

Outsourcing: Is the Third Industrial Revolution Really Around the Corner?

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Arvind Panagariya

1 Introduction

Job losses due to a shift of economic activity from home to abroad have been debated almost as long as free trade. The traditional “Employment Argument for Protection” has focused on merchandise imports replacing similar domestically supplied goods and rendering the workers employed in the production of the latter unemployed. Likewise, the literature on factor mobility in general and direct foreign investment (DFI) in particular addresses the issue of job losses associated with the home firms moving their manufacturing operations abroad.

Traditionally, imports of services have not been controversial from the jobs perspective presumably because they are seen as either creating jobs or neutral with respect to them. For example, foreign banks and insurance firms selling banking and insurance services to home country must locate on the latter’s soil and add to the availability of jobs there. Service imports such as increased tourism abroad are viewed as having no effect on jobs at home.¹

This has changed, however, with the advent of the Internet and other innovations in the telecommunications industry. These innovations have dramatically reduced the cost of buying certain services abroad at arm’s length. Call centers serving customers in the United States can be located in countries such as India and the Philippines where the

¹ I hasten to add that this perception is not entirely accurate. If increased tourism abroad results from the diversion of tourism from domestic destinations, jobs will be shifted from home to abroad. From jobs perspective, this shift is entirely analogous to increased merchandise imports replacing similar domestic supplied goods. Yet, even protectionists rarely treat the two phenomena symmetrically.

wages of the employees are a small fraction of the U.S. wages. Likewise, U.S. firms can buy customized software services from vendors in Ireland, India and China at substantially lower prices than the corresponding U.S. prices.

The vast potential for the purchase of these “skilled” services by rich countries in the poor countries has triggered a major debate among academics as well as policy analysts regarding the effect of this trade on overall welfare, wages, employment and transitional labor-market adjustments in the importing country. While some analysts have gone so far as to argue that such trade undercuts the case for free trade, others predict massive downward adjustments in the wages and transitional costs as workers move from declining to rising sectors.

In an early contribution to this literature, Bhagwati, Panagariya and Srinivasan (2004) dealt with theoretical issues as well as policy concerns arising out of the phenomenon of arm’s length purchases of services abroad. They also pointed to a number of confusions that had arisen in public discussions on it. Since then, the literature has grown, with notable contributions by Blinder (2006, 2007), Mankiw and Swagel (2006), Bhide (2007), and a number of authors in the volume edited by Collins and Brainard (2005).² A report by a panel of the National Academy of Public Administration (NAPA) (2006) has considered in detail the data and definitional issues. Some of these contributions have moved the debate further but some have introduced additional confusions.

In this paper, I revisit the issue of outsourcing in the light of the new writings. In so far as some of the latest contributors have taken issue with the propositions in

² I will refer to some of the specific contributions in this volume later in the paper.

Bhagwati, Panagariya and Srinivasan (2004), I offer them my rejoinder. In Section 2, I begin with the confusions that continue to surround the terminology and the identification of the precise new phenomenon on which we must focus. In Section 3, I discuss the available evidence on the number of jobs outsourced by the United States and in-sourced from India to-date. The bottom line here is that no matter how one calculates, the number of jobs outsourced per year is so far tiny in relation to both the number of jobs created and destroyed by the U.S. economy every year and the total number of services jobs in the United States even if we limit ourselves to the sectors susceptible to outsourcing. I then briefly turn to the welfare economics of outsourcing paying special attention to the proposition, widely but incorrectly attributed to Paul Samuelson (2004), that the phenomenon of outsourcing fundamentally undermines the gains from trade theorem. This is done in Section 4.

In several influential papers, Blinder (2006, 2007) has contended that 30 to 40 million services jobs in the United States are under the threat of outsourcing in the long run and that the United States must prepare itself for a painful transition to the third Industrial Revolution. In Section 5, I subject these propositions to a critical examination. Because India is at the center of the outsourcing phenomenon on account of its ability to offer some skilled services at low prices recently, in Section 6, I examine its potential as a source of skilled services jobs for the rich countries, especially the United States. In Section 7, I conclude the paper with possible policy responses to the phenomenon of outsourcing of skilled services.

2 Terminology and Definition: Continuing Muddles

While the origins of the outsourcing debate go farther back, a key event leading to its intensification was the publication of the *Economic Report of the President* on February 9, 2004.³ The report stated (p. 229),

One facet of increased services trade is the increased use of *offshore outsourcing* in which a company relocates labor-intensive service industry functions to another country. For example, a U.S. firm might use a call center in India to handle customer service-related questions. The principal novelty of outsourcing services is the means by which foreign purchases are delivered. Whereas imported goods might arrive by ship, outsourced services are often delivered using telephone lines or the Internet. The basic economic forces behind the transactions are the same, however. When a good or service is produced more cheaply abroad, it makes more sense to import it than to make or provide it domestically.

Presenting the report to the press, Gregory Mankiw, Chairman of the President's Council of Economic Advisers, went on to state (Mankiw and Swagel 2006, p. 8):

I think outsourcing is a growing phenomenon, but it's something that we should realize is probably a plus for the economy in the long run. Economists have talked for years about trade, free international trade, being a positive for economies around the world, both at home and abroad. This is something that is universally believed by economists. The President believes this. He talks about opening up markets abroad for American products being one of his most important economic

³ Figure 1 in Mankiw and Swagel (2006) shows the number of times the term "outsourcing" appeared in four leading newspapers (USA News, New York Times, Los Angeles Times and Washington Post) between January 2002 and July 2005. The highest peak is reached between February and April 2004 and the total count during 2004 exceeds 1,000.

priorities. And we saw discussions this weekend of the Australia agreement. So it's a very important priority.

When we talk about outsourcing, outsourcing is just a new way of doing international trade. We're very used to goods being produced abroad and being shipped here on ships or planes. What we're not used to is services being produced abroad and being sent here over the Internet or telephone wires.

But does it matter from an economic standpoint whether values of items produced abroad come on planes and ships or over fiber optic cables? Well, no, the economics is basically the same. More things are tradable than were tradable in the past, and that's a good thing.

Although the central point in this statement and that in the President's report was that the "gains from trade" applied just as much to trade via outsourcing as to the conventional trade in goods, the press and politicians interpreted them as giving approval to the shipping of U.S. jobs abroad.⁴ Indeed, the statement by Mankiw caused such a furor in the press that even President Bush felt compelled to distance himself from it.⁵

One thing that should be very clear from the two statements quoted above is that the phenomenon that had been at the heart of the ongoing debate on trade policy was arm's length trade in services. From a conceptual standpoint, this phenomenon was not new. Even absent the breakthroughs in the telecommunications technology, arm's length

⁴ A story with the headline "Bush Supports Shift of Jobs Overseas" in the Los Angeles Times on February 10, 2007 fired the opening shot and was followed by a series of attacks on the President's report and Mankiw by Democrats that journalists extensively covered with their own commentaries. See Mankiw and Swagel (2006) for a blow-by-blow account of the story as it unfolded.

⁵ For example, see <http://www.cnn.com/2004/US/02/12/bush.outsourcing/>.

purchases of services abroad were feasible. Manuscripts could have been airmailed to another country, edited, and returned for printing. Likewise, blood samples could be flown to another country for analysis and blood reports flown back. What the information technology revolution did, however, was to multiply the scope for the expansion of trade in these services. And in so far as this trade principally applied to skilled services, it raised fears that were qualitatively different: the issue now was that U.S. skilled wages as well as lead in skilled-labor-intensive services was under threat from the low-skilled-wage countries such as India.

