The Economics of Offshoring*

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Abstract

This paper examines the various economic issues on offshoring (international outsourcing). It begins with a discussion of the factors that determine a firm's decision to offshore and illustrates, with simple models, the cost saving of offshoring certain stages of production and the advantages of specializing in some input production and engaging in other input trade. The paper then examines the recent trend in offshoring with emphasis on the rise of IT offshoring and also the characteristics of firms in relation to offshoring and exporting. The effect of offshoring and national welfare is then discussed in light of numerous results in recent empirical studies. After examining the current U.S. programs to help the displaced workers, the paper concludes with the various short-run and long-run policy proposals to solve the growing public concern and vexation on offshoring.

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1 Outsourcing and Offshoring

The term "offshore outsourcing" or "offshoring" can be defined in various ways. It can refer to U.S. multinational firms shifting production away to an overseas subsidiary, U.S. firms importing services or intermediate goods from foreign companies, or U.S. firms making overseas investments. Other than the last category, economists regard offshoring as a form of trade in goods or services. In this paper, we shall follow Garner's (2004) definition of offshoring which is the relocation of jobs and production to a foreign country. This relocation can occur through a separate company located abroad or through the foreign office of the same firm. Conversely, the term "outsourcing" does not necessarily imply that jobs and production are being relocated to another country.

Over the years, economists have utilized many different terms when referring to outsourcing and offshoring.[1] According to Grossman and Rossie-Hansberg (2006, p.1), they prefer "using the term 'offshoring' to the more popular 'outsourcing,' because the latter suggests that tasks formerly performed in-house are now being purchased at arm's-length, whereas the former implies that tasks formerly undertaken in one country are now being performed abroad. In other words, offshoring includes not only foreign sourcing from unrelated suppliers, but also the migration abroad of some of the activities conducted by a multinational firm." Thus, offshoring can take place within the boundaries of a firm through foreign direct investment (FDI), or at arm's length, with independent foreign suppliers or partners. It can be classified into captive offshoring and non-captive offshoring—the former outsources the business to a foreign affiliate, while the latter to a foreign, non-affiliated firm.

Instead of using domestic factor resources, offshoring results in the importation of goods or services produced in foreign countries, or equivalently, importation of embodied foreign factor contents. It is often regarded as driven by comparative advantage. In theory, service offshoring is just a form of offshoring that should yield the usual gains from trade and entail the necessity of resource adjustment. From a global point of view, offshoring increases the efficiency of resource allocation in the world economy and will raise the average living standard worldwide. However, there is a distributional consequence from offshoring. A firm that offshores can cut costs and increase profit, but the factors that are laid off will likely suffer as they must seek employment elsewhere. This has created a heated debate about the costs and benefits of offshoring. For example, the influential Lou Dobbs has used CNN programs to express his strong personal view against

[1] For example, "kaleidoscope comparative advantage" by Bhagwati and Dehejia (1994) to describe firms changing their production locations; "fragmentation" by Jones and Keirzkowski (1990)—favored by Deardorff (2001)—to emphasize the splitting of an integrated production system into separated production processes connected by service links; "slicing up the value chain" by Krugman (1994); "intra-mediate trade" by Antweiler and Trefler (1997, 2002); "intra-product specialization" by Arndt (1997 and 1998); "delocalization" by Leamer (1998); and "vertical specialization" by Hanson (1996) and Hummels, et al. (1998).

offshoring.[2] Gregory Mankiw, while serving as the Chairman of the Council of Economic Advisors, appeared in 2004 before a Congressional testimony defending the benefits of outsourcing.[3]

Manufacturing offshoring has been a long-time phenomenon. Recent controversy focuses more on service offshoring. The WTO World Trade Report (2005) classifies service offshoring into four modes:

1. Mode 1 involves arm's-length supply of services, with the buyer and supplier in their own home locations. Foreign firms managing call centers, back offices and software programming for U.S. firms belong to this mode. This is the mode defined as offshoring by Bhagwati, Panagariya and Srinivasan (2004).

2. Mode 2 requires that the recipient be at the location of the provider to receive the service, such as U.S. residents traveling abroad for tourism.

3. Mode 3 requires that the provider establish a commercial presence in the buyer's country. This mode carries an element of foreign direct investment. Banking and insurance services typically belong to this mode.

4. Mode 4 requires that the seller move to the location of the buyer. Examples include construction and consulting services, as well as medical and educational services provided by doctors and teachers moving to the location of the recipient. This mode implies temporary migration, which may become permanent.

