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OFFSHORING OF INFORMATION-TECHNOLOGY JOBS:  
MYTHS AND REALITIES

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## Executive summary

Notwithstanding the rapid development of information-technology industries in India and other countries with lower labor costs, the risks of the United States losing high-end IT jobs are much smaller than many recent high-profile reports suggest. A closer look at employment trends during and after the 2000-01 recession shows that, with few exceptions, most of the job losses that stoked offshoring fears were cyclical in nature and have been recouped. IT offshoring risks are limited to low-end occupations (such as programmers, coders and support specialists) that are labor intensive, easy to codify, or require little face-to-face contact. “High-end” jobs – that is, those which require advanced degrees in computer science or information systems as well as a good understanding of management and business processes – show no signs of secular decline, and are in fact now growing at rates common in the 1990s boom.

## Offshoring and information technology: some definitions

Offshoring in its broadest sense refers to the replacement of domestically-located service or production facilities with equivalent facilities abroad. If these facilities serve new foreign markets, then the negative effects on domestic employment will be negligible. However, if they serve U.S. markets, then fears of job losses at home are well-founded.

Offshoring can take two distinct forms. The most visible is when a company creates a foreign wholly or jointly owned subsidiary. This is quite common in manufacturing industries, although the foreign subsidiaries most often serve foreign markets. For instance, in 2001 only 4 percent of the sales of US subsidiaries in India served U.S. markets; in China the corresponding figure was 11 percent. More recently, some IT service companies have begun making similar moves, and anecdotal evidence suggests that they much more commonly serve U.S. markets.

A less visible form of offshoring (and of more importance to IT professionals and other service occupations) is when U.S. firms outsource activities to third-party firms in foreign countries. This is evidenced by the rise of Bangalore and other clusters in India, in which Indian firms provide IT services to US companies.

There are many definitions of the information-technology sector, some based on industrial groups and others on occupational groups. An occupational definition of IT is preferable when studying offshoring. According to occupational data published by the Bureau of Labor Statistics, less than half of all IT occupations are found in what are commonly termed “IT industries” (which include computer and peripheral equipment manufacturing, information and software publishing and computer systems design services). The remaining jobs are found throughout the economy in both goods- and service-producing industries, and an occupational analysis takes them into account.

## What kinds of jobs are at risk?

The driving force of offshoring in IT services is drastic reductions in barriers (both with regard to cost and technology) for sharing, analyzing and using information across great geographic distances. As information becomes increasingly important in business operations, and that information

can be digitally transmitted virtually anywhere on the globe, it is no surprise that global networks within and among companies, as well as among their suppliers and customers, are flourishing.

But the choice to move activities offshore is not just a matter of cheap labor. The decision to offshore depends on at least three factors:<sup>1</sup>

**Labor intensive:** It makes more sense to locate such jobs in countries with relatively low wages. This is the classic phenomenon of comparative advantage. IT jobs that may fall into this category are data entry clerks, low-end programmers and coders.

**Easily codifiable:** Tasks that can be codified into a set of simple instructions and require minimal employee judgement (such as call centers for IT technical support and software testing) are. Many of these jobs are at risk of automation as well.

**Highly transparent:** Tasks that do not require face-to-face contact to verify information or build trusting relationships are easier to locate offshore. For example, a firm might consider sourcing its accounts payable department to a lower-cost jurisdiction (since it is easy to verify mistakes and irregularities), but the same company would probably want on-site presence of its provider when implementing and maintaining a customized enterprise resource-planning software system (since it would want to be sure that the vendor understands the firm's culture and organization).

### Myths and realities of IT offshoring risks

The potential dangers of IT offshoring took center stage in 2003. Job weakness in IT occupations (and outright declines in some) during the period 2000-02, combined with the rise of India as an emerging competitor in the area of IT services, led many to conclude that large numbers of white-collar IT jobs would soon leave the country. A high-profile analysis by Forrester Research, released in late 2002 and updated in 2004, estimated that 3.3 million jobs in vulnerable service-sector occupations would move offshore by 2015, of which upwards of 500,000 would be in IT services. That study became a reference point in business and the media, and stoked fears of continued job losses in IT occupations of all skill levels. Subsequent studies by consulting firms and others seemed to support this pessimistic outlook (Table 1).

<sup>1</sup>Adapted from C. Alan Garner, "Offshoring in the Service Sector: Economic Impact and Policy Issues," Federal Reserve Bank of Kansas City Economic Review, Third-Quarter 2004, pp. 5-37.

