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Chapter 2: The Economics of Offshoring

This chapter provides background material on the economics of offshoring. The first section deals with the economic theory applicable to offshoring, including discussions of why firms engage in offshoring and what economic theory indicates the consequences may be for individuals, firms, and nations. The second section covers the extent of offshoring; it first cautions the reader about the difficulties in tracking offshoring activities, and then provides estimates of current, recent, and projected offshoring activity in the United States, Europe, India, and other countries. The third section draws general conclusions about the economics of offshoring and identifies data that it would be useful to collect in order to better understand offshoring.

2.1 The Economics of Offshoring: Rationale and Potential Impacts

From a long-term view, offshoring is a response to two developments: technical change, especially in IT itself, and international differences in population and economic growth. Advances in IT have made it possible to trade in what were previously untradable (or difficult to trade) services such as software development, support, and maintenance. In particular, as discussed in Chapter 1, the development of low-cost and high bandwidth communications links that connect most corners of the globe have facilitated a massive increase in the potential to move information around the world with virtually no time lag and at low prices. This has allowed service providers in countries such as India and the Philippines and manufacturers in China to coordinate and communicate with their customers instantaneously. This ability to communicate has made a whole new set of sourcing opportunities feasible that were previously unattractive due to the high costs. More rapid population growth combined with increases in education levels outside the developed countries has meant that countries such as India, Brazil, China, and the Philippines have large numbers of young and talented workers who face limited opportunities for productive employment and therefore have received relatively low wages in the local economy. The combination of these developments makes for fruitful opportunities for gainful trade, sparked by the sustained growth in demand for IT talent since the 1990s in the United States and other developed countries.

Several additional factors make it easier for some countries than others to provide offshore services. Even relatively low-skilled service jobs generally require literacy, for example, help desk workers need to be able to look up reference material when needed. Thus, countries with more educated workers are more likely to be able to handle offshored jobs. Speaking the same language as the client nation is also beneficial for jobs requiring communication with the client country; thus, India has an advantage over China for receiving offshored work from the United States.

Some of the confusion and disagreement about the extent of offshoring stems from a lack of agreement about whether goods are included as well as services, lack of precision when applying the terms offshoring and outsourcing, and disagreements about whether direct foreign investments are included in offshoring. For a discussion of some of these issues, see Bhagwati et. al.(2004).

In a free market economy, offshoring decisions are made primarily by private firms seeking to maximize profits. The decision to offshore the production of goods or services to another country can be implemented in one of two ways. A firm may choose to source the good or service from a foreign provider that could be either an unaffiliated firm or a captive

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organization such as a subsidiary. (A captive organization is one which has its operating decisions dictated by another organization. This might be, for example, because the captive organization is owned by the captor organization or because there are strong economic incentives for them to follow the dictates of the captor.) A firm's choice to produce a good or service itself or to outsource it to an unaffiliated firm is often referred to as the "make versus buy" decision and can apply both to domestic and offshore situations. It is worth pointing out that the degree of outsourcing of IT services to specialists has been increasing significantly in developed countries over the last decade, initially to domestic providers and recently to both domestic and offshore providers.

Firms consider any offshoring that they undertake to be in the best interests of their stockholders. The theory of comparative advantage indicates that, if each country specializes in the production of goods where it has a comparative (relative) advantage, both countries can enjoy greater total consumption and well being in aggregate by trading with each other. In our context, if providers in countries such as India have a relative advantage in the provision of software services, for instance, then it would be beneficial for US firms that utilize these services in their operations to source the services from Indian providers and focus their scarce resources on activities in which they have a relative advantage. Note that we do not say whether these are captive or outsourced providers since that decision will depend on a variety of factors such as whether the service creates valuable intellectual property. Likewise, the gains from trade are generally beneficial to the service provider's host country. In countries such as India, employees at software firms have seen significant increases in their incomes even as the number of employees such as software engineers increases rapidly. Similarly, revenues and profits at these firms are growing rapidly.

Services can also flow from developed countries to developing countries. For example, companies based in developed countries such as ABN Amro, ING Bank, Prudential, and Citibank are capturing significant market share in developing countries in numerous service industries such as banking and insurance, and displacing workers in less efficient domestic companies in these countries. In these sectors, the know-how possessed by these firms provides them with comparative advantage. As Chapter 4 discusses, some of the IT service firms headquartered in developed countries such as IBM Global Services and Accenture, are adding workers from developing countries in order to take advantage of low wages, talent, and location enabling them to compete directly with Indian software service firms such as Infosys, Wipro, and TCS in the global software services industry.

What the theory of comparative advantage does not mean is that all members of society will benefit from trade. In general, imports of an input have economic effects that are similar to those of an increase in the supply of the input, namely, lower returns to the suppliers of the input, lower costs of production, and lower prices for consumers. If the input were a service, the wages and salaries of those producing the service would fall, but so would the costs for firms that are buyers of the service. In the exporting country, the opposite effects hold. That is, the returns to the owners or suppliers of the service or input increase and the wages of the employees at the service providers increase due to the higher demand. However, there are costs as well. In the short run, assuming lead time to develop and scale service capacity, providers will often transfer capacity from a domestic market to service the export market, raising costs to the domestic consumers of these services.

There have been relatively few studies estimating the economic impact of outsourcing and most of those that exist have been based on European data and focus more on the outsourcing of intermediate goods rather than services. Several studies identify cost saving as the primary motive for outsourcing of intermediate goods, for example, Egger et. al. (2003). For the United States, Feenstra and Hanson (2001) construct industry-by-industry estimates of outsourcing (of intermediate products) between 1972 and 1992 and find that outsourcing contributed substantially to an increase in domestic demand for high-skilled, non-production workers and their wages.

European studies, such as Gorg and Hanley (2004), have used plant-level data for the electronics industry in Ireland for the period from 1990 to 1995 to show that offshoring of services had a positive, though not highly robust, effect on productivity growth[1]. Likewise, Girma and Gorg (2003) find a positive impact of outsourcing of industrial services1 on productivity in the UK manufacturing industries during 1980-1992, although they are unable to distinguish between international and domestic outsourcing.

The studies, however, did not consider offshoring of services. Recent work by Mann (2003) provides a back-of-the-envelope estimate that the first wave of offshoring, which focused on global sourcing of computer hardware, led to a reduction in IT hardware costs of 10 to 30 percent in the 1990s and an annual increase in productivity of 0.3 percentage points during 1995-2002, or $230 billion in additional Gross Domestic Product (GDP). This fall in IT costs would be reflected in higher profits for producers and lower prices for consumers. IT production workers lose, while firms and consumers gain. She goes on to argue that, since a larger share of IT costs accrue to labor-intensive tasks such as software development and systems implementation, the productivity impacts of offshoring these tasks can be expected to be significantly higher.

Economists believe that trade generally leads to significant gains to society. These gains are not inconsistent with employment losses in specific sectors that will cause economic pain to the workers affected. To achieve an equitable result, many analysts believe that it is important to establish a safety net that provides income and training opportunities to affected workers. (See, for example, Atkinson (2004); Bivens (2004); Kletzer (2004); and Mann (2004).) Components of the safety net should include unemployment insurance, wage insurance, and retraining. This topic is discussed in more detail in Chapter 8.

A key assumption underlying the theory of comparative advantage is that the economy enjoys full employment. Thus, this theory is best thought of as a theory of the long-term where workers displaced by imports or offshoring find work in other sectors. By contrast, most popular discussions of the offshoring phenomenon tend to focus on questions such as “where will the new jobs be created” and “can the workers be retrained for these new jobs”? In general, peering into the crystal ball to predict where and what types of new jobs will be created is both difficult and unrewarding. A dynamic economy, such as that of the United States, creates and destroys millions of new jobs in response to changes in tastes, and more importantly, innovations and advances in technology. The US economy creates and destroys more than 30 million jobs each year. In 1999, 32.9 million jobs were lost and 35.5

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[1] The authors find that international outsourcing generally had a positive effect on productivity, of which the effect on the level of productivity can be attributed to outsourcing of material inputs. Similarly, for international outsourcing of materials inputs, Egger, Pfaffermayr, and Wolfmayr-Schnitzer (2001) find outsourcing of material inputs by Austrian manufacturing firms to the Eastern transition economies increases domestic growth in total factor productivity, more so in capital-intensive industries than in labor-intensive ones. Egger and Egger (2003) find that a 1 percent increase in outsourcing of intermediate inputs to the Eastern countries relative to gross production induces a shift in relative employment by about 0.1 percent in favor of high-skilled labor. Egger and Egger (2001) find that outsourcing of intermediate products by EU manufacturing firms reduces productivity of low-skilled workers in the short-run and increases it in the long run, an effect which the authors attribute to imperfections in the EU labor and goods markets.