Unfortunately, neither public policy debate nor academic literature has shown clarity in defining the new phenomenon at the heart of the outsourcing debate that has ensued. Instead, economists as well as journalists have gone on to include manufactures imports as well as DFI by firms in the definition of outsourcing, which they now increasingly refer to as “offshoring” (more on this below). As I have noted above, trade economists have extensively analyzed imports of manufactures and DFI by firms in the existing literature.

In their contribution, Bhagwati, Panagariya and Srinivasan (2004) had explicitly recognized the definitional muddles that existed in the policy domain at the time.⁶ Therefore, they made a special effort to define outsourcing precisely, using the classification of services according to the modes of delivery identified by trade economists (Bhagwati, 1984 and Sampson and Snape, 1985) and adopted by the World

⁶ For example, Presidential candidate John Kerry had been criticizing all firms, including those engaged in manufacturing, for shifting their operations abroad, calling them “Benedict Arnolds,” meaning traitors. In his television program *Lou Dobbs Tonight*, CNN journalist Lou Dobbs had been regularly featuring the segment “Exporting America” in which he reported on corporations that outsourced jobs overseas and included among the latter the firms importing their components and services as well as those moving manufacturing operations abroad.

Trade Organization (WTO).⁷ This classification relies on the manner in which the seller delivers service to the buyer: with buyer and seller remaining in their respective locations, buyer moving to the location of the seller, and the seller moving to the location of the buyer.

Thus, the WTO Mode 1 services are those traded at arm's length, with the buyer and seller remaining in their respective locations. These are the services that come the closest to what the President's report and Mankiw called "outsourcing" and constitute the new phenomenon of concern. Mode 2 services require the buyer to move to the location of the seller as, for example, in the case of tourism. Mode 3 services require the seller to have "commercial" presence in the buyer country as in the case of banking and insurance. Mode 4 services require the movement of workers to the location of the buyer as is the case with information technology workers entering the United States under H1B visas. Modes 3 and 4 are conceptually similar in that they both require the seller to move to the location of the buyer. The distinction is largely made to facilitate WTO negotiations: countries are less willing to grant entry to individuals looking for jobs (Mode 4) than to firms seeking to establish themselves commercially (Mode 3).

Parenthetically, it may be noted that an important source of the fear from the imports of Mode 1 services in the rich countries is that arm's length delivery opens the door to their imports in indefinite volume, subjecting domestic workers to intense competition. This is in contrast to imports via Modes 2, 3 and 4. Mode 2 imports require home country buyers to travel abroad for face-to-face contact with the supplier as in the case of tourism. These imports do not pose a direct threat to workers at home. Mode 3

⁷ Thus, see Bhagwati (1984) and Sampson and Snape (1985).

imports bring require commercial presence of the supplier and, therefore, bring foreign firms to the home country. These imports create rather than destroy jobs at home. Mode 4 imports bring foreign workers to domestic soil and do pose a direct threat to home workers but can be controlled through immigration policies. .

In using the term “outsourcing” and limiting its scope to Mode 1 services, Bhagwati, Panagariya and Srinivasan (2004) had chosen to stick to the dominant terminology at the time and defined it to refer to the phenomenon whose expansion had been accelerated by the advent of the new technologies.⁸ Nevertheless, the confusion over terminology as well as its scope has continued. Thus, arguing that the term “outsourcing” is used to refer to the procurement of a component or service by a firm from an outside source regardless of whether the latter is located at home or abroad, some authors have advocated using the term “offshoring” for the phenomenon at the center of the controversy.⁹

But attempts to shift to the new terminology have themselves added to the confusion. For example, the NAPA panel to which I alluded earlier defines offshoring as “U.S. firms shifting service and manufacturing activities abroad.” (NAPA 2006, p. 42) This definition turns out to be far wider than the new phenomenon of arm’s length

⁸ A measure of the dominance of “outsourcing” over “offshoring” terminology is that in trying to measure the intensity of public debate on the phenomenon, Mankiw and Swagel (2006) chose to look for references to the former in four leading newspapers.

⁹ Bhagwati, Panagariya and Srinivasan (2004) were, of course, fully aware of the prior use of the term “outsourcing” for the purchases of components by firms from outside suppliers at arm’s length. Thu, the opening paragraph of their paper stated, “In the early 1980s, “outsourcing” typically referred to the situation when firms expanded their purchases of manufactured physical inputs, like car companies that purchased window cranks and seat fabrics from outside the firm rather than making them inside. But in 2004, outsourcing took on a different meaning. It referred now to a specific segment of the growing international trade in services. This segment consists of arm’s-length, or what Bhagwati (1984) called “long-distance,” purchase of services abroad...”

purchases of services abroad, as the following elaboration of it in NAPA (2006, p. 42) makes clear:

The Panel's definition clearly states that off-shoring includes U.S. firms shifting service or manufacturing activities to either affiliated or unaffiliated firms located outside the United States in order to provide intermediate or final goods or services imports back to the United States, exports to foreign markets, or to directly supply the market in which the activity is occurring. The definition is not limited by import substitution or relocation conditions, and therefore includes job opportunities lost due to forgone exports and imports from either the expansion of U.S. foreign affiliates or expanded unaffiliated contracts."

From the viewpoint of outsourcing/offshoring debate, this definition has at least three important limitations:

- It extends to trade in goods, services and DFI. I have already argued that only Mode 1 trade in services constitutes the new phenomenon of concern. Other forms of trade and DFI have been extensively analyzed in the literature before.
- Even setting aside the previous point, in many cases, this definition attributes job losses to DFI when no such losses have actually occurred (see below).
- This definition treats the transactions by firms and consumers asymmetrically even when their implications for job losses may be entirely symmetric (see below). It is simply not clear why we should view job losses directly associated with the actions of the firms less favorably than those directly associated with the actions of the consumers.

As an example of DFI that leads to no job losses but is presumed to be doing so under the NAPA definition, consider the production of automobiles by the Ford Motor Company in India for sales within India. The NAPA definition considers this activity as offshoring on the ground that Ford could have alternatively produced these automobiles in the United States and exported them to India. Therefore, locating production in India leads to job losses for the U.S. workers. But such an interpretation fails to recognize that India imposes a prohibitive tariff on auto imports. Ford simply does not have the option to locate production in the U.S. and serve the Indian market at arm's length. This is not an isolated example. When American firms locate abroad to serve the local market, even absent tariffs, it is often the case that they would be rendered uncompetitive if they located at home.

This problem is even more serious when we consider DFI associated with Mode 3 services. Banks and insurance companies can sell these services only if they locate themselves within the physical proximity of the customers. If the U.S. banks and insurance companies serving customers in India were to relocate themselves on the U.S. soil, they will simply lose their customers in India. Jobs created by the U.S. banks and insurance companies in India cannot be counted as jobs lost to the U.S. workers.

According to the NAPA definition, if consumers rather than firms are directly responsible for the shift in purchases from domestic to foreign sources of supply, such shifts do not qualify as offshoring. For example, if consumers decide to switch to European clothing in preference to domestically produced clothing and start ordering it directly from Europe on the Internet, the switch will not qualify as offshoring even though it causes jobs to shift to Europe. In the same vein, if a decline in the cost of

international air travel leads U.S. residents to switch from domestic tourist destinations to foreign ones, the change leads to a shift in the U.S. jobs abroad but it does not count as offshoring.

Thus, substituting the term offshoring for outsourcing is not without hazard. It can simultaneously lead to a switch in the phenomenon we are analyzing.¹⁰ Surprisingly, Blinder (2007), who prefers the term offshoring to outsourcing, approves of the NAPA definition uncritically, stating, “That seems a workable definition to me.” Yet, the phenomenon he analyzes throughout his paper corresponds most closely to Mode 1 services just as Bhagwati, Panagariya and Srinivasan (2004) had urged. Blinder implicitly recognizes that manufacturing trade and DFI are old hats and that they call for no new analysis.

