>2</sup> *Ibid.*

<sup>3</sup> *Measuring the Information Economy* (Paris, Organization for Economic Cooperation and Development [OECD], 2002).

<sup>4</sup> *Digital Economy 2003* (Washington, DC, U.S. Department of Commerce, December 2003).

<sup>5</sup> *ITAA Quarterly Workforce Survey* (Arlington, VA, Information Technology Association of America [ITAA], Dec. 18, 2002).

<sup>6</sup> See Roger Moncarz, “Preparing for careers in information technology is a function of multiple subroutines. Which algorithm will you choose?” *Occupational Outlook Quarterly* (Washington, DC, fall 2002); Daniel E. Hecker, “High-technology employment: a NAICS-based update,” *Monthly Labor Review*, July 2005, pp. 57–72; and William Luker, Jr. and Donald Lyons, “Employment shifts in high-technology industries, 1988–96,” *Monthly Labor Review*, June 1997, pp. 12–25.

<sup>7</sup> Global Insight, Inc., “The Impact of Offshore IT Software and Services Outsourcing on the U.S. Economy and the IT Industry,” (Lexington, MA, March 2004).

<sup>8</sup> Moncarz, “Preparing for careers...”

<sup>9</sup> *Ibid.*

<sup>10</sup> Global Insight, Inc., “The Impact of Offshore IT Software...”

<sup>11</sup> E-mail correspondence with Roger Moncarz, BLS, on Sept. 15, 2004.

<sup>12</sup> Carol Ann Meares and others, *The Digital Work Force: Building Infotech Skills at the Speed of Innovation* (U.S. Department of Commerce, June 1999), figure 1, p. 5.

<sup>13</sup> Mary Amiti and Shang-Jin Wei, “Service Outsourcing, Productivity and Employment: Evidence from the US,” (International Monetary Fund [IMF], First Draft, May 2004). Because their sample of 450 industries included only 5 service industries, they did not separate out an impact just on them.

<sup>14</sup> See, for example, Jagdish Bhagwati, Arvind Panagariya, and T.N. Srinivasan, “The Muddles over Outsourcing,” *Journal of Economic Perspectives* (forthcoming).

<sup>15</sup> See, for example, Government Accountability Office (GAO), “International Trade: Current Government Data Provide Limited Insight into Offshoring of Services” (Washington, DC, Government Printing Office, September 2004); and Global Insight, Inc., “The Impact of Offshore IT Software...”

<sup>16</sup> Federal Reserve Bank (FRB) of Boston, “Understanding the ‘Job-Loss’ Recovery,” *Public Policy Briefs* No. 04-1, June 2004.

<sup>17</sup> *Ibid.*

<sup>18</sup> *Ibid.*

<sup>19</sup> *Ibid.*

<sup>20</sup> The OECD, using a broader occupational-based definition of the IT sector which represented about 19 percent of total employment, reached a similar conclusion. They concluded that the number of jobs lost to offshoring was relatively small compared with general job turnover in OECD countries. This was further supported by a European Union (EU) study that concluded jobs lost due to offshoring seldom resulted in redundancies. See OECD, *Potential Offshoring of ICT-Intensive Using Occupations*, DSTI/ICCP/IE (2004) 19 (Paris, December 2004); and EU, *Outsourcing of ICT and related services in the EU*, (Luxembourg, European Foundation for the Improvement of Living and Working Conditions, 2004).

<sup>21</sup> McKinsey Consulting, “Offshoring: Is It a Win-Win Game?” (San Francisco, CA, August 2003).

<sup>22</sup> John McCarthy, “3.3 Million U.S. Service Jobs to Go Offshore,” (Forrester Research, November 11, 2002).

<sup>23</sup> McKinsey Consulting, “Offshoring: Is It...”

<sup>24</sup> John McCarthy, “3.3 Million U.S. Service Jobs...”

<sup>25</sup> See, for example, Mary Amiti and Shang-Jin Wei, “Fear of Service Outsourcing: Is It Justified?” *NBER Working Paper No. 10808* (Cambridge, MA, September 2004).

<sup>26</sup> Government Accountability Office (GAO), “International Trade: Current Government Data Provide...”

<sup>27</sup> See Mary Amiti and Shang-Jin Wei, “Service Outsourcing Productivity...”

<sup>28</sup> *Ibid.*

<sup>29</sup> Government Accountability Office (GAO), “International Trade: Current Government Data Provide...”

<sup>30</sup> Estimates were determined from a survey of 100 companies specializing in business process outsourcing plus 1,800 leading IT companies in the United States and India. See John McCarthy, “Near-Term Growth of Offshoring Accelerating,” Forrester Research, May 2004.

<sup>31</sup> Global Insight Inc., “Executive Summary: The Comprehensive Impact of Offshore IT Software and Services Outsourcing on the U.S. Economy and the IT Industry,” sponsored by Information Technology Association of America (ITAA), March 2004. Model forecasts the economy for 2004–08 with and without outsourcing; assumption is a 40-percent cost savings for companies using outsourcing.

<sup>32</sup> Charles L. Schultze, “Offshoring, Import Competition and the Jobless Recovery,” Policy Brief #136 (Brookings Institution, August 2004).

<sup>33</sup> Ashok D. Bardhan and Cynthia Kroll, “The New Wave of Outsourcing, Institute of Business and Economic Research, Fisher Center for Real Estate & Urban Economics” (Berkeley, CA, University of California, 2003).

<sup>34</sup> *Ibid.*

<sup>35</sup> Terms of trade are typically defined as the prices of exports divided by the prices of imports.

<sup>36</sup> Robert C. Shelburne, “Trade and inequality: the role of vertical specialization and outsourcing.” Paper presented to International Trade and Finance Association, San Antonio, TX, May 2004.

<sup>37</sup> Paul Samuelson, “Where Ricardo and Mill Rebut and Confirm Arguments of Mainstream Economists Supporting Globalization,” *Journal of Economic Perspectives*, (forthcoming).

<sup>38</sup> “Ten Myths about Jobs and Outsourcing,” *Economic Watch*, on the Internet at <http://www.heritage.org/research/features/economywatch/outsourcing.cfm>, visited November 1, 2004.

<sup>39</sup> “Samuelson Strikes Again: The Debate Over Outsourcing,” *Exploit the Worker*, on the Internet at <http://exploittheworker.com/exploit/archives/000061.html>, visited November 1, 2004.

<sup>40</sup> Jagdish Bhagwati, Arvind Panagariya, and T.N. Srinivasan, “The Muddles over Outsourcing...”

<sup>41</sup> Catherine L. Mann, “Globalization of IT Services and White Collar Jobs: The Next Wave of Productivity Growth,” *International Economics Policy Briefs*, December 2003; Bhagwati...

<sup>42</sup> Bhagwati...

<sup>43</sup> Robert C. Shelburne and Jorge G. Gonzalez, “The Role of Intra-Industry Trade in the Service Sector.” Paper presented at the Annual Conference of the International Trade and Finance Association, Washington, DC, May 2001.

<sup>44</sup> Bhagwati...

<sup>45</sup> *Ibid.*

<sup>46</sup> Lori Kletzer, “Job Losses from Imports: Measuring the Costs” (Washington, DC, Institute for International Economics, 2001).