[1] This study defines “industrial” services as “activities such as processing of inputs which are then sent back to the establishment for final assembly or sales, maintenance of production machinery, engineering or drafting services, etc.” (p. 5). They do not include “non-industrial” services such as accounting, consulting, cleaning, or transportation services.

million new jobs were created for a gain of 2.6 million jobs. In 2003, there was a net loss of 100,000 jobs even though 30.2 million new jobs were created (BLS Business Employment Dynamics). There is no guarantee that the economy will continue to create these new jobs, but we can take some comfort from the historical evidence that thus far it has managed to do so. The key to job creation is of course the ability of the economy to rapidly generate and adopt innovations, that is, new types of goods and services, and productivity-enhancing process improvements.

Innovation is indeed an engine of economic growth, and perhaps the most important source of productivity growth in developed economies. When there is rapid technological innovation, as in the case of IT, there is a significant spillover effect to users of the technology when the price paid for the technology is lower than the value received. This can result in significant productivity and economic growth in the user sectors as well. Given that IT is a general-purpose technology, the users are many and varied.

In general, trade stimulates innovation and economic growth in both trading partners. However, Gomory and Baumol (2000) and Samuelson (2004) argue that innovation opportunities create new possible conflicts of interest between trading partners. For instance, insofar as offshoring stimulates innovation and productivity growth in countries such as India, and more likely, Brazil, China, and Israel, in goods and services for which developed countries such as the United States or Germany enjoy a comparative advantage, this will cause the terms of trade to become less favorable for the developed nation. Simply put, the comparative advantage of the developed nation becomes less valuable over time. As a result, offshoring may impose permanent losses in the developed nation. In other words, even if free trade is the best policy, it may well be that free trade, by stimulating innovation overseas, may impose long-term losses. However, Gomory and Baumol's analysis shows that this conflict of interest is present when the two trading partners are at similar stages of development. Since most offshoring involves countries at very different levels of development, this conflict of interest is presently unlikely.

In the IT services sector, there is a related concern in the developed nations, particularly in the United States. Currently, it is efficient to offshore low-end IT services such as coding or maintenance, with high-end activities such as requirements analysis, design, and research and development remaining in the developed country. However, the concern is that eventually the "labs will follow the mills", and high-end IT activities will also move offshore. Were this to happen, the developed country might cease to be the technology leader. There is some anecdotal evidence that some process innovations are moving offshore. For example, in laptops, it used to be the case that contract manufacturers made product to the design specifications of US vendors. Today, many of these companies have moved upstream to design the product. Intel is designing processors at its R&D facility in India. Likewise, software services firms have moved upstream to provide increasingly sophisticated software solutions from more traditional applications, and to business process services such as accounts payable, human resources, and even medical applications. Thus, in addition to the static, resource allocation efficiency from free trade, one must also look at the impact on the fundamental capabilities that underlie innovation.

These concerns reflect possible scenarios, perhaps even plausible scenarios. However, it is not clear how likely they are. There are offsetting forces as well. In parallel with offshoring, the inflow of skilled and trained workers into the United States has grown. Though perhaps these inflows substitute for native-born workers in the short run, in the longer run, they create all-around benefits by raising innovation. Moreover, it could be argued that even a loss of technical leadership in one area could be beneficial by allowing scarce talent and resources to be allocated to more promising areas such as nano-technology, bioinformatics, or genomics. The post-9/11 trend of a reduced rate of immigration should be of concern to the United States given that many other developed countries are seeing increases in immigration of qualified professionals.

Arora and Gambardella (2005) suggest that the scenarios that result in a loss of US technological leadership are very unlikely. In many industries, the locus of production and the locus of invention are physically separated. This is particularly true when the body of knowledge underlying the invention process has a strong scientific basis. Building on earlier work by Lamoreaux and Sokoloff (1996; 1997), Sutthiphisal (2003) studied the location of production and invention in three different industries during the Second Industrial Revolution, namely, textiles, shoes, and the electric industry. He finds that, in general, the locus of invention did not shift with the locus of production as the latter moved to other locations. Moreover, he found that the link between location of production and invention is weaker in the more science-based electric industry. Using data from a century later, Mariani (2001) studied the location of R&D and production facilities by the Japanese multinationals in Europe. She found that in low- and medium-R&D industries, R&D labs are more likely to be located close to production facilities than in more R&D-intensive industries. Chapter 5 discusses some of the current patterns in the globalization of research.

Can the United States specialize and keep its comparative advantage in the higher end? The starting point for this discussion is to note that there are two key resources required to remain the center of innovation in software: access to talented designers, software engineers, and programmers along with proximity to a number of large and technically sophisticated users. The United States dominates on both counts. Recall that in the 1990s, there was considerable concern about Japan's software factories (e.g., Cusumano 1991), but there has not been a single successful Japanese software product that has developed a global market (if one excludes the software that is a key component of gaming devices which is not sold separately). To the extent that students are misreading the tea leaves and moving away from studying computer science, the United States in particular could face a longer-term problem in having access to talented software professionals. This topic is discussed in Chapters 7 and 8.

The size and the openness of its culture and economy have given the advantage to the United States over Japan and Western Europe in attracting talent from around the world. The United States has been and continues to be a large producer of IT human capital for the world, especially at the graduate level, and some of the students who study remain to work in the country after graduation. The country has also been a magnet for technical workers trained elsewhere. The United States as a destination for study and work has abated somewhat in the past several years partly because of the harsher governmental regulations in support of national defense.

Another global advantage of the United States is that most lead users are US-based. New software applications depend largely on knowledge about demand and about the applications domain. This is especially true for the substantial fraction of software used in running businesses and business processes. Proximity to business activities is crucial for innovations in such areas. Indeed, the development of new commercial applications or solutions is a very special comparative advantage of the United States. On a more limited basis, this benefit also accrues to other developed countries such as Germany where the software giant, SAP, is based and dominates the market for enterprise software. In general though, US industry is the largest user of IT in the workplace.

Globalization may reinforce this lead because we find that innovative companies from Israel, Ireland, and even India are likely to move their operations to the United States to be closer to their users. Sometimes, venture capitalists push for such a move as well. Other intermediating institutions, such as legal services and thick and well functioning labor markets, are also important sources of advantage enjoyed by the United States that are not likely to be eroded soon.

There are counter-tendencies as well. In so far as these professionals (be they Indian, Irish, Israeli or Chinese) have a preference for staying in their home country where the cost of scientists and engineers is lower, the cost of R&D activities that are human-capital-intensive and relatively less intensive in physical infrastructure will also be lower offshore.

More broadly, the United States has several distinct capabilities – the best universities and research institutions, highly efficient capital markets, flexible labor markets, the largest consumer market, business-friendly immigration laws, and a large and deep managerial talent pool. As a result, the evolution of business in the United States has followed a consistent pattern: launch innovative businesses here, grow the business, and as products and services mature, migrate lower-value-added components and intermediate services over time to lower-cost countries. As more countries and regions enter global trade with highly skilled and capable labor pools, this increases the amount of competition that US companies and workers face. This competition produces an increased premium on the innovation and productivity of the US workforce.

To continue growing the wealth of the United States and its individual workers, labor productivity must grow at a rate that equals or exceeds the growth of wages. Labor productivity can increase in a variety of ways but generally occurs through an increase in worker skills combined with increased innovation in products and processes. Essentially, growth requires capital investment in technologies that increase productivity and a focus on innovation that results in new or transformed existing marketable products and in more efficient processes.

In summary, economists have argued on both sides of the offshoring and free trade issue. The arguments are sophisticated and nuanced, and the results often depend on whether the underlying assumptions hold in the current context. While a majority of economists are proponents of free trade, the underlying question is an empirical one and can be answered by analyzing reliable data. As someone once said, “The difference between theory and practice is greater in practice than in theory.” Unfortunately, there is a lack of data to help understand the phenomenon, and more importantly, there are no data collection processes underway that would help in conducting a statistical analysis of the empirical evidence.

It is important to distinguish among effects at the country, firm, and worker levels. Because it is voluntary, offshoring benefits the firms that undertake it. Workers, on the other hand, sometimes lose substantially from offshoring because they cannot instantly (and may never) transfer their skills to other jobs that pay as well. At the country level, the benefits of trade often outweigh the costs, but we have seen that this is not always the case.

2.2 Data on the Current State of Offshoring and Projections for the Future

“...there are currently no reliable statistical indicators of the extent or nature of global outsourcing.” (Huws et. al. 2004)

The report that triggered public concern about the impact that offshoring would have on US lives was produced by Forrester Research in 2002, indicating that 3.3 million US service jobs would be lost to offshoring by 2015. This report was followed by many additional studies, each with its own numbers, produced by private consulting firms, federal agencies, and economists from academia and think tanks. These numbers ranged quite widely, in some cases differing by a factor of ten. How are we to know which numbers are correct? This section discusses some of the general issues concerning data about offshoring. It then considers what the existing data tells us about the current state of offshoring and about projections of future offshoring activity. The greatest emphasis is on the United States (the leading sending country), then on India (the increasingly dominant recipient country), but data are provided about all the countries actively involved in offshoring to the degree that we could identify data. Worldwide data was given in Chapter 1 and is not repeated here.