This continued confusion demonstrates that substituting “offshoring” for “outsourcing” terminology has not proved as fruitful as its advocates may have desired. To alleviate the problem, in the remainder of this paper, I will use the terms outsourcing and offshoring interchangeably but explicitly distinguish between trade in Mode 1 services and other forms of trade and DFI. As I have already emphasized, it is the former phenomenon that should concern us in the context of the current debate. My main reason for briefly including the latter in this paper is to give some clarity to the literature that has lumped all shifts in job from home to abroad under the rubric of outsourcing/offshoring.

¹⁰ I have chosen the NAPA definition only for illustrative purposes. NAPA (2006, pp. 38-47 and Table 3.1) documents a number of such definitions. Others have provided yet different definitions. For example, Markusen (2005) views “offshoring” as trade and factor movements affecting white-collar jobs and wages. In some respects, his definition turns out to be even wider than that considered by NAPA since white-collar jobs may be lost through *all* forms of trade in goods and services regardless of whether it is conducted by firms or consumers. His definition also extends to direct foreign investment if it has any impact, direct or indirect, on skilled jobs or wages.

I may add one final point of clarification before moving to assessing the evidence on the number of jobs shifted abroad through trade in Mode 1 services and other forms of trade and DFI. Direct foreign investment may sometimes play a facilitating role in the imports of Mode 1 services. For instance, General Electric was among the early players to establish an outsourcing center in India. Likewise, the IBM, Hewlett-Packard and many other U.S. companies have established outsourcing centers in India and other countries. While such DFI is entirely consistent with and relevant to the imports of Mode 1 services, a disproportionately large part of the direct foreign investment is associated with either manufacturing or services that lead to no offshoring of jobs (U.S. banks and insurance companies serving customers in India through commercial presence).

3 Jobs Outsourced To-date

The available data do not permit the calculation of a definite, single estimate of the number of jobs offshored. What we are able to do, however, is to calculate some very rough estimates from in a variety of data sources. Luckily, it turns out that these estimates lead to the same bottom line: so far the number of jobs offshored by different modes of trade and DFI are small in relation to the total number of jobs.

3.1 Jobs Lost to Mode 1 Services Imports

All evidence points to a small number of Mode 1 services jobs having been offshored to-date. There are three main sources of direct evidence:

- McCarthy (2002) of Forrester Research, Inc. estimated that 3.3 million U.S. jobs would be offshored by 2015. He based this estimate on changes in employment in nine occupational categories identified as especially vulnerable to offshoring.

These categories included, for example, management, architecture and engineering and computer and mathematical operation. McCarthy (2004) revised this estimate to 3.4 million and placed the number of U.S. jobs offshored at 315,000 in 2003, and predicted their cumulative rise to 588,000 in 2004 and 830,000 in 2005.¹¹ All of these numbers imply annual job losses to offshoring of approximately 300,000. In comparison, the U.S. economy destroyed 30 million jobs in 2003 and created as many of them. Alternatively, based on the data compiled by Kirkegaard, this figure was only 0.53 percent of the 56.7 million jobs in 2002 in the nine categories from which it is derived.¹² Kirkegaard (2004) analyzes in detail employment changes in the nine occupational categories chosen by Forrester between 2000 and 2002. In aggregate employment in these categories fell by 1.14 million between 2000 and 2002 or by 1.97 percent of the total employment in the former year. Importantly, this is the fall in employment due to all factors including the business cycle effect. Only a small fraction of these jobs could have been actually offshored. Furthermore, Kirkegaard studies the changes in employment by industry in the nine occupational categories. He finds that though manufacturing accounted for less than 10 percent of employment in the nine job categories, it experienced more job losses than the

¹¹ See Auchard, Eric, "Report finds exports of U.S. jobs to be accelerating," USA Today, May 17, 2004 at http://www.usatoday.com/tech/techinvestor/2004-05-17-outsourcing-pace_x.htm.

¹² Kirkegaard (2004) analyzes in detail employment changes in the nine occupational categories chosen by Forrester between 2000 and 2002. For each occupational category, he studies the changes in employment by industry. He finds that though manufacturing accounted for less than 10 percent of employment in the nine categories, it accounted for the vast majority of the job losses in them. Services sectors as a whole experienced a net gain in employment the nine categories. Across occupational categories, management, which is less likely to be outsourced, accounted for 60 percent of the job losses.

economy as a whole. Services industries as a whole experienced a net gain in employment in these nine categories. This observation further suggests that the Forrester estimate is probably an overestimate.

- Bhagwati, Panagariya and Srinivasan (2004) estimated the number of offshored jobs by adding up the number of employees in such occupations as software development and call center operations in countries such as India, the Philippines and others serving the overseas markets. Based on data between 2000 and 2004, they concluded that this number could not have been expanding at more than 100,000 workers per year.
- Mankiw and Swagel (2006) try to glean information on offshoring from trade data. They note that in the trade data, compiled by the Census Bureau, category Business, Professional, and Technical Services (BPT), which includes trade in computer and information services, management and consulting, services, research and development and testing services, operational leasing, and an “other” entry, is likely to represent services associated with offshoring. BPT is a sub-category of broader category “Other Private Services,” which additionally includes education, financial services, insurance, and telecommunications. As Mankiw and Swagel (2006, p. 33) note, these latter sub-categories ‘would not be expected to fall under the rubric of outsourcing, which more commonly refers to business services such as call centers and professional services such as engineering design or radiological diagnoses (both of which fall under BPT).’ In 2004, BPT imports and exports amounted to \$40.7 billion and \$75 billion, respectively. If BPT imports are identified with Mode 1 services imports, as

would follow from the statement by Mankiw and Swagel just quoted, these figures show that outsourcing by the United States is more than offset by insourcing from it.¹³ Mankiw and Swagel note that BPT imports accounted for only 16 percent of total private services imports and 2 percent of total goods and services imports in 2004.

We can bring some further evidence to corroborate the conclusion that the number of Mode 1 services jobs outsourced is likely to be small. This includes:

- The Bureau of Labor Statistics (BLS) uses filings for unemployment insurance to identify firms that had layoffs of more than 50 workers for more than 30 days. It then asks these firms whether the layoff resulted from a move of the work to another location within or outside the company and if yes, geographical location of such a move. According to Mankiw and Swagel (2006), the data for the first six quarters (starting in January 2004) for which data were available to them, only 1.6 percent of the layoffs were associated with out-of-country relocations. Job losses associated with relocations within the United States accounted for 3.3 percent of the job losses. Given that relocations included manufacturing as well as services, offshoring of Mode 1 services could have accounted for only a tiny proportion of 1.6 percent of the total layoffs attributable to relocations overseas.
- Mann (2003) calculates that once we adjust for the business cycle effects and compare the employment in the information technology-related industries

¹³ It may be noted, however, that there are large discrepancies between imports of services reported by the Bureau of Economic Analysis (BEA) of the United States and exports of services to it reported by partner countries. Kozlow and Borga (2004) note that services imports from India reported by the BEA accounted for only 17 percent of the services exports to the United States reported by India for the year 2002.

between end-1999 and October 2003, employment in various categories associated with Mode 1 services shows steady expansion. Her calculations do not directly measure the extent of outsourcing, but they do suggest at most tiny impact of outsourcing on employment.