**Table 1**  
**Summary of private-sector estimates of IT offshoring and its potential effects**

Source	Scope and methodology	Major findings
Forrester Research (November 2002)	<p>Scope: 18 occupational groups in the service sector of the U.S. economy.</p> <p>Methodology: ranks each occupation by 4 offshoring risk factors; applies subjective (and growing) share of jobs offshored for 2000, 2005, 2010 and 2015</p>	<ul style="list-style-type: none"> <li>• 3.3 million jobs may be offshored by 2015.</li> <li>• IT job losses could reach 50,000 per year.</li> </ul>
Gartner Group (June 2003)	<p>Scope: IT industries and occupations</p> <p>Methodology: qualitative discussions with IT suppliers and purchasers about their offshoring plans</p>	<ul style="list-style-type: none"> <li>• By the end of 2004, 500,000 IT jobs may be displaced.</li> <li>• 10 percent of jobs in IT industries may move to emerging markets.</li> <li>• 5 percent of IT occupations in non-IT industries may move to emerging markets.</li> </ul>
Global Insight (March 2004)	<p>Scope: Examines software and IT service industries but estimates economywide effects.</p> <p>Methodology: Macroeconomic model of the U.S. economy, based on historical statistical relationships among economic variables.</p>	<ul style="list-style-type: none"> <li>• Just over 100,000 of the 372,000 jobs lost from 2000 to 2003 were attributable to offshoring.</li> <li>• By 2008, IT employment will rebound (though more slowly than in the absence of offshoring).</li> <li>• Higher IT investment, output and productivity will ensue due to lower production costs.</li> </ul>

Source: Adapted from General Accountability Office, “Current Government Data Provide Limited Insight into Offshoring of Services,” GAO report 04-932, September 2004, pp. 44-45.

All studies outlined in the table have their limitations. The Forrester and Gartner estimates are based on the experience and knowledge of a relatively small number of industry observers and IT executives. Service-sector offshoring is a relatively new phenomenon with little historical precedent to guide future trends, and long-term quantitative estimates based on professional opinions, however well informed, are necessarily subject to large margins of error.

The strength of the Global Insight study – the fact that it is based on a well-calibrated statistical model of the U.S. economy with a proven record of short-run predictive power – is also a weakness for similar reasons. It relies on historical relationships between economic variables to predict future trends. Fundamental changes in economic activity – such as those made possible by the Internet revolution – often disrupt historical patterns and reduce the accuracy of forecasts.

Most studies of the potential effects of offshoring examined employment changes in 2001 and 2002 and tried to extrapolate longer-term trends. However, the economy had just come out of a recession, so some of the job weakness simply reflected the normal business cycle (employment

recoveries tend to lag GDP turnarounds by 6 to 9 months, as employers are reluctant to resume hiring until they are reasonably sure an expansion is going to last).

But in 2006, the U.S. has been in the midst of a robust expansion, and total employment has grown by nearly 5 million since early 2003. If IT job losses were indeed due to offshoring (and hence permanent), one would expect that they would continue to show lackluster growth or decline even after 2002. Table 2 examines this proposition by showing employment growth during the recession and the ensuing expansion.

**Table 2**  
**IT employment growth by occupation, 2000-02 and 2002-04**

Occupation	2000-02	2002-04
Computer Programmers	-13.8%	-13.4%
Computer Support Specialists	-8.4%	2.7%
Database Administrators	-5.5%	-1.6%
Network and Computer Systems Administrators	-0.6%	13.1%
<b>Weighted average, “low-end” IT occupations</b>	<b>-8.9%</b>	<b>-1.5%</b>
	<b>2000-02</b>	<b>2002-04</b>
Computer and Information Scientists, Research	-5.4%	10.4%
Computer Software Engineers, Applications	-4.8%	23.3%
Computer Software Engineers, Systems Software	-3.6%	25.9%
Computer Systems Analysts	1.0%	6.3%
Network Systems and Data Communications Analysts	11.9%	32.5%
<b>Weighted average, “high-end” IT occupations</b>	<b>-0.8%</b>	<b>18.1%</b>

Source: U.S. Bureau of Labor Statistics

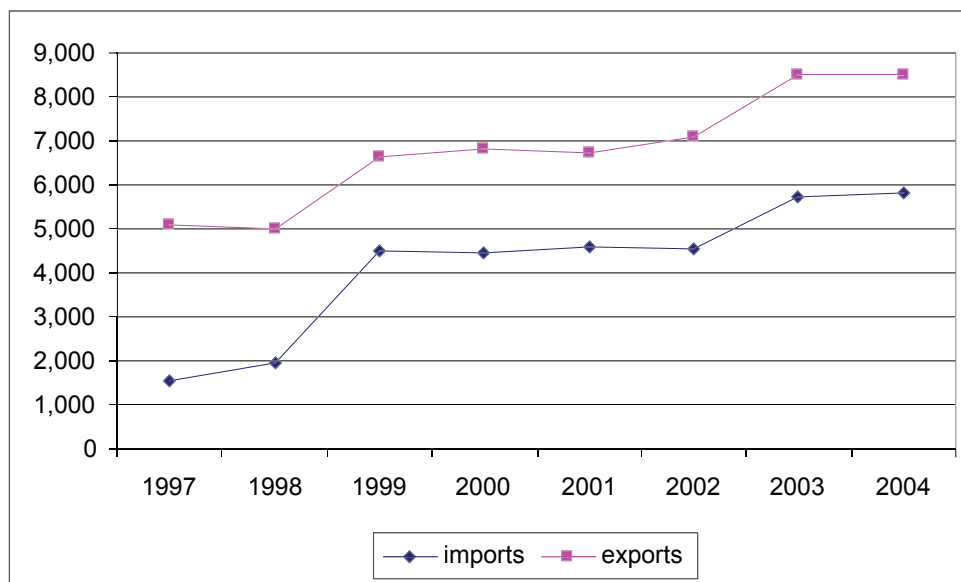
There is a clear bifurcation of trends in low-end and high-end IT occupations in the current recovery. Overall, low-end IT employment continued to decline from 2002 to 2004, driven by the specific occupations of programmers and database administrators. This is certainly consistent with anecdotal evidence of the rise of India as a programming powerhouse.