What Are the General Issues We Should Consider in Evaluating the Accuracy of Data About Offshoring?

There are three basic points to consider in evaluating offshoring data. First, there is a question of the definition of offshoring. Some reports include all service jobs, some include a subset of the service jobs that pertain to professional and technical services (following a category used by the Bureau of Labor Statistics (BLS) in the U.S. Department of Labor), some include all IT jobs, some include only software jobs, some include IT-enabled service jobs, some include other jobs with other criteria, and some reports are not precise in defining what they are counting. Obviously, the numbers will vary considerably based upon the definition used.

Second, it is not clear what should be considered a good measure of the extent of offshoring. Many people count jobs or workers. In addition to the issue raised in the prior paragraph about what kinds of jobs one has in mind, there are other considerations. Suppose one wants to count the number of jobs lost in the United States or Western Europe to offshoring. How does one know which jobs to count? Business decisions by companies are complex and, while the press sometimes reports horror stories of employees being asked to train IT workers from a low-wage country and afterwards being replaced by them, it is rarely clear-cut whether a job has been lost directly because of offshoring. A company might cut back on the number of workers in one location and add workers in another location, or cut back on people in one occupation and replace them with workers in another occupation. And this might be because of some good business reason other than labor arbitrage that is taking advantage of the wage differentials in the two countries to save on labor costs. It might be, for example, that one product line is declining and resources are needed elsewhere in the company, or the company needs fewer workers in a particular field because of automation of some aspects of the work or rationalization of the work process, or because the company has a global strategy that it is trying to achieve and part of that strategy involves building market presence in specific geographic locations.

One might instead want to count the number of jobs created in a low-wage country to do offshoring for a high-wage country. There is, however, no necessary correlation, for instance, between the number of Indian jobs created and American jobs lost. A company might decide to hire more Indian workers to work on a project than the number of American workers displaced because the cost of the Indian workers is so low and better results might occur by dedicating a larger labor effort to it. An American worker and an Indian worker might not have the same productivity rate because of educational level, work process, infrastructure, technical tools available to support the work, or many other reasons. The literature gives examples where American workers are clearly more productive than the Indian workers, and other examples that show the opposite. In particular, work processes often are reengineered before being implemented in India, and the reengineered process sometimes leads to significant increases in productivity. Also, in some lower level jobs (for example, working in a call center), Indian companies are on average able to recruit workers to do these tasks who are much more highly educated than the average American holding that job. There is also confusion in the statistics about whether to count only the jobs newly created that are focused on doing software work for export versus counting all new and existing jobs with this focus.

One might want to focus on the monetary value of the business rather than on the number of workers who perform the work. This, too, is difficult to measure. One of the problems is that a significant portion of the work that is done for multinational corporations is done by their subsidiaries in countries such as India. The work that is conducted is then regarded as an internal operation of the multinational, and this may make it difficult to identify the monetary value of the work performed offshore or even to know when to consider something as offshoring and when to regard it simply as a product or service developed by a multinational through several of its divisions located in different countries. This is a serious issue in measuring offshoring because balance-of-payments data tells us that intrafirm trade represents 71% of all business, technical, and professional services imported into the United States and, moreover, in the period 1997-2002, it was increasing faster than imports from companies not affiliated with a multinational (UNCTAD 2004).

Another issue is that offshoring of complex products or services often occurs by dividing up the labor and having some of it done within the client company, some done by one or more vendors, and some purchased as components. In these cases, it is often difficult to value fairly the portion of the product or service that has been outsourced. A recent European study addressed these issues:

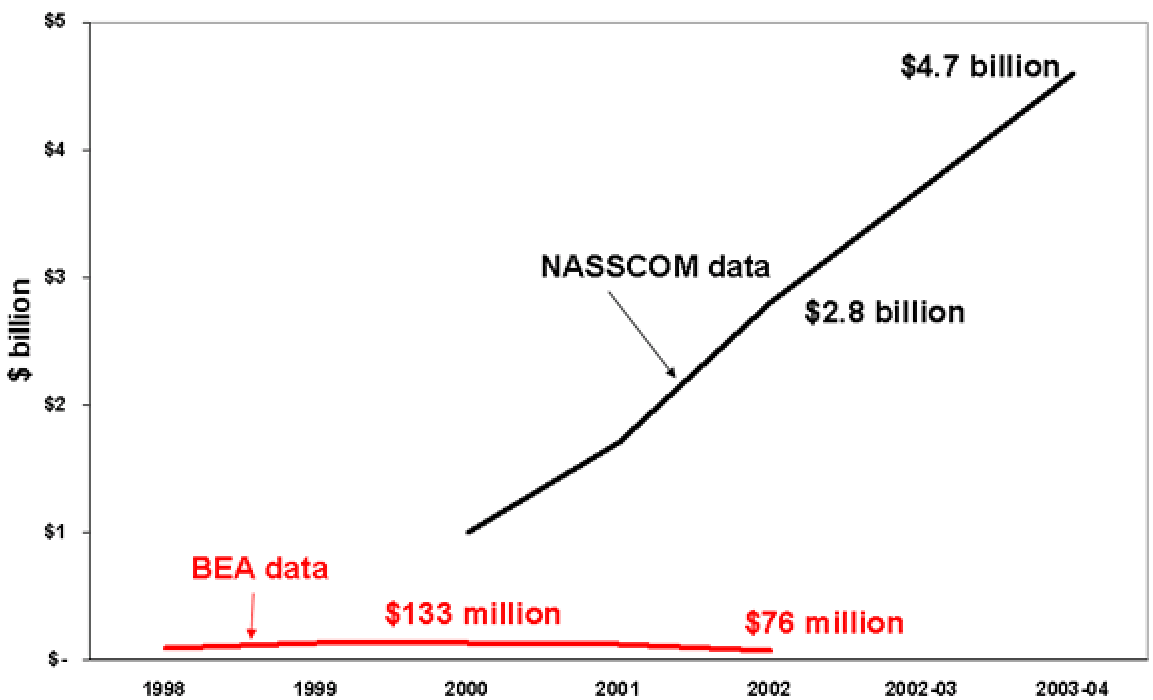
> In its legal sense “outsourcing” refers to a business activity, involving the production of either goods or services, purchased by an organization from an external supplier rather than internally. It is, in other words, “subcontracting.” However, in the current context of rapid organizational change, determining what is “internal” and “external” is increasingly difficult. Mergers, demergers, strategic alliances, public-private partnerships, and a variety of different forms of organizational disaggregation – including those resulting from business process re-engineering – are increasingly common. If a company is restructured on the basis of separate cost or profit centers, for instance, should transactions between them be regarded as ‘outsourcing’ or merely as internal accounting flows?” (Huws et. al. 2004, p. 3)

If one wants to focus on the long-term impact of offshoring, the appropriate metric might be jobs lost or created, or the monetary value of offshoring business over time rather than at any specific point in time such as today. This kind of data tends to be of two types. One type analyzes the nature of work to determine the number of jobs that might be vulnerable to offshoring without making any claims that all or any particular portion of these jobs would be transferred from the high-wage to a low-wage country. The other type analyzes the number of jobs that will actually be sent overseas (or the monetary value of actual offshoring business) by a certain date. Even in cases where the methodology is sound and soundly applied, projections about the future are much less likely to be accurate than data about today’s or yesterday’s situation since it is difficult to predict all the factors that will come into play over time.

These two types of analyses introduce additional data issues. Vulnerability analyses are less prone to errors because they require fewer assumptions than the other types of analyses. To conduct a vulnerability analysis, all that is required is to identify industries whose work could be transferred offshore and count the number of workers and their occupations in the identified industries. To some extent, the list of vulnerable industries is subject to change as new technologies and price changes can affect the list of industries that are vulnerable to offshoring. A more important problem with vulnerability analyses is that they tend to produce very large numbers that may bear little relationship to the actual amount of offshoring that will take place. For example, all manufacturing, mining, and agricultural activities could be replaced by offshore activities. Thus, other than pointing out which industries and occupations are immune from offshoring, assessments of the number of jobs vulnerable to offshoring provide a very high upper bound that may be of little practical value. As described in the following, projections of how much offshoring will occur, while more useful in theory, are plagued by additional problems.