- None of the calculations take account of the fact that in many cases imports of Mode 1 services may help preserve or generate jobs at home. Once the option to buy services abroad opens up and some countries begin to take advantage of it, those that choose not to do so will be rendered uncompetitive in the activities intensive in the use of those services. In a similar vein, projects that may not be profitable when all its component activities are performed at home may become profitable upon offshoring of low-end skilled jobs. Drawing on Pearlstein (2004), Bhagwati, Panagariya and Srinivasan (2004) offer a concrete example in support of this point. Several years ago, the Information Management Consultants (IMC) of Reston, Virginia considered undertaking a specialized software project. It concluded that the project was unviable if undertaken entirely in the United States but viable if its Indian subsidiary did the bulk of the coding work. It took the latter option and was able to employ six engineers in the United States for each engineer in India.

3.2 Jobs Lost to Offshoring the Production of Goods and Services in General

The studies discussed so far aim to capture the extent of Mode 1 services offshored by the United States even though they may be successful in doing so only to a limited degree due to data limitations. A somewhat larger body of research studies offshoring of jobs more generally. This research uses one of two sets of data: data from the Bureau of

Economic Analysis (BEA) on variables such as employment and wages associated with the activities of U.S. and foreign multinational corporations; and trade data combined with input-output tables. Given the focus of this paper on offshoring of Mode 1 services, I do not cover the studies on offshoring in general in detail. Mankiw and Swagel (2006) provide an excellent summary of them. Drawing on their paper, I selectively describe some of the findings of this literature.

- The BEA data track employment by the U.S. multinationals abroad as well as that by foreign multinationals in the U.S. Therefore, these data allow us to get some idea of both offshoring and “in-sourcing” from the United States. Mankiw and Swagel (2006) plot these data from 1988 to 2003. Both the employment by U.S. corporations abroad and by foreign corporation in the U.S. grew steadily during the 1990s. During the 2000s, the downturn in the U.S. economy was accompanied by a decline in the number of workers employed by foreign corporations in the U.S. Employment by the U.S. corporations abroad continued to grow, though at a slower pace. The total number of employees in foreign affiliates of the U.S. corporations was a little above 8 million in 2003 and in the U.S. affiliates of foreign corporations was a little above 5 million in the same year.
- From the viewpoint of employment in the U.S., the key question is whether the workers in the U.S. affiliates abroad displaced the workers at home or helped preserve their jobs. Economists indirectly seek an answer to this question by examining the whether employment in the parent corporation rises or falls (i.e., whether it exhibits complementarity or substitutability) with employment in the foreign affiliates. Hanson, Mataloni and Slaughter (2003) use firm-level data to

estimate labor demand equations for the U.S. multinationals and find that increased overall sales by the foreign affiliate is accompanied by increased employment in the U.S. parent. Job gains are asymmetric across skill levels, however. While the demand for skilled workers increases, that for unskilled workers declines with increasing sales abroad. Evidence on the effect of foreign wages on the parent employment is in dispute: while Hanson et al (2003) find that lower wages abroad reduce employment by the parent, Brainard and Riker (1997) find they have no effect on the latter.

- Landefeld and Mataloni (2004) show that job creation in the U.S. market between 1989 and 1999 at 1.6 percent per annum by multinationals expanding overseas was not especially different from that at 1.8 percent per annum by all U.S. firms during the same years. These authors also find that foreign affiliates of the U.S. firms sold 65 percent of the output in the local market, 24 percent in the third-country markets and 11 percent in the U.S. market. This fact also points to low job displacement at home unless one believes that the corporations could have produced all output in the U.S. and remained competitive in various markets.
- Baily and Lawrence (2004) combine trade data with input-output data and calculate jobs losses due to trade. They find that it is weak export performance rather than rapid rise in imports that accounts for the bulk of trade-related job losses after 2002. They point to the lagged impact of a strong dollar in the late 1990s as the key cause of the weak performance of U.S. exports.

4 Samuelson and the Welfare Economics of “Outsourcing”

An article by Nobel laureate Paul Samuelson (2004) created much stir in the press. Most press accounts reported the article as lending support to the view that outsourcing undermined the case for free trade. But as I explained in the note “Why the Recent Samuelson Article is not about Offshore Outsourcing,” (Panagariya, 2004) posted on my website, the phenomenon Samuelson analyzed was not offshore outsourcing at all. Instead, he considered the effect of productivity gain abroad in a product exported by home country. Such a change expands the foreign output of the good and lowers its price in the world market. This decline in price represents a deterioration in the terms of trade of home country and hence a loss in welfare.

As I explain in my note, the terms of trade deterioration due to productivity increases abroad have been known to trade economists since at least the 1950s. But even these losses do not undermine the case for free trade. What the terms of trade deterioration does is to reduce the gains from trade for home country. But the gains remain positive so that a move by home country to autarky will still lower its welfare.

In Bhagwati, Panagariya and Srinivasan (2004), we offer a proper analysis of the welfare effects of opening to the imports (and exports) of Mode 1 services. We demonstrate that the effect of such a change is necessarily positive on the global economy as a whole. It is also positive on a small open economy that takes the terms of trade as given. In a large open economy, the primary effect of opening to the imports of Mode 1 services is positive but it may be accompanied by either an improvement or deterioration of the terms of trade with respect to the previously traded goods. In the former case, the terms of trade improvement produces a secondary gain reinforcing the primary gain. But

in the latter case, the deterioration of the terms of trade counteracts the primary beneficial effect and the net welfare effect is ambiguous. It deserves emphasizing, however, that even when the terms of trade deteriorate so much that the welfare declines, a withdrawal from trade will make matters worse, not better. Trade yields less gains than prior to the possibility of imports of Mode 1 services but those gains are positive.

5 Mode 1 Services Imports: The Next Big Thing?

In sharp contrast to public perceptions reflected in numerous press reports and blogs, Economists are in agreement that Mode 1 services imports are so far tiny in relation to the overall market for skilled workers in the United States. While most economists also do not see this phenomenon turning into a tidal wave in the future, one eminent economist, Professor Alan Blinder (2006, 2007) of Princeton University, has forcefully argue the opposite. Blinder (2006, 2007) has set off alarm bells arguing that services imports promise to bring third industrial revolution in the United States, the first being the displacement of agriculture by industry and second involving the ascendancy of industry over services.

5.1 Blinder's Alarmist Thesis

To give an idea of what Blinder (2006) has in mind, he begins by reminding that in 1810, 84 percent of the U.S. labor force was in agriculture compared with just 3 percent in manufacturing. By 1960, the first Industrial Revolution had raised the share of manufacturing in labor force to 25 percent and lowered that of agriculture to 8 percent. The second Industrial Revolution followed. By 2004, it had raised the share of services

in the labor force to 82 percent and lowered those of industry and agriculture to 16 and 2 percent, respectively.

According to Blinder (2006, 2007), the United States is now in the midst of a third Industrial Revolution. He contends that this time around, the revolutionary change will be massive offshoring of what he calls “‘impersonal services’—that is, services that can be delivered electronically over long distances with little or no degradation in quality.” In turn, this offshoring will be accompanied by a shift of the U.S. workforce into “personal services”—that is, services that cannot be delivered electronically without significant deterioration in quality and require face-to-face contact.

As an aside, I may note that what Blinder calls “impersonal services” are precisely what Bhagwati, Panagariya and Srinivasan (2004) had identified as the WTO Mode 1 services.¹⁴ By implication, “personal services” in Blinder’s nomenclature are identical to WTO Modes 2, 3 and 4 services taken together. Therefore, the assertion by Blinder that all this while, we have lacked a nomenclature that conceptually distinguishes among various services is inaccurate. Numerous conceptual and theoretical analyses of trade in services by trade economists during the last two decades have relied on precisely the kind of distinction he makes. Blinder does introduce a new element by associating some economic properties with one set of services versus the other (e.g., higher productivity growth in impersonal (Mode 1) services than in personal (modes 2 to 4) services); but as I will argue below such association is on rather slippery slope.