In sharp contrast, high-end IT occupations are following the business cycle. Overall, high-end jobs returned to the double-digit growth common in the 1990s once the current economic expansion took hold, strongly suggesting that the 2000-02 job losses had little, if anything, to do with offshoring. Software engineers in particular saw a phenomenal turnaround in job fortunes, swinging from 4 percent decline to 25 percent growth. For reasons described in a companion paper on the IT employment outlook, demand for U.S.-based computer engineers will continue to grow strongly for the foreseeable future.<sup>2</sup>

A second way of examining the prevalence and relative importance of IT offshoring is to examine data on U.S. imports and exports of computer information services, reproduced in Chart 1.

<sup>2</sup> Jeremy Leonard, “The Occupational Outlook for Information-Technology Professionals,” white paper prepared for American Sentinel University, April 2006.

**Chart 1**  
**Imports and exports of computer information services, 1997-2004**  
 (millions of dollars)



Source: U.S. Bureau of Economic Analysis

The data reveal several interesting trends.<sup>3</sup> Perhaps the most important is that the U.S. runs a surplus, and in fact exports almost 50 percent more IT services (in terms of dollar value) than it imports. The trade surplus narrowed considerably in 1999, but this is primarily attributable to contingency plans for the Y2K bug. Since then, the surplus has been roughly unchanged in dollar terms. It is also important to bear in mind that the total value of imports of IT services is less than 2.5 percent of domestically-provided software publishing and information services.

### Implications for “high-end” IT occupations

There is thus little direct job risk for those considering a career in computer engineering or systems analysis. Nonetheless, it seems inevitable that offshoring of certain low-end IT occupations will continue.

But the cost savings that come from such low-end IT offshoring will likely manifest itself in higher demand for IT investment. Several researchers, including Catherine Mann of the Institute for International Economics, note that offshoring is simply one aspect of the coming globalization of IT services, which may follow a similar path as the globalization of IT hardware in the 1990s.<sup>4</sup>

<sup>3</sup> Some observers have questioned the accuracy of the data produced by BEA, noting that India reported IT exports to the U.S. of \$6.0 billion in 2003, up from \$3.7 billion in 2001. This figure is larger than the worldwide U.S. IT service imports reported by BEA. Part of the discrepancy is due to personnel from Indian firms who work temporarily at U.S. sites, who are counted as IT service exports by India, but not as imports by BEA. See Charles L. Schultze, “Offshoring, Import Competition and the Jobless Recovery,” Brookings Institution Policy Brief number 136, August 2004.

<sup>4</sup> Catherine Mann, “Globalization of IT Services and White Collar Jobs: The Next Wave of Productivity Growth,” Institute for International Economics Policy Brief number PB03-11, December 2003.

Mann argues that global integration of IT production accounted for up to 30 percent of the dramatic decline in hardware prices, which contributed to an explosion in IT investment which ultimately brought benefits to large swaths of the economy in the form of higher productivity growth.

She sees a similar path for IT services. There are many large sectors of the U.S. economy, including health services, retail trade and construction, that have surprisingly low rates of IT investment and were essentially left behind in the IT hardware revolution. Offshoring of low-end IT service jobs may allow companies in these industries to boost their use of information-driven business processes, which could in fact boost U.S. demand for computer engineers and systems analysts even further.

## Conclusion

Fears of offshoring voiced in the past several years have proved to be overblown, for the simple reason that most of the job losses in high-end IT occupations were cyclical rather than structural. All high-end IT occupational groups – particularly software engineers -- have experienced the strong job growth typical of the 1990s in the current economic expansion, and long-term projections suggest these trends will continue. At the same time, some IT jobs – notably programmers, support specialists, database administrators and data entry clerks – have one or more characteristics that put them at risk of offshoring, and those jobs will move offshore and see sluggish growth or absolute declines in the United States.

The silver lining to the possible offshoring of low-end IT jobs is lower costs for IT services, which may incite sectors with low IT intensity (such as health services) to more fully implement IT systems into their business organizations, further stimulating demand for high-end IT professionals.