In addition to issues with the definition of offshoring and what constitutes a good measure of it, there is an issue concerning the source of the statistics. There are four major categories of data providers: government agencies, trade associations, consulting firms, and universities and think tanks. At least in the United States and Western Europe, the national governments provide data that is among the most trustworthy. For example, the US government collects large and often fairly complete data sets, taking advantage of its ability to compel business organizations and individuals to report certain kinds of data under penalty of law. Most of these federal agencies employ well-trained and experienced economists and demographers who typically use appropriate methodologies and open their methods and assumptions to scrutiny. In the United States and a number of other countries, the data-collecting and reporting agencies have been relatively unbiased – not subject, for example, to political whims but instead trying honestly to determine what the data tells us. Some analysts have argued, however, that US government data and reports may indeed be either inferior to data from other sources or biased. For example, the Economic Policy Institute (2004) has noted that the Bureau of Economic Analysis (BEA) data on US imports of software from India shows much lower levels and a different trend (flat or declining compared to a rapid increase) than data provided by NASSCOM, the Indian trade association (see Figure 1). Business Week Online (2005) points out how the tone in US Department of Commerce reports on the effects of offshoring changed markedly when one of their reports was updated with the authorship shifted from career staff to political appointees.

Figure 2-1. U.S. Software imports from India



Source: Bureau of Economic Analysis and the Indian National Association of Software and Service Companies (NASSCOM).

Projections, however, require more than simply collecting and analyzing data. Models must be developed to extrapolate trends, and decisions must be made on turning points and when new forces will affect trends. Thus, it is not surprising that projections related to offshoring, and other labor market variables as well, are subject to error, particularly when projecting over longer periods of time. Even federal agencies are often far off the mark with projections especially if these projections extend far into the future. The BLS periodically assesses the accuracy of its projections. The most recent BLS review of its general occupational projections shows that although BLS does reasonably well in projecting overall employment in broad occupational groupings, the projections do not do as well in dealing with specific occupations (Alpert and Auyer 2003). In projecting employment growth from 1988 to 2000, the BLS projected an increase of 15.3 percent, but employment grew by 21.7 percent over the period. The most serious problems in projecting occupational employment patterns resulted from problems in anticipating changes in staffing patterns. Examples of particularly large errors include the category of gas station attendant, which was projected to grow from 308,000 to 331,000, but actually fell to 140,000, and travel agents, whose ranks were expected to grow by 54 percent but whose numbers declined by 6.2 percent (Wessel 2004). An earlier outside review of the BLS occupational projections found that BLS tended to underpredict the growth of occupations requiring a college education (Bishop and Carter 1991).

Even when government agencies do a good job of collecting data and making projections, they generally collect data that helps them assess issues that have occurred in the past so when a new phenomenon arises (such as offshoring), it is not clear that the data that federal agencies have been collecting and the analyses they have been performing will answer the policy questions that now arise. This is generally true for both the federal data from most countries and for the data collected by pan-national organizations such as the United Nations, the International Monetary Fund, and the Organization for Economic Cooperation and Development (OECD).

The data provided from the other sources is potentially more problematic. Trade associations, such as the Information Technology Association of America (ITAA) and the National Association of Software and Service Companies (NASSCOM), the trade association for the software industry in India, have access to large data sets from their members. However, the members of these organizations are not necessarily representative of the totality of producers or consumers of information technology so the data from these organizations may not accurately represent the full story of what is going on. Moreover, these organizations are partisan to their members, and they may craft their data studies or reporting of these studies in ways that are favorable to the interests of their membership.

The consulting firms have a strong interest in increasing their business based on their statistics. It is in their interest to provide numbers that demonstrate to potential clients that there is a problem that needs fixing. Most of the consulting firms keep proprietary the method by which they produce their projections so it is hard to evaluate what their numbers mean. In fact, many economists are skeptical of the methods these firms use. Much of the alarmist data about the impact of offshoring on job loss in the United States and Europe has been generated by the consulting firms. All of this discussion indicates that it is difficult to get accurate data about the amount of offshoring currently going on and that is likely to take place in the future.

What Does the Data Tell Us About the Size and Impact of Offshoring in the United States?

Although the Forrester Research numbers are the most widely quoted, it would be preferable to be able to use other sources because Forrester is an interested party and the firm is not forthcoming about its methodology. One would like to use US federal data, if possible, for quality and objectivity. The most relevant federal data source is the Bureau of Labor Statistics Mass Layoff Statistics (MLS) series. Unfortunately, the MLS has serious shortcomings for this purpose in that it both undercounts and overcounts layoffs. It counts only relatively large layoffs (at least 50 employees within a five-week period) and only layoffs at companies that employ at least 50 employees; thus it undercounts by not counting all small businesses and by not counting companies that lay off people for offshoring purposes in smaller numbers or over a longer period of time. The MLS also overcounts in that its numbers include people who are laid off for many reasons, including a number not relevant to our interest such as bankruptcy, financial difficulties of the company, movement to other locations within the United States, or change of company ownership. BLS reports that these latter reasons are more common than layoffs for outsourcing, both domestic or across national boundaries.

For the IT industries (by which the BLS means the communications equipment, communication services, computer hardware, and software and computer services), MLS only identified 7,923 people affected by movement of their jobs during the period January through September 2004. Of these job relocations in the first three quarters of 2004, 70% of the jobs were moved within the United States and 80% were moved within the same company. When the jobs were moved contractually to another company, 40% of the jobs were moved outside the United States. These numbers appear unreasonably low.

A study by Bronfenbrenner and Luce (2004) used online media tracking and corporate research to identify offshoring job losses in the United States. This study found that the MLS grossly underreported job loss due to offshoring. It estimated that 206,000 jobs were shifted overseas in 2002 and 406,000 were moved in 2004. The authors argue that their method, while imperfect, probably undercounts job migration because not all losses are reported in the media and their search tools did not fully capture job losses that are reported only in the local media, a common place for such losses to be reported.

[2]Even if the MLS data does not provide exact numbers, it might serve as a representative sample from which one could learn about trends (for example, the year in which losses peak in a particular field of IT). If this sample is indeed representative, computer hardware, software and computer services, and communications equipment had their peak losses in 2001, while communications services had its peak losses in 2002. The Bronfenbrenner and Luce study discovered that the largest job losses came from the midwestern states in the United States, and that there have been rapid increases in job movements in IT, call centers, and white-collar jobs to India.

Another potential source of federal data on offshoring comes from the US Department of Commerce's Bureau of Economic Analysis (BEA). However, some economists believe that the BEA numbers seriously underreport software imports to the United States. For example, BEA reports the United States imported $76 million in software from India in 2002, whereas the Indian software trade industry association NASSCOM reports Indian software exports to the United States at $2,800 million that same year (see Figure 1). A small part of this difference can be attributed to differences in definitions but not nearly the entire amount. The US Government Accountability Office (GAO) noted the shortcomings of the BEA data on offshoring as follows: "In addition to the lack of quarterly survey data for unaffiliated transactions and lack of quarterly product detail for affiliated services, there are reliability issues related to the mandatory filing requirements and survey coverage." (Government Accountability Office 2003, p.62).

[2] This study defines "industrial" services as "activities such as processing of inputs which are then sent back to the establishment for final assembly or sales, maintenance of production machinery, engineering or drafting services, etc." (p. 5). They do not include "non-industrial" services such as accounting, consulting, cleaning, or transportation services.

The BEA data nevertheless show some trends. Imports of business, professional, and technical services into the United States increased by 77% to $38 billion between 1997 and 2002. US investments in developing countries that offshore services were small compared to investments in developed countries, and most services created abroad are sold to non-US markets.

Turning to trade association data about offshoring and the United States, the Information Technology Association of America (ITAA) is the principal provider. ITAA is an organization that represents 350 US-based Internet, software, service, and telecommunications companies. It reports that 372,000 software and services jobs were lost between 2000 and 2003, with only 104,000 lost to offshoring. ITAA estimated that 90,000 new software and service jobs were created in the United States in 2004 due to increased economic activity.

The largest amount of data (that is also the most suspect data) comes from the consulting firms. Table 1 provides information about the impact of offshoring on the United States based on reports and projections from consultants. The numbers generally indicate that 12 to 14 million IT and IT-enabled jobs in the United States are vulnerable to relocation through offshoring. Annual losses range from under 200,000 to about 300,000 for service jobs lost from the United States due to offshoring. The number of IT jobs lost is somewhat lower than these estimates because the estimates include service jobs such as working in call centers and possibly in other IT-enabled services such as business process and knowledge process outsourcing. The numbers from the American Electronics Association might seem to be contradictory to the other data, but it should be remembered these are net losses in the industry so they include losses not only to offshoring but for other reasons such as company downsizing or bankruptcy, and these losses are offset by newly created jobs. The consensus seems to be that about 20% of US companies are currently offshoring work but that the percentage will rise considerably over the coming years. Bednarzik (2005) concludes that “employment trends by industry and occupation suggest that offshoring in the information technology sector occurs, but not to a great extent.” These numbers also do not take into consideration jobs that are created by offshoring.