¹⁴ In his formal definition, Blinder limit impersonal services to services that can be delivered electronically. But he clearly does not mean to exclude other modes of arm’s length delivery as, for example, when blood samples are flown abroad and blood reports airmailed back to the home country. Therefore, there is complete identity between what he calls impersonal services and WTO Mode 1 services.

Blinder's main argument (Blinder 2007, pp. 14-24) may be summarized as follows.

- Offshoring will continue to expand for several decades to come: Three are three factors driving this process. First, advances in information and communications technology (ICT) will continue to turn more and more personal services into impersonal, Mode 1 services. Second, India, China and other countries will continue to provide large and increasing number of skilled workers. Finally, Baumol's (1967) disease will drive the demand away from personal to impersonal services. Baumol's disease, as applied by Blinder to services, says that there is little scope for productivity increase in personal services. Therefore, productivity increases in impersonal services, which raise real wages, also raise prices of personal services. Such price increases shift the demand away from personal to impersonal services, contributing to offshoring.
- Eventually, the number of jobs subject to offshoring competition will be huge. Based on the characteristics of jobs of approximately 800 occupations in the Bureau of Labor Statistics (BLS) Standard Occupational Classification (SOC) description, Blinder develops a subjective ranking of most offshorable to least offshorable jobs. From this ranking, he concludes that as many as 30 to 40 million of the current jobs will eventually become capable of being offshored though this does not mean that this many jobs will be actually offshored. There is no way of knowing the actual number of jobs that will be offshored.
- Offshoring is likely to lead to major adjustment problems in the economy. U.S. workers will face adverse employment as well as wage effects. There are three possible sources of transitional unemployment. First, offshoring will lead to

greater increase in the gross job destruction rate than job creation rate. This will raise the natural rate of unemployment during the transition. Second, job mismatch will lead to structural unemployment. Many million Americans may be forced out of their impersonal (Mode 1) services employment into something else. Changing *occupations* will be painful. Finally, imports will rise in relation to exports due to offshoring, leading to deficient aggregate demand and Keynesian unemployment. On the wage front, the availability of low-wage skilled labor from India and China will push skilled wage down in the United States. Even the threat of the availability of this low-cost labor may be sufficient to drive down the wages in the occupations vulnerable to offshoring.

5.2 *A Critique of Blinder's Thesis*

Although the story told by facially coherent, a close examination of it reveals large holes in it. Let me consider some major problems.

Do the Numbers Add up to a Tempest?

Even if we take the numbers offered by Blinder at face value, they do not add up to a tempest. Begin with the following statement by him (Blinder 2007, p. 19): “I am not—repeat, *not*—claiming that 30-40 million Americans will lose their jobs because of offshoring. Rather, this is my rough estimate of the number of jobs that will face *potential* foreign competition. Only a fraction of them will actually be moved offshore. In addition, this transition will take some time—perhaps decades.” [Emphasis in the original.] Blinder does not state precisely what fraction of the 30 to 40 million jobs he expects to be actually offshored in the final equilibrium. Is it four fifths? One half? Or

could it be just one tenth? Nor does he state precisely how many decades it will take for the adjustment to complete? Is it 150 years cited by him for the first Industrial Revolution (1810 to 1960), 45 years for the second Industrial Revolution (1960 to 2004), or something else?

If we are talking about half of the 30 to 40 million jobs offshored over 60 years, we get approximately 250,000 to 340,000 jobs offshored per year on the average. The larger of limits numbers is awfully close to the annual average implied by the Forrester forecast. Even if we make the extreme assumption that the entire 30 to 40 million jobs counted by Blinder will be offshored and limit the transition time to 45 years taken by the second Industrial Revolution, we are talking about offshoring approximately 670,000 to 890,000 jobs per year. These figures may look impressive in absolute terms but are still a tiny fraction of the 48 million jobs the U.S. economy currently creates and destroys each year.¹⁵

These numbers offer a more sober picture than the one Blinder (2007, p. 9) paints when he talks of a long-lasting tempest in the making: “But before we reach the promised land, I suspect that we Americans will experience a nasty transition, lasting for decades, in which not just millions but tens of millions of jobs are lost to offshoring. (That’s gross, not net, losses of course.) Which brings to mind the quotation from Keynes at the start of this paper.”¹⁶ One will have to be foolish to assert that the adjustments during the first and second Industrial Revolutions did not involve pain and sacrifice or that there were no

¹⁵ I infer this last figure Blinder (2007, p. 20) who states that the U.S. economy creates and destroys 4 million jobs every month.

¹⁶ The quotation from Keynes, appearing at the beginning of Blinder’s paper, in turn says, “Economists set themselves too easy, too useless a task if in tempestuous seasons they can only tell us that when the storm is long past the ocean is flat again.”

losers along the way. But the transition was surely not cataclysmic. On the average, the expanding manufacturing sectors during the first Industrial Revolution and services sectors during the second Industrial revolution did a reasonably efficient job of pulling up the workers in the declining sectors into better-paid jobs. Moreover, with the benefit of the past experience and a wealthier economy, we are surely more knowledgeable in handling transition and financially better equipped to ease the pain of adjustment than in the past.

Are Large Numbers Likely?

Going by Blinder's (2007, p. 14) own description, the rate of technological change in information and communications technology has progressed at a "dizzying" pace in recent years. In turn, this has made a large number of personal services into impersonal or Mode 1 services. Yet, the realized level of offshoring of the latter has been relatively small. All well-informed observers including Blinder agree that the gross number of jobs offshored to-date is less than one million. While no one can predict future accurately except by chance, factors that have inhibited a rapid expansion of offshoring to-date will continue to inhibit it in the future.

Much of the offshoring to India today is in low-end software services. Dossani (2005, Table 6) provides the valuable data on the share of India in the global software services market by different categories. In application development, which refers to the creation of applications programs, India enjoyed a large share of 16 percent in 2003. But the global market in application development is only 5 percent of the total software services market. Therefore, when the software services market as a whole is considered, India's share adds up to only 0.8 percent. Despite the hype on the abundance of skilled labor at

low wages, India's presence in the high-end software services is minuscule. Thus, in systems integration categories including hardware and software deployment and support as well as applications, tools, and operating systems, India had a share of less than 1 percent in 2003. In managed services, which refer to managing applications and networks, India's share was 1.6 percent.

Focusing on offshoring to the poor countries, which poses the greatest threat to wages in the rich countries, several factors are likely to inhibit rapid expansion of offshoring in general and offshoring of high-end Model 1 services in particular. First and foremost, once we get past the low-end Mode 1 services such as application development, data entry, call centers and back-office operations and consider more sophisticated services such as systems integration, managed services, R&D and product development, the buyer-seller contact becomes crucial. Users and consumers of complex new services and goods largely reside in the rich countries. Firms engaged in innovating such products must closely interact with these consumers while introducing and debugging the latter. Additionally, those engaged in the innovation process also require close proximity with one another. Therefore, even when it is technologically feasible to offshore many tasks, the communication problems in the absence of physical proximity make offshoring costly.

This message comes out most forcefully in a recent study by Bhide (2007) who interviewed CEOs of 105 venture capital backed companies in the United States. CEO after CEO tells Bhide how important keeping the entire team in a single location and near the customers is. To quote one CEO (Bhide 2007, p. 7):

“All of our customers are now based in the US, and it's very important that the people who are developing our software are in regular communication with our customers,

and not just by talking with them on the telephone. They need to be visiting the customer's physical locations, see how the software is being used, talk with the end users, take that knowledge back to the company, and use it to design new features and capabilities. I just didn't see how that could be effectively done overseas.”

Another CEO emphasizes the need for placing even engineering staff with sales, marketing, and product managers in a single location close to customers precluded offshoring (Bhide 2007, p. 8):

“It's not just the time difference and language barrier of dealing with a country like India. You also struggle with communication in the same country, even in the same location, because engineers speak a different language from salespeople and product-marketing people. Even with everybody being American, if you have a development center somewhere in the middle of the US and the rest of the team is in California, you really run into problems. It's not a question of cost. You want people right next to you, not in India or Alabama. If it's purely repetitive work and there is no need for constant communication and feedback, I'm sure outsourcing could work. But here, we're constantly dealing with customers, who constantly give us changes.”

The second reason why indiscriminate spread of offshoring of Mode 1 services is likely to be arrested stems from the regulations aimed at protecting the consumers in the buyer country. Satisfying the technical and regulatory standards when the service is provided from a remote location can be highly costly. The example of outsourcing of X-ray readings best explains this point. A story entitled “Who is reading your X-ray?” in the New York Times (November 16,2003) had created a huge stir that even the jobs of radiologists who typically earn \$300,000 per year are not safe from outsourcing.

Subsequently, a careful investigation by Levy and Goelman (2005), which the New York Times obviously did not do before printing its story, revealed that the phenomenon is confined to the so-called “nighthawk” radiology services sought during night by hospitals that need a small number of X-Rays read. This small number does not justify employing a radiologist at night. It turns out that all large hospital providing nighthawk services are located in the United States. All non-hospital firms providing nighthawk services are also headquartered in the United States but have radiologists offshore in Bangalore, Barcelona, Sydney and Tel Aviv. The first of these firms began operation in 2001. The number of offshore radiologists remains small because they must be board-certified, licensed to practice in the state in which the hospital seeking the service is located and credentialed in the hospital.

A final factor working against massive spread of outsourcing to the poor countries such as India comes from the supply side in the form of shortage of skilled workers there. I will discuss the potential of India as the offshore source of skilled jobs in greater detail in Section 6. But I may note here that though India has been able to produce large numbers of skilled personnel that can deliver some low-end services cheaply, scarcity quickly takes over as we move up the skill ladder. In the field of Economics, when we look for technically proficient research even on India, the bulk of it is to be found in the United States. Those of us who have searched for potential collaborators for even good policy research, rather than more challenging theoretical and econometric research, find ourselves returning to the same small group of researchers. The same phenomenon exists in other areas. Even at the low end, shortages have led to very rapid increases in the wages—10 to 20 percent per year. Simultaneously, the turnover rates have reached

unprecedented levels. One may argue that this will change over time as more and more skilled workers come on the market. But considering the woes of the Indian higher education system and the absence of realization that the entire system is in need of reform offers little reason for optimism (Panagariya, 2007, chapter 20).

What about “Onshoring”?

Blinder (2006) leaves the reader wondering whether the United States will be left importing everything and exporting nothing. He discusses how more and more services will transform into Mode 1 impersonal services and therefore offshored, with the United States workers left to perform just personal services. Given the United States also lacks comparative advantage in manufacturing, this left the question unanswered what would it be exporting. In his more recent contribution, Blinder (2007, p. 3) is more careful and states at the outset that he is ‘*not* claiming that the United States is about to lose comparative advantage in everything!’ [Emphasis in the original] He also has some passing references to the U.S. “onshoring” certain services. Most importantly, his policy prescription III explicitly deals with what the U.S. might export as more and more services become subject to offshoring.

But Blinder clearly downplays the role of onshoring. Even when offering policy advice, he favors educating the future generation in the provision of high-end personal services. During the second Industrial Revolution, many argued that with the progressive loss of comparative advantage in manufacturing, the United States would be importing everything. But that did not happen: instead, the United States has continued to be highly competitive in high-end manufacturing and has emerged as a large exporter of services, both personal and impersonal. Indeed, since the United States (or any other country)

cannot run current-account deficit beyond a limits, most imports must be paid for by exports. Given the United States is likely to remain substantial net importer of goods, it is also likely to remain substantial net exporter of services. This means that as personal services turn into impersonal services and therefore subject to trading at arm's length, a large chunk of the latter will be onshored. In turn, this means that new jobs that pull up workers from declining sectors will arise during the transition. It may be recalled in this context that according to the evidence provided by Mankiw and Swagel (2006) and reported above, the United States currently runs a large surplus in Business, Professional, and Technical Services, which is the category in trade data coming closest to Mode 1 services.

A Quibble on the Application of Baumol's Disease

A key step in Blinder's argument—the application of Baumol's disease—suffers from an important conceptual flaw. Baumol's original thesis was stated in terms of two distinct sets of products called manufactures and services. Within this classification, manufactures were hypothesized to have faster productivity growth than services.¹⁷ But Blinder has chosen to apply this hypothesis to personal and impersonal services such that the latter show higher productivity growth than the former. This will be fine in a model with two distinct sets of services. But in the model used by Blinder, personal services are continuously transforming into impersonal services. In such a model, it is not clear how low-productivity-growth personal services that transform into impersonal services acquire the high productivity growth of the latter. For the argument to work, minimally,

¹⁷ Baumol's disease is better known to trade economists as the "Balassa-Samuelson" effect (Balassa 1964 and Samuelson 1964) and goes at least as far back as Harrod (1933).

it must be assumed that on the average impersonal services continue to exhibit higher productivity growth even as they absorb more of what were previously low-productivity-growth personal services. It is not clear if such an assumption will be justified by data.

Indeed, one can even question the empirical validity of the assumption that current set of impersonal services exhibits higher productivity growth than the current set of impersonal services. For instance, productivity growth in many R&D activities, medical advances, banking, insurance, advanced medical procedures, and high-end software development, which remain in the personal services category due to the necessity of buyer-seller contact, may well be higher than the low end services currently subject to offshoring. At the least, empirical evidence remains to be provided to substantiate the assumption, made by Blinder, that personal services exhibit lower productivity growth than impersonal services and will continue to do so even as the former transform into the latter.

And as India and China Get Richer...

One final point, which Blinder overlooks, is that if the transition to the final equilibrium is long—say, fifty years—chances are excellent that India and China themselves will turn into rich countries before we reach the end of his third Industrial Revolution. This fact has the obvious implication that the fear of having to compete against low-skilled-wage workers in these countries is perhaps exaggerated in his analysis. In fifty years, India and China will themselves emerge as net demanders of Mode 1 services they currently export. Moreover, skilled wages there will catch up with skilled wages in the rich countries, thus, eliminating the threat of low-wage competition to the latter.

6 India as an Offshore Source of Skilled Services

I have argued that prospects of India turning into a major source of skilled services, especially at the high end of the ladder, are rather poor. I now elaborate on this theme. I begin by presenting the growth of software exports comprising the outsourcing industry in Table 1. As the table shows, the total software exports from India shot up to \$31.3 billion in 2006-07 from less than \$1 billion in 1995-96.¹⁸ The growth rate of total software exports has averaged 31.1 percent between 2001-02 and 2006-07. If we include the earlier years, the growth rate is even higher.

Software services are divided into information technology (IT) and IT Enabled Services (ITES). The former refer to the design, development, implementation, support or management of computer-based information systems, particularly software applications, and computer hardware. The ITES, popularly called the Business Process Outsourcing (BPO) services in India, refer to specific business task such as payroll or billing. BPO services may include back office tasks (internal business functions) such as billing, payroll and purchasing as well as front office task addressed to customers such as marketing and tech support through call centers. While the BPO exports from India have shown rapid expansion in recent years, IT exports still account for approximately three-fourths of the total software exports by India.