The current value of offshore contracts from the United States seems to be in the $10 to 20 billion range, and most analysts believe there will be rapid growth in these numbers over the coming few years. It should be remembered, however, that we do not know the methods used to arrive at these numbers and how independent the data from one consulting firm is from that of another. We do not know, however, of any body of extant raw data that serves this analysis well.

Table 2-1: The Impact of Offshoring on the United States

Source	**Data reported**	**Statistic**
I. Current or Recent Offshoring		
Forrester (2004)	US service jobs lost in 2003	315,000
Forrester (2004)	US service jobs lost by end of 2005	830,000
Goldman Sachs (2004)	US jobs lost in past three years	300,000 to 400,000

Dossani (2005)	Software workers in the United States	1,200,000 software engineers; 500,000 programmers
Evalueserve (2004)	IT jobs offshored year ended March 2004	212,000 (60% to India)
Evalueserve (2004)	Call center jobs offshored year ended March 2004	136,000 (90% to India)
Gartner (2004)	Fortune 500 companies expected to offshore some IT work by end of 2004	40%
Gartner (2003)	IT industry and employment	500,000 jobs by end of 2004
Meta Group (2004 Annual IT Staffing and Compensation Guide)	US companies using offshore labor in software	19%
American Electronics Association (2003 Cyberstates report) [Seeley 2003]	Jobs lost in 2002 in the US software services sector	30,000 (compared to 146,000 the year before)
American Electronics Association (2003)	Jobs lost in 2002 in the US software industry	150,000
American Electronics Association (2003)	Jobs gained in 2002 in US in high-tech R&D	7,000
Washington Alliance of Technology Workers (CBSNEWS.com, 2005)	Jobs lost in the US IT sector March 2001 to April 2004	403,300
Washington Alliance of Technology Workers (CBSNEWS.com, 2005)	Percentage of IT sector jobs in San Francisco area lost March 2001 to April 2004	49%
United Nations Conference on Trade and Development (World Investment Report 2004)	Average percentage annual growth in US imports of computer and data processing services, 1992-2002	31%
Bajpai et al. (2004)	Percentage of companies that have offshored work (survey is mostly but not exclusively of US companies)	25%
Bajpai et al. (2004)	Percentage of companies that have already or plan to offshore work	79%
IDC	Value of offshore contracts from US in 2005	$17.6 billion

ITAA	Value of offshore contracts from US in 2003	$10 billion
II. Estimates of Workers Vulnerable to Offshoring		
Bardhan and Kroll (2003)	US workers in service jobs vulnerable to offshoring	14,000,000
Progressive Policy Institute (2004)	US IT jobs vulnerable to offshoring	12,000,000
III. Projections of Offshoring		
Wired magazine (Pink 2004)	Service jobs leaving the United States each year for the foreseeable future	200,000
Prism (2004) meta-analysis	Percentage of IT jobs lost from US over next five years	7% to 8%
ITAA	Value of offshore contracts from US in 2008	$31 billion
Deloitte Research (2003 report cited in GAO 2004)	Financial services jobs that may move offshore	850,000 (15% of industry employment)
Forrester (2004) report cited in GAO (2004)	U.S. service jobs lost by 2015	3,300,000
Goldman Sachs (2003 report cited in GAO 2004)	Services and manufacturing jobs lost over coming decade	Up to 6 million jobs
Evalueserve (2003)	All jobs lost 2003-2010	1.3 million worst case
Evalueserve (2004A)	Total jobs offshored in IT and non-IT business process operations (BPO) in 2010	775,000 IT jobs 1,414,000 non-IT BPO jobs
Evalueserve (2004B)	Growth of value of knowledge process offshoring (KPO) from 2003-2010	From $1.29 billion in 2003 to $17.0 billion in 2010 (46% annual growth rate)
Shaw quoted in McDougall (2005)	IT jobs moving offshore in 30 years	30% of IT jobs offshore within 25-30 years
Gartner quoted in McDougall (2005)	Percent of U.S. IT jobs offshored in 2005 and 2015	Will increase from 5% in 2005 to 30% in 2015

Two studies estimated the number of jobs in the United States that are vulnerable to offshoring, and they found 12 to 14 million jobs could be offshored (Bardhan and Kroll 2003; Progressive Policy Institute 2004). Both studies note that their figures represent an upper bound on offshoring activity that could occur not a projection of what will take place. Thus, these studies are useful not so much for the numbers they provide as for identifying sectors and occupations subject to offshoring. Bardhan and Kroll, for example, include in their 14 million jobs vulnerable to offshoring office support, business and financial support, computer and mathematics professionals, paralegals and legal assistants, diagnostic support service jobs, and medical transcriptionists.

A number of studies provide projections of offshoring activity in the United States. It is difficult to make comparisons among the studies for several reasons. The major obstacle is that the studies measure different sectors of the economy (e.g., IT, services, manufacturing, business processing operations, knowledge process offshoring), use different measures of the extent of offshoring (e.g., jobs lost, percent of jobs lost, value of jobs or business lost), and different start and end points. Few of the studies provide details on how they developed their projections which makes it difficult to assess the reasonableness of the assumptions and the soundness of the methodology. The Evalueserve studies provide more details on their methods so one can assess the assumptions and methods better than for most other studies. For example, a critical assumption in Evalueserve's work is that there will be a large shortage of labor in the United States and that a significant part of the solution will be from offshoring. Since Evalueserve has described its assumptions and methods in some detail, other analysts can make their own assessment of how reasonable these assumptions and methods are.

All the projections indicate that offshoring of service jobs in the United States in general and of IT jobs specifically will continue to grow, but there is some disagreement about how rapidly the growth will take place. Some of the studies project absolute numbers of workers lost over a given number of years such as Forrester's projection of 3.3 million service workers by the year 2015. The problem with these projections is that most of them do not give a baseline for understanding the significance of the job losses. They often do not tell you the size of the population from which these projected losses will be taken. In fact, it is a difficult task to count the number of IT or service workers in the United States. Here is one part of a lengthy analysis of this issue from a Computing Research Association study done in 2000 about the IT workforce.

> Commerce used the narrow definition of the Bureau of Labor Statistics classifications: computer scientists and engineers, systems analysts, and computer programmers. The Information Technology Association of America (ITAA) used a broader definition: any skilled worker who performs any function related to information technology, which itself is defined as the "study, design, development, implementation, support or management of computer-based information systems, particularly software applications and computer hardware." (Freeman and Aspray 2000)

Not surprisingly, different definitions lead to different numbers. The Bureau of Labor Statistics counted a little more than 2 million workers in 1997 and about 3 million today. Between 2000 and 2004, the ITAA has counted between 10 and 11 million IT workers. Service workers account for a very significant portion of the American labor force, amounting to many tens of millions of workers. Some significant fraction of these service workers are enabled by information technology, but it is hard to count how many and to what extent.

Some of the other studies project in terms of the percentage of the jobs lost. These vary significantly in the percentages they quote and the length of time over which this job loss takes place. But perhaps more importantly, it is hard in some cases to know what a given percentage projection means or to compare across these projections by different organizations since their meanings are often different from one another. When a study says that 25% of the US IT jobs will be lost by a given year, does it mean that the IT workforce in the United States will be a quarter smaller than it is today? Does it mean that there will be three IT jobs in the United States at that date in the future for every IT job in another country doing work for a US firm? Are the numbers calculated on a base of the number of IT jobs today or at that time in the future? Would it matter if there were a sizable number of IT jobs in other countries servicing the US economy if the number of IT jobs that remained in the United States continued to grow?

Some of the projections are for specific slices of the offshoring market. For example, Evalueserve (2004B) has projected a high rate of growth—46 percent annual compound rate of growth—in what they term knowledge process offshoring (KPO). Evalueserve distinguishes KPO from other business process operations (BPO) by the high level of knowledge intensiveness required. Examples of opportunities in KPO include intellectual property research; equity, financial, and insurance research; data search, integration, and management; analytics; and research and information services in human resources (Evalueserve 2004B, p. 4). What happens in the KPO slice that is developing from a small base, making it easier to have high growth percentages, may well not be true for other segments of the offshoring industry.

How do we put all this in perspective? Looking only at the number of jobs lost to offshoring is a narrow and one-sided way of looking at the situation. If one wants to know how many jobs there will be for IT workers in the United States in the future, one needs to look not only at all the ways in which jobs are lost (including not only those moved offshore but those lost through companies downsizing or going out of business) but also look at the number of new jobs that are created in the IT occupations.