While the rapid growth of IT and ITES exports from India is widely acknowledged, it is important to note that their direct contribution to even the Indian economy is still relatively small. In 205-06, India's GDP at current dollars was \$806 billion. Therefore,

¹⁸ Data on India usually relate to its fiscal year, which begins on 1 April and ends on 31 March. Therefore, a year such as 1995-96 refers to the period beginning 1 April, 1995 and ending on 31 March, 1996.

even if we count the entire quantity of exports as value added, they represented only 2.9 percent of the GDP that year.¹⁹ Once we take into account domestic and imported inputs embodied in these exports, the contribution of the sector to the GDP is likely to be much smaller.

Table 2 offers some further details relating to the Indian software sector. According to it, approximately one-fifth of the output of the sector serves the domestic demand. The National Association of Software and Service Companies (NASSCOM), which provides these data, also reports that the industry employed approximately 1.6 million individuals in total in 2006-07 of which 1.2 million served the export market. This number places the upper limit on the number of jobs outsourced to India from all countries in the world. The actual number is, of course, likely to be much smaller for at least three reasons. First, many of the call center type of jobs were already lost to machines in the rich countries. For instance, even before call centers began to open in India, many calls in the United States were being handled by automated answering systems. Second, many of the jobs in India actually support additional jobs in the rich countries. They make viable certain business ventures that will not be otherwise viable. Finally, productivity and wage differences suggest that for each worker displaced in the rich countries, more than one worker is employed in India. For example, it is common for the firms in India to employ drivers to take the employees around and to have coffee and tea served in the office by a human being, which is not customary in the rich countries.

Salary increases in India suggest a very tight market for skilled workers. Hewitt's Asia-Pacific Salary Increase Survey has been consistently reporting the highest salary

¹⁹ I was unable to do this calculation for 2006-07 due to the unavailability of the average exchange rate during 2006-07 for the conversion of the rupee GDP into dollars.

increases in India for the last several years. Though the increases are in local currencies and in nominal terms, given the margin Indian salary increases exhibit over those in other countries, low inflation and the relative stability of the rupee in terms of the U.S. dollar—the annual average of the rupee-dollar exchange rate moved from 41.3 rupees per dollar during 1998 to just 44.1 rupees per dollar during 2005—, it is safe to assume that the increases have been the highest in real terms as well. For illustrative purposes, Tables 3 and 4 present recent annual average salary increases in India according to employee group and industry as reported by the Hewitt Salary Increase Survey. First three categories of workers in Table 3 represent skilled workers. They received the highest salary increases and for all three years shown. According to a report in *Hewitt Quarterly Asia Pacific*, the salary increases during 1997-2002 in India were even higher than those reported for 2005.²⁰ The same publication also reports salary increases in other countries in Asia including China, Hong Kong, Korea and Singapore in the single digits. Table 4 further shows that across industries, salary increases in the IT and ITES sectors are among the highest. The Hewitt report relating to 2005 reports salary increases similar to those in Table 4: 16.5% for IT and 16.1 percent for ITES sector.

A recent study by consulting firm A.T. Kearney reinforces these trends reporting that the average wages for programmers in India, China and Eastern Europe rose 20 to 40 percent on the average in 2006 compared with 5 to 10 percent increases in the United States. The study predicts the cost advantage enjoyed by India and China will disappear by 2027. If this forecast proves true, Mode 1 services trade between the rich and poor

²⁰ “Hewitt’s Asia Pacific Salary Increase Survey 2005-2006,” *Hewitt Quarterly Asia Pacific* 4(3): http://www.hewittassociates.com/Intl/AP/en-AP/KnowledgeCenter/Magazine/HQ_15/index.html.

countries may turn into intra-industry type relatively soon and the wage pressures implicit in Blinder's analysis may disappear rather soon.

Reports on the employee turnover rates reinforce the picture conveyed by the wage movements. In call center type of activities, turnover rates in excess of 50 percent are commonplace. For example, a story in the *Economist* (2004) notes, "Even the best call-center operators in India lose about half their employees each year (but then turnover in British call-centers is about 70%). One Convergys job advertisement in the *Times of India* promises to make prospective call-center employees 'a prime target of all the dons of the industry. You will be hunted down, with almost a king's ransom on your head.'"

Finally, the woes of the higher education system in India also point to continuing shortage of highly skilled workers in the future. Gross enrolment ratio in higher education as reported by UNESCO rose from 10 in 2000 to 12 in 2004 in India.²¹ In China, this ratio rose from 6 percent in 1999 to 13 percent in 2002 and to 19 percent in 2004. Not only the ratio in India is low, it is rising at snail's pace. This progress in turn is routed in a higher education system that is crumbling though without any effort on the part of the government to reform it.

Once we get past the top educational institutions such as the Indian Institutes of Technology (IITs) and Indian Institutes of Management (IIMs), the quality of education available declines rapidly. India has not permitted private universities traditionally and even now their entry is extremely difficult since it requires legislative action by the

²¹ These figures are taken from the UIS (UNESCO Institute of Statistics) database. Generically, gross enrolment ratio is defined as the ratio of the pupils enrolled in a given level of education (regardless of age) to the theoretical age group for the same level of education. For the indicators reported in the text, UIS uses the five-year age group following the secondary school leaving age as the denominator. This age group is different from the (larger) six-year age group used to compute the gross enrollment ratio in higher education in Table 13.5.

central government or a state government. The University Grants Commission, a central government body, tightly controls the entire higher education system right down to the curricula and degrees to be awarded. At the same time, the government has no resources to invest in higher education. In 2003-04, India spent 0.6 percent of the GDP on higher education. In absolute terms, this was approximately \$3.7 billion at the average exchange rate of 45.95 rupees per dollar that year. In comparison, Indian students are estimated to spend anywhere between \$2 billion and \$4 billion on higher education abroad, principally in the United States.

On the quality front, two factors have helped in delivering a small number of well-qualified graduates. First, the school system continues to function reasonably efficiently and gives good education. This brings some excellent students to colleges in most universities. In turn, the universities have a UGC-determined curriculum and they do a satisfactory job of quality control through a university-wide examination system. Students know that if they distinguish themselves among the top 3 to 5 percent students in these examinations, the market will recognize their talent. Therefore, they work hard absenteeism of professors or poor instruction in the classroom.

A second factor leading to the delivery of a tiny number of extremely talented students is the presence of a handful of institutions of excellence such the IITs, IIMs, and the Delhi School of Economics. These institutions select a handful of top students from the entire country and offer them world-class education. The number of students coming out of these institutions is truly small, however. For example, the total number of students graduating from the IITs in 2002-03 was only 2,274.²² Once we get past these

²² See Wadhwa, Gereffi, Rissing and Ong (2007).

institutions, the quality of education does drop rapidly. This is the reason as many as 150,000 Indian students currently study in the United States, Canada, U.K. and Australia.

On the quantity front, much of the expansion of post-secondary education has taken place in the private sector. Though the entry of private universities is extremely difficult, India has long permitted private colleges and diploma-granting institutions. The former provision has specifically helped expand engineering education and the latter management education. Private colleges awarding degrees must still affiliate themselves to some public university, however. Institutions awarding only diplomas can do so on their own. These provisions, accompanied by the state's tight budgets, have resulted in the share of private colleges in student population rising from 26 percent in 2000-01 to 43.4 percent in 2005-06. The shift is far more dramatic when it comes to engineering colleges. The share of private engineering colleges rose from just 15 percent in 1960 to 86.4 percent in 2003.²³

While engineering graduates in India (and China) have expanded rapidly in recent years, their numbers have been greatly overstated in the press and public policy debates. Simultaneously, the number of engineering graduates in the United States has come to be understated. For instance, Iype (2006) notes that according to All India Council for Technical Education, India produced 401,791 engineers in 2003-04. In 2004-05, the number of engineering graduates rose to 464,743, with 31 percent being computer engineers. Iype also cites 600,000 engineers graduating from China every year, comparing it to the relatively low figure of 70,000 engineers annually produced by the United States.