It is useful to consider what has happened over the past five years and compare that situation with some of the projections just mentioned about IT job growth. The reports discussed earlier in this section indicate that the United States has lost several hundreds of thousands of jobs to offshoring since the height of the dot-com boom. Does that mean that we have fewer jobs today in the United States in the IT field than we did then? The last section of Chapter 1 contains an analysis of recent US Bureau of Labor Statistics numbers (see Table 8). It shows that the number of US IT workers is actually higher today than in 1999, at the height of the dot-com boom, despite the hundreds of thousands of jobs lost to offshoring. People who study the overall US labor market will not be surprised to learn that the situation is not as dire as it is made out to be by those who dwell on the offshoring losses. This is because history shows tremendous and continuing churn in the American labor market with massive numbers of jobs lost and jobs created each year, but with a fairly consistent pattern that the number of jobs created is larger than the number of jobs lost. These patterns do not hold true for all occupations of course, we have significantly fewer telephone operators than we once had, for example, but the Bureau of Labor Statistics in its ten-year forecasts continue to believe that the IT occupations will experience overall sustained growth and, in fact, several IT occupations will be among the fastest growing occupations in the next decade. The ITAA study mentioned previously also suggests that the number of IT jobs created in the United States in the future will be robust.

One can similarly ask about the effect of offshoring not on jobs but on wages for US IT workers. The same Bureau of Labor Statistics data just cited indicates that, since the height of the dot-com boom and throughout the dot-com crash, even through a recession in the US economy, IT wages have continued to rise at about twice the percentage of inflation. Wages did not rise at the same rate in all IT occupations. High-skill jobs rose at the highest rates, for example, computer science research salaries rose at 5.6% per year and computer systems manager salaries at 5.7% per year. Wages for low-skills jobs rose less rapidly. For instance, computer support personnel wages rose at only 2.1% per year, fairly close to the rate of inflation during this time. Even the much talked about programmer, whose job is expected to be particularly vulnerable to offshoring, had wages rise by a healthy 3.7% per year.

What will happen in the future is hard to predict. If the United States remains innovative in the IT field and if this innovation continues to have an important positive influence on the US economy as was the case throughout the 1990s, then it is likely that the United States will continue to create large numbers of jobs for IT workers. If the country does not continue to promote innovation and it cedes large portions of its IT industry to other countries, then the future is likely to be much bleaker for American IT workers.

What Does the Data Tell Us About the Size and Impact of Offshoring in Countries Other Than the United States That Offshore Work?

EUROPE OVERALL

The European Union is the largest offshorer of IT software and services after the United States. In one project of the European Commission's Information Society Technologies Programme, known as the STILE project, there was an effort to cull data on the IT-producing sector in Europe. The study group tried to use the accepted classification scheme, Nomenclature Generale des Activites Economiques dans les Communautes Europeenes (NACE) (General Industrial Classification of Economic Activities within the European Communities). They found that this was not particularly useful because IT activities are in many cases bundled with non-IT activities in the classification codes, and it was impossible to separate out services from products. More generally, there seems to be very little data, if any, collected by government organizations that provides information about the state of offshoring in Europe. As one major survey of the literature on European offshoring summarizes:

> It is important to emphasize, along with the OECD (van Welsum, 2004) that there are currently no reliable statistical indicators of the extent or nature of global outsourcing. It is not possible, either through the trade statistics or the EU occupational and employment statistics, to track statistics of imports and exports of business services to identify with any accuracy which components of these services represent jobs.
>
> For evidence we must therefore look to the results of market research, one-off surveys and case studies or anecdotal evidence. It must be emphasized that these vary in their reliability and their conclusions. They may be coloured, either positively or negatively, by the specific interests of the agencies who commissioned them, depending on their point of view. In between, lie many analyses which strain for objectivity but are hampered by the lack of solid empirical evidence….
>
> An even greater confusion exists in the EU [than in the United States] where there are notably few academic, systematically led investigations in the area of European and offshore outsourcing. Estimates of the impact on Europe are vague, especially in relation to outsourcing to smaller Asian countries and eastern European states. (Huws et. al. 2004, p. 10)

Table 2 provides an overview of some of the consultant data on the extent and impact of offshoring in Europe. The amount of offshoring is clearly at substantially lower levels than in the United States. These reports indicate that only about 5% of European businesses are currently offshoring, and not quite a third of European companies are even planning for offshoring. Huws et. al. (2004) point out that most studies agree that 2 to 3% of all EU service employment will be lost to offshoring by 2015 but notes that this loss is likely to be less than the number of new jobs created so that the European service industry is likely to expand its employment over time.

It is true today that Europe overall is not losing IT service jobs. Even at the country level, this is mostly true, and where there are national losses, in every country other than Denmark, any losses in computer jobs have been more than offset by growth in business service jobs (Eurostat, Community Labour Force Survey). Other than the United Kingdom, Western Europe has a decided preference for selecting Eastern European firms to do their offshore work (Pierre Audoin Consultants (2003), quoted in Huws et. al. 2004). Nevertheless, there is a sizable amount of work sent from Germany as well as from the United Kingdom to India. Eurostat data (Community Labour Force Survey) shows that the EU countries that are growing most rapidly in IT business activities are the new member states such as Hungary which had been behind the rest of the EU in percentage of IT activities. These data are consistent with, but not proof of, these countries becoming prime destinations for European offshoring.

Table 2-2: The Extent and Impact of Offshoring on Europe

Forrester (August 2004 as quoted in Gumbel 2004 and Knapp 2004)	Jobs lost by Europe to offshoring by 2015	1.2 million, including 150,000 IT jobs
Deloitte Research (quoted in Matlack et al. 2004)	Financial-services and high-tech jobs that will migrate from Europe to low-wage countries by 2008	800,000
Heidrick and Struggles/PeopleSoft (2004) as reported in van Breek (2004)	CEOs of European companies who reported offshoring work to low-cost labor markets as a key business issue	31%
European Commission 2000 (as quoted in Huws et al. 2004)	European companies offshoring	5.3%
Forrester Research (as quoted in Huws et al. 2004)	Value of offshore spending in western Europe in 2004 and 2009	1.1 billion, 3.6 billion Euros
Gartner (as quoted in Huws et al. 2004)	European business expected to include offshoring in their business plans by end of 2005	30%
Huws et al. (2004)	EU service employment lost to offshoring by 2015	2% to 3%

United Kingdom

The United Kingdom is the largest offshorer in Europe by a considerable margin, and this trend is likely to continue at least for the next few years. Forrester Research estimates that the United Kingdom will be responsible for three-quarters of all European offshoring in five years (Huws et. al. 2004). 61% of UK companies send IT work across national boundaries compared to only 15% in Germany, the second largest offshorer in Europe (Roland Berger 2004). Amicus (2004) claims that a thousand UK jobs are being lost to offshoring each week and projects a loss of 200,000 UK IT jobs by 2008 with a significant number of these positions in IT support. Management Consultancies Association predicts 25% growth in offshoring of call centers between 2003 and 2008 (Huws et. al. 2004). The Communications Workers Union (2004) predicts almost 200,000 call center jobs moved from the United Kingdom to low-cost countries between 2004 and 2006.

According to the consulting firm Evalueserve (2004), the United Kingdom will face a shortage of 714,000 workers by 2010 due to the aging of the workforce. IT is one of the fields projected to have the greatest shortages. Evalueserve estimates that 342,000 of these 714,000 jobs can be filled by immigrants and notes that the remainder will need to be filled in other ways if the country is to avoid a decline in GDP due to an insufficient labor pool. Evalueserve claims that, by the end of 2002, 31,100 jobs in the service sector in the United Kingdom had been moved offshore, and the company projects that 272,000 more jobs will move offshore in the period 2003-2010. Focusing more narrowly on IT and software development jobs only, Evalueserve claims that 18,000 jobs had been moved offshore by the end of 2002 and 84,000 more would be moved between 2003 and 2010.

GERMANY

In Germany, there are no federal statistics that help to track the number of jobs offshored (Bartsch 2004). For various reasons, it is expected that offshoring will not be as significant in Germany as in the United States: few people in low-wage countries speak German, Germany has fewer low-skill jobs than the United States of the sort that have been offshored, stricter layoff regulations make it more costly in Germany than in the United States to lay off workers and relocate the work overseas, and there has been less political fallout over jobless recovery after the last recession than in the United States. Germany historically does not have such strong labor rebounds after a recession as the United States. After the most recent recession, job recovery was close to the historical norms in Germany, while in the United States the recovery led to an unprecedented small number of jobs created.

Using an analysis of German foreign direct investment in Central and Eastern Europe by the Oesteuropa-Institut, together with employment trends in German foreign affiliates and correction factors for the German foreign affiliates numbers (because they underreport activities by small and medium-sized companies), Elga Bartsch arrived at an estimate on behalf of the consulting firm Morgan Stanley that the number of jobs (of all kinds) offshored to Central and Eastern Europe over the past decade is approximately 600,000. She also considered an alternate source, the European Restructuring Monitor (ERM), which “compiles information on major corporate restructuring announcements from daily press runs of the major national newspapers in the European Union and classifies them by country, industry, and reason for the restructuring” (Bartsch 2004). The ERM found that 117,000 jobs losses were announced in Germany from January 2002 into mid-2004, and that 3% were lost to relocation of production facilities and another 0.3% to outsourcing. In another study commissioned by the Deutsche Bank, it was estimated that 50,000 German IT-related jobs had been relocated outside Germany up until the time of the publication of the study (Huws and Flecker 2004).

In a McKinsey study (Farrell 2004), Germany shows only a $0.80 return on each dollar invested in offshoring, compared to $1.14 return on the dollar invested in offshoring for the United States. There are multiple reasons for this: German companies have higher management costs because of language and cultural issues; offshoring work is frequently contracted to Eastern Europe where the wages and infrastructure costs are higher than in India; Germany is not able to capture much in high-tech exports through offshoring because of the dominance of US firms in these export markets; Germany gains practically nothing from repatriated earnings (i.e., from offshoring providers abroad that German companies have invested in); and most important of all, as many as 60% of German workers have difficulty being re-employed when they lose their jobs through offshoring which is a major drag on the German economy.

What Does the Data Tell Us About the Size and Impact of Offshoring in India?

By far, the most complete data about the Indian software industry is provided by the Indian trade association, NASSCOM. Table 3 provides a snapshot of the offshore industry based on the NASSCOM Strategic Review 2005. You can see that the industry is vibrant with growth in the 20 to 30 percent range each year. IT software and services are still the largest export, far ahead of hardware and ITES/BPO, but the IT-enabled services are growing more rapidly than any other sector of the Indian offshoring industry. The United States, followed distantly by the United Kingdom, is the destination of most of this work.[3] About 60% of the ITES/BPO work is conducted by multinationals with this percentage edging higher over time. The export trade is growing much more rapidly than the domestic IT/ITES market in India, from 58% to 78% by revenue from 1996 to 2003 (RIS 2004 as quoted in UNCTAD 2004). The software and service industry is becoming increasingly important to India's economy, growing from 3% to 21% of India's total exports between 1996 and 2003 (RIS 2004 as quoted in UNCTAD 2004). Although there are more than 3000 software and service exporters in India, 25 of these firms collect more than 60% of the revenue (Prism 2004).

Table 2-3: The Extent and Impact of Offshoring in India

Indian national economic output attributable to the IT-ITES industry in 1997-98	1.2%
Indian national economic output attributable to the IT-ITES industry in 2003-04	3.5%
Indian IT industry revenue in IT services and software in 2003-04	60%
Indian IT industry in hardware in 2003-04	22%
Indian IT industry in ITES/BPO in 2003-04	18%
Growth in Indian IT and ITES exports	$9.9 billion in 2002-03 $$13.3 billion in 2003-04
IT and ITES export from India to the United States in 2003-04	69%
IT and ITES export from India to Europe in 2003-04	22% (mostly to the United Kingdom)
India IT services and software revenue in 2003-04	$12.8 billion (29.6% increase over previous year)
Jobs added to Indian IT services and software sector in 2003-04	98,000 (more to domestic companies than multinationals)
Growth in Indian IT services revenue	$1.9 billion in 2002-03 $2.5 billion in 2003-04
Growth in Indian offshore product development exports (includes exports of software products made by Indian companies)	$560 million in 2002-03 $710 million in 2003-04 (mostly produced by multinational captives)
Multinational companies that opened captive centers in India since early 2001	230

[3] Joseph and Parayil (2004 as quoted in UNCTAD 2004) claims 80%. Table 3 gives 69% for IT and ITES combined.

Value of research conducted by Indian captives of multinationals in 2003-04	$800 million to $1 billion
Value of research conducted by Indian captives of multinationals in 2008 (projected)	$11 billion
Call center seats	96,000 in 2003; 158,000 in 2004

Source: NASSCOM Strategic Review 2005

What Does the Data Tell Us About the Size and Impact of Offshoring in Countries Other Than India That Do Software Work for Export?

Quantitative information about software exports especially those related to offshoring is difficult to locate for most countries. Table 4 provides a smattering of data that we have been able to locate although we cannot attest to its correctness.

Table 2-4: Nations Other than India with Offshoring Industries

Country	**Statistic**	**Source**
Australia	$21B commercial service exports in 2003 (22% computer and communications)	World Development Index database
	call center seats: 135,000 in 2003, 146,000 in 2004	www.bpoindria.org/knowledgeBase/
Barbados	$1.1B commercial service exports in 2003 (16% computer and communications)	World Development Index database
Belarus	$1.5B commercial service exports in 2003 (24% computer and communications)	World Development Index database
Brazil	$9.6B commercial service exports in 2003 (50% computer and communications)	World Development Index database
Canada	HRDC estimates 500,000 Canadians work in call centers	Prism (2004)
Cape Verde Islands	$211M commercial service exports in 2003 (9% computer and communications)	World Development Index database
China	8,000 software and service providers, ¾ of whom have fewer than 50 employees and only five have more than 2,000 employees. (Yuan 2005)	McKinsey (January 2005)

	$1.5B in 2003	Prism (2004)
	Call center seats: 38,000 in 2003; 54,000 in 2004	www.bpoindria.org/knowledgeBase/
Czech Republic	$7.8B commercial service exports in 2003 (24% computer and communications)	World Development Index database
Dominican Republic	$3.4B commercial service exports in 2003 (5% computer and communications)	World Development Index database
Ghana	$612M commercial service exports in 2003 (11% computer and communications)	World Development Index database
Guatemala	$954M commercial service exports in 2003 (19% computer and communications)	World Development Index database
Hong Kong	Call center seats: 10,000 in 2003; 10,700 in 2004	www.bpoindria.org/knowledgeBase/
Hungary	$7.9B commercial service exports in 2003 (41% computer and communications)	World Development Index database
Ireland	leads the global market in offshore IT services with 25% of market	World Investment Report 2004
	$3.8B in 2000, 8.5B Euros in 2003	Prism
	60% of EU software is developed or localized in Ireland; software industry is 11% of GDP	
	55% of Ireland's 28,000 IT professionals are employed by multinationals and account for 90% of Irish software exports	
	$38B commercial service exports in 2003 (61% computer and communications)	World Development Index database
Israel	$1.9B value in offshoring exports in 2002	Prism (2004)

Latvia	$1.5B commercial service exports in 2003 (19% in computer and communications)	World Development Index database
Madagascar	$202M commercial service exports in 2003 (32% computer and communications)	World Development Index database
Malaysia	call centers growing at between 100 and 200% per year since 2000	World Investment Report 2004
	$14B commercial service exports in 2003 (33% computer and communications)	World Development Index database
Mauritius	$1.3B commercial service exports in 2003 (17% computer and communications)	World Development Index database
Mexico	$13B commercial service exports in 2003 (7% computer and communications)	World Development Index database
Morocco	$5.1B commercial service exports in 2003 (18% computer and communications)	World Development Index database
	Call center seats in all North Africa in 2005 (Morocco has largest share): 3,900	Datamonitor
New Zealand	Call center seats: 12,000 in 2003; 13,500 in 2004	www.bpoindria.org/knowledgeBase/
Philippines	27,000 people in call center jobs in 2003 and growing rapidly	World Investment Report 2004
	$250 software, or $1B including BPO (2003)	Prism (2004)
	Call center seats: 20,000 in 2003; 40,000 in 2004	www.bpoindria.org/knowledgeBase/
Poland	number of jobs in BPO will increase from 3,000 in 2004 to 200,000 in 2008	McKinsey & Co. (as quoted in Wagstyl 2004)
Romania	$3B commercial service exports in 2003 (42% computer and communications)	World Development Index database

Russia	$150 – 200M value of offshoring exportsin 2003	Prism (2004)
Senegal	$3890M commercial service exports in 2002 (40% computer and communications)	World Development Index database
Singapore	Call center seats: 10,000 in 2003; 10,100 in 2004	www.bpoindria.org/knowledgeBase/
Slovak Republic	$3.3B commercial service exports in 2003 (28% computer and communications)	World Development Index database
South Africa	number of call centers to expand from 494 in 2004 to 939 in 2008); serving the English but also the German populations.	Datamonitor (as quoted in Chatterjee 2004)
	Employees working in call centers in 2005	New York Times (Feb 2, 2005)
	$6.4B commercial service export in 2003 (9% computer and communications)	World Development Index database
Thailand	Call center seats: 11,000 in 2003; 13,000 in 2004	www.bpoindria.org/knowledgeBase/
Tunisia	$2.8B commercial service exports in 2003 (16% computer and communications)	World Development Index database
Ukraine	$5B commercial service exports in 2003 (11% computer and communications)	World Development Index database

2.3 Conclusions

Even in the face of offshoring, economists generally continue to believe in the theory of comparative advantage, that if each country specializes in the production of goods where it has comparative advantage and trade is not restricted, both countries can enjoy greater total consumption and well being by trading with one another. Some economists, notably Gomory and Baumol, have pointed out that it is possible for a country to lose under free trade. In the short-term, the question is one of jobs and wages. Are the jobs lost to offshoring in developed countries compensated for by new job creation in these countries which might come, for example, from the lower cost of development and production, faster development time, higher quality, or round-the-clock service associated with using an offshore workforce to supplement or supplant the domestic workforce? Similar questions can be asked about wage rates. The analysis by Mann of hardware offshoring to Asia in the 1990s suggests by analogy that it is entirely possible for a developed nation to be much better off through offshoring of its software work. Recent Bureau of Labor Statistics shows that IT jobs and wages have generally increased in the United States from the height of the dot-com boom until late 2003, a period during which there was active offshoring. However, lack of data limits what we can say about the impact of offshoring.