²³ See Panagariya (2007, chapter 20) for more details and the sources of the data reported here.

In the United States, those fearing potential competition from India and China accept these figures uncritically. Wadhwa, Gereffi, Rissing and Ong (2007) point out that even the National Academies and the U.S. Department of Education have cited these numbers. These figures also have salience in India since many wishfully think that India is about to become the provider of all cutting-edge research and skilled services to the rest of the world. But closer and careful examination brings these numbers into serious doubt.

Wadhwa et al carefully research the subject and find that the numbers are vastly overstated for China and India and understated for the United States. In the case of China, the authors note,

In China, the word “engineer” does not translate well into different dialects and has no standard definition. We were told that reports sent to the MoE [Ministry of Education] from Chinese provinces did not count degrees in a consistent way. A motor mechanic or a technician could be considered an engineer, for example. Also, the numbers included all degrees related to information technology and to specialized fields such as shipbuilding. It seems that any bachelor’s degree with “engineering” in its title was included in the ministry’s statistics, regardless of the degree’s field or associated academic rigor. Ministry reports also included ‘short-cycle’ degrees typically completed in two or three years, making them equivalent to associate degrees in the United States. Nearly half of China’s reported degrees fell into this category.

A similar problem also exists in India where all kinds of degree qualify as engineering degrees. Iype (2006) himself quotes C R Muthukrishnan of the Department

of Computer Science and Engineering at IIT-Madras as stating, “We have degrees like a Bachelor of Computer Applications (BCA), Master of Computer Applications (MCA), Bachelor of Engineering or Technology (BE/B.Tech) in computer science, BE/B.Tech. in information technology, Bachelor of Science in computer science, Master of Science in computer science and an integrated M.Sc. in computer science /software engineering.” Numbers such as those reported by Iype (2006) perhaps also include diplomas awarded by polytechnic institutes after short courses in various engineering branches.

More careful research by Wadhwa et al leads them to place the number of engineering graduates in the United States at 170,000 in India and 133,854 in the United States in the academic year 2004-05. In the case of China, they cite two figures: 361,270 according to China Education and Research Network and 442,463 according to the MoE Yearbook in 2003-04. The authors regard the latter figure as a substantial overestimate. Wadhwa et al also interview multinational and local technology companies in China and India regarding the quality of graduates. In China, they find that the companies feel ‘comfortable hiring graduates from only 10 to 15 universities.’ The list of universities varies from company to company but there was agreement that quality of graduates dropped dramatically beyond the list in each case. In India, the local companies and multinationals feel ‘comfortable hiring the *top graduates* from most universities in India.’ [Emphasis added] This finding is consistent with the point I made earlier that most universities in India receive some excellent students at the top who continue to acquire knowledge even if they do not receive it in the classroom so that they may do well at the university examinations.

As I discuss in Panagariya (2007, chapter 20), the higher education system in India faces serious challenges. Being highly centralized and interventionist even when it comes to private colleges, it leaves limited room for innovation at the local levels. Moreover, Indian universities produce hardly any world-class research. With the economy now growing at 8 to 9 percent per year, bright graduates are being increasingly absorbed by the industry so that a serious shortage of teachers at all levels is beginning to emerge. The upshot is that the prospects for India being able to supply skilled workers in unlimited volumes at a relatively low wage are not good during the next couple of decades.

7 Concluding Remarks: The Future Policy Course

There is consensus among well-informed analysts that the number of Mode 1 services jobs outsourced/offshored by the United States to-date is so far less than a million. Most academic authors who have addressed the issue explicitly also do not predict that it is likely to turn into a gigantic phenomenon with the very important exception of Professor Alan Blinder of Princeton University. My own interpretation of the scenario envisaged by him, discussed in this paper, is that even it does not foretell the coming of a tempest but this is definitely not his view. He does view the current volume of outsourcing/offshoring as the tip of a huge iceberg. He expects it to turn into a “big deal.”

It is important to recognize that just because Professor Blinder’s is the minority view does not make it less likely to be right. Therefore, the real crux of the matter is how the two sides differ in their policy advice. Luckily, here the differences are turn out to be remarkably minor. Both sides agree that protection is not the answer and that the thrust

of the policy should be to minimize the pain of adjustment and to prepare the labor force for tomorrow's technologies and products.

On adjustment assistance, I have no disagreements with Blinder. Trade adjustment assistance must be made more effective and generous and extended to services. But more importantly, social safety nets must be improved and extended to all displaced workers. Wage loss insurance program advocated by Brainard, Litan and Warrant (2005) must also be introduced. This program will insure against earnings losses for permanently displaced workers who secure reemployment.

There is only one policy recommendation by Blinder with which I will disagree. Based on his prediction that American workers will be increasingly pushed into employment in personal services, he advocates re-orienting education towards high-end personal service occupations. I will instead target all high-end occupations since I do not expect the United States to be displaced from them just because they turn into Mode 1 services. I expect the U.S. will keep its lead in high-end services in general and will be a net seller rather than buyer in this category of Mode 1 services. On balance, other countries will in-source high-end Mode 1 services from the United States. In terms of re-orienting the education system, what is required is to offer flexible skills that can be readily adapted for employment in a variety of occupations. Unlike in the past, few workers will have the luxury of being employed in a single profession for the entire life (except perhaps professors!)

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Table 1: Software Exports of India (\$Billion)

Year	IT Services	ITES-BPO	Total Software
1	2	3	4 (=2+3)
1995-96	0.8		0.8
1996-97	1.1		1.1
1997-98	1.8		1.8
1998-99	2.6		2.6
1999-00	3.4	0.6	4.0
2000-01	5.3	0.9	6.2
2001-02	6.2	1.5	7.6
2002-03	7.0	2.5	9.5
2003-04	9.2	3.6	12.8
2004-05	13.1	4.6	17.7
2005-06	17.3	6.3	23.6
2006-07	22.9	8.4	31.3

Source: Reserve Bank of India, *Annual Report*, various issues and NASSCOM (July 2, 2007 update).

Table 2: Software Industry in India: Exports and Domestic Components

Item	2005-06	2006-07	2007-08*
IT Exports	17.3	22.9	28-29
ITES-BPO Exports	6.3	8.4	10.5-11
Domestic Market	6.7	8.2	~10
TOTAL	30.3	39.6	49-50

Note: Data for 2005-06 and 2006-07 are actual and for 2007-08 projections by NASSCOM.

Source: NASSCOM (Media Room, July 2, 2007 update)

Table 3: Average Annual Salary Increases by Employee Group in India

Employee group	2004	2005	2006
Senior/Top Management	11.3	13.90%	13.90%
Middle Management	11.9	14.50%	15%
Professional/Supervisor/Technical	12.2	15.40%	16%
Clerical/Support	11.1	13.30%	13.50%
Manual	9.5	11.40%	11.90%

Source: Compiled from various news stories. In particular, see

<http://www.hewittassociates.com/Intl/AP/en->

[IN/AboutHewitt/Newsroom/PressReleases/2007/march-15-2007.aspx](http://www.hewittassociates.com/Intl/AP/en-IN/AboutHewitt/Newsroom/PressReleases/2007/march-15-2007.aspx)

Table 4: Annual Average Salary Increases by Industry in India

Industry	2006
Insurance	17.10%
Banking & Financial Services	17%
IT Enabled Services	15.60%
Information Technology	15.40%
Telecommunication	15.10%
Healthcare and Medical Products	12%
Not-for-Profit	11%

Source:

<http://www.hewittassociates.com/Intl/AP/en-IN/AboutHewitt/Newsroom/PressReleases/2007/march-15-2007.aspx>