Leaving aside for the moment the question of whether offshoring has hurt aggregate jobs or wages, there are at least two ways in which offshoring might harm a developed country. Offshoring clearly can do harm to individuals who lose their jobs through offhsoring and to local communities that lose large numbers of jobs or particular businesses through this type of trade. The general sense among economists is that the only solution to this is a political one of providing a safety net to workers. This might include wage insurance, extended unemployment benefits, retraining, and perhaps others benefits. However, the costs of providing this safety net are great. The other way that offshoring can harm a developed country in the long run is to erode the country's capability to innovate. As a developed country loses its edge in innovation, it becomes less able to remain competitive. Enabling a country to remain innovative is a matter of education, research funding, and immigration policy. These issues are discussed in Chapters 7 and 8.

What does the available data tell us about the extent and trajectories of offshoring? First, considering the United States which has seen the largest amount of offshoring and is subject to the greatest amount of loss through offshoring, we know that there are perhaps 12 to 14 million jobs vulnerable to offshoring. However, this number represents a high upper bound on potential job losses, and nobody believes that all these jobs will be lost. So far, annual job losses have probably been no more than 2 to 3% of the IT workforce in the United States. Moreover, there are questions about the reliability of these numbers because of the definitions and other methodological issues. The meaningfulness is also at question because these job losses have to be placed in perspective with the much higher level of job loss and creation that occurs every year in the United States and, in particular, with the jobs that are created directly or indirectly because of companies sending work offshore. The data simply does not exist that would enable a full analysis of the impact of offshoring on the US IT workforce. Anecdotal information, together with data, suggest that the United States will continue to increase the amount of work it offshores at double-digit percentage rates at least for the next few years. Programming and related technical work continues to be the work most likely to be offshored, but IT-enabled services are rapidly taking a greater share. There is also rapid growth, from a small base, in the offshoring of higher-value activities such as knowledge processing and research.

Data about countries other than the United States or worldwide data are much harder to come by than data for the United States. There are reports of offshoring industries or sectors of these industries that have grown in India, China, and a few other countries by 20, 30, or higher percentages per year with projections that these growth rates will continue for varying lengths of time into the future. It is difficult to evaluate these projections but it seems likely that there will be continued rapid growth at least for the next few years. Whether these growth rates will be 10, 20, 30, or 40 percent per year is beyond our ability to project based on existing data. It appears that India will continue to be the primary destination of offshoring, with China growing rapidly. However, Chinese software activities are devoted to a significant extent on the emerging domestic market not the export market. There appears to be some promise of growth for the main nearsourcing countries such as Canada and those in Eastern Europe despite the fact that their wage rates are higher than those in the low-wage Asian countries. There are at least limited opportunities for offshoring work by companies located in Africa, Latin America, and low-wage Asian countries other than India and China. Data, together with anecdotal evidence, suggests that Western Europe is beginning to increase the amount of work it offshores. The United Kingdom has been by far the largest offshorer in Europe, and this is likely to continue to be true for the next few years. And Germany, in particular, has begun to increase the amount of work being offshored in the past year or two. Japan is set to increase the amount of work offshored especially to China.

There are numerous problems with the current state of data. Definitions used in reporting offshoring's growth and impact are inconsistent with one another. All of the obvious metrics that could be used to measure offshoring have limitations. Government statistical organizations, such as the US Bureau of Labor Statistics and the Bureau of Economic Analysis, provide the greatest promise in providing good data because of their highly trained staffs and long traditions of quality, reliability, and objectivity. Governments collect data, however, in connection with existing policy issues, and the offshoring phenomena is sufficiently different that existing government data sources turn out to be not very useful. Trade organizations and consulting firms are not disinterested parties, and these organizations are often unwilling to make public the methods and assumptions by which they arrive at their results so it is not surprising that there is some skepticism in the economic community about the credibility of their results. For many parts of the world, little or no data is being gathered.

A professional society such as ACM itself is not in a good position to collect data. However, it can encourage the principal data gatherers – governments, trade associations, and consultants – to improve their offshoring data practices. We need clear definitions, careful choice of metrics, data that separates the impact of offshoring on job loss from other causes of job loss such as business cycles and technological change, and data that measures the various aspects of offshoring (jobs created, gains in wealth to companies and nations, impact on wage rates, etc.) not just job loss. Thus, we recommend that the following steps be taken:

Standard definitions of offshoring and related terms should be developed. A good starting place is the diagram developed by the US General Accountability Office (Figure 2) that provides a complete description of all outsourcing and offshoring activities. These definitions should be used by all countries participating in the global software market, not just the United States.

The US Department of Labor should gather data on layoffs that is more suited to measuring offshoring than the current Mass Layoffs Statistics data. Ideally, such data should be collected on a regular basis, but even a one-time special effort would be useful. Other countries should collect similar data.

The United States should improve the collection of data on imports and exports of services by country, following the guidelines recommended by the General Accounting Office (2004). Other countries should follow similar practices, and practices should be consistent from country to country.

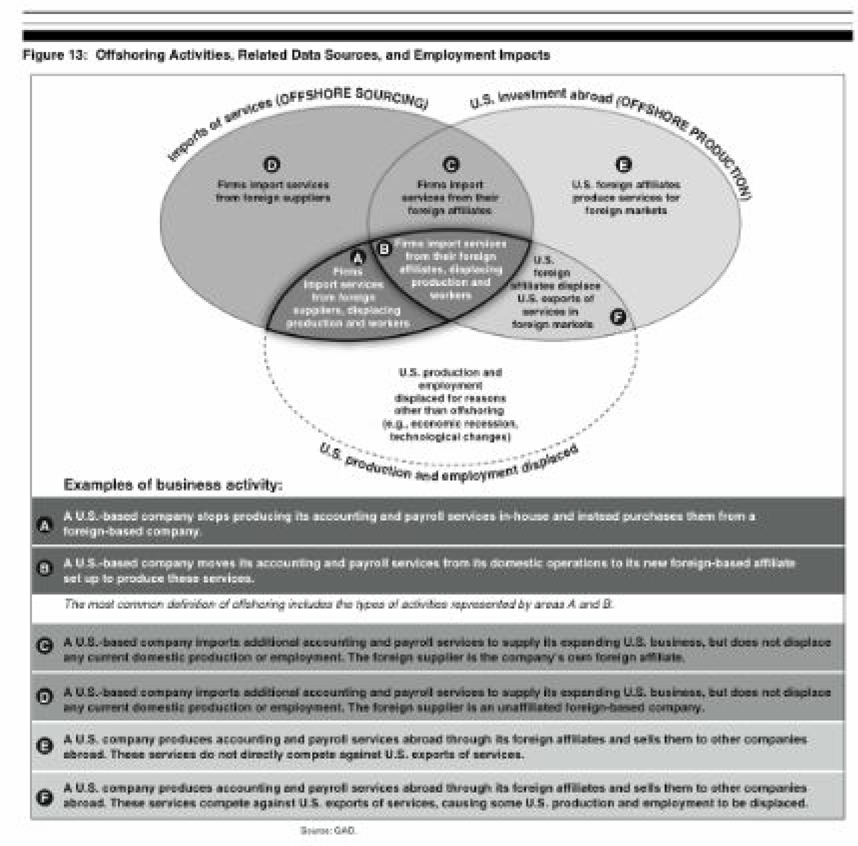
Data on direct investment abroad by source country and multinational company operations should be improved also following the recommendations of the GAO (2004).

R&D and design activities in low-wage countries should be tracked especially in affiliates of multinational firms.

All organizations, private as well as public, that are creating statistical information about offshoring should be transparent about their methods and assumptions.

Developing better current data and adopting standardized definitions should help to improve projections of offshoring. We are not sanguine, however, about the likelihood of developing good projections any time soon. In the United States, the BLS has been modestly successful in developing ten-year occupational projections, but projecting the size and effects of offshoring appears to be more difficult.

Figure 2-2



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