During trade negotiations, developed countries pursue Mode 3 in order to expand their commercial presence overseas but oppose Mode 4 which will enable the inflow of people from abroad. Developing countries, on the other hand, resist liberation of Mode 3 but push for Mode 4 to allow their unskilled workers to provide services overseas.

In this paper, we shall examine the various economic issues on offshoring. With the meaning of offshoring and outsourcing clarified, we discuss the factors that determine a firm's decision to offshore in Section 2 and in Section 3 we illustrate the cost saving feature of offshoring a stage of producing and also the advantage of specializing in some intermediate inputs while offshoring other inputs. We will then examine the recent trend in offshoring in Section 4 with emphasis on the rise of information technology offshoring. In Section 5, we discuss offshoring and firm characteristics, followed by a detailed discussion of offshoring and national

[2] Dobbs (2004) suggests four policies: (1) prohibit the offshoring of government contracts; (2) review all "free trade" agreements to ensure fair and balanced trade; (3) work with WTO to ensure that our trading partners meet specific human rights and labor standards; and (4) any US multinational that offshores should meet the same privacy standards for its American customers as in the case of domestic operation.

[3] See Mankiw, et al. (2004).

economics welfare in Section 6. Lastly, we cover in Section 7 the current U.S. programs designed to aid displaced workers and explore the various short-run and long-run policy proposals to alleviate the negative impacts of offshoring on displaced workers.

2 Factors Determining Outsourcing and Offshoring

There are numerous factors that determine the extent of outsourcing and offshoring. They can be technological, economic, regulatory, strategic, or any other influencing factor. Here are the ones that play an important role in decision-making:

1. The pattern of specialization is governed by comparative costs. If a domestic production activity costs less than it does in a foreign country, it pays for a domestic firm to outsource that activity after other costs, such as trade costs, are considered. In this case, trade can therefore be interpreted as the trading of tasks between countries. This leads to a growing disintegration of production processes as demonstrated by the rapid increase in intermediate input trade recently.

2. The reduction of transportation and communication costs can make formerly non-tradable intermediate inputs or final goods tradable. Progress in information technology such as fiber-optic cable, personal computers and the Internet are the impetus for global outsourcing.

3. Economies of scale may lead to increased offshoring activities in sectors which have developed in a foreign location. As a foreign firm increases its size with a scale economy, its average cost keeps falling, enabling its attractiveness as an outsource location.

4. If the production processes can be easily fragmented, a firm may want to concentrate on its core competency by outsourcing parts of its production. Easier technical and institutional separability enhances the feasibility of outsourcing. Also, a task with a higher degree of standardization is more easily outsourced. Increased standardization decreases both the buyer's and seller's risks.

5. A sequential task can be performed during normal day shifts in different time zones to ensure a continuous 24-hour operation.

6. Uncertainty in technological progress may increase outsourcing in order to offset the risks from obsolete technology and idle capacity. The firm must weigh hedging technological uncertainty against the potential holdup by the contract suppliers. This is also the case if there is the possibility of capacity constraints associated with irreversible, hard-to-expand investments. If uncertainty is high, then outsourcing can be an attractive business strategy to shift risk to the contract suppliers.

7. Rapid economic globalization and liberalization of trade in goods and services are important factors that contribute to offshoring activities. Furthermore, recent trends of deregulation and privatization in developed and developing countries have been a key catalyst in driving offshoring and outsourcing. This is especially true in service sectors that were heavily regulated.

8. For a firm to compete successfully in the world market, it is often necessary to respond strategically to its rivals' actions. These types of offshoring activities may be termed "strategic offshoring."[4]

9. The quality of foreign legal and political institutions can be a central determinant of offshoring. Also, the quality of the foreign supplier's product and workers are important factors to consider. For example, workers in call centers in India have to learn how to speak English the 'American way.' As the quality of foreign institutions improve, offshoring becomes more attractive.

10. Foreign tax and investment conditions also affect offshoring decisions.

11. Diversifying operational locations to different countries may be a way to hedge against the risk of currency movements.

The relationship between the degree of standardization and the types of outsourcing have been studied by the WTO (2005). If the degree of standardization is very low, it is optimal for a firm to perform the task in-house. As the degree of standardization increases, captive offshoring becomes the optimal choice as the firm outsources the task to a foreign affiliate in order to take advantage of lower costs, while still retaining control of the firm. This pattern is replaced by outsourcing to a domestic unaffiliated supplier as the degree of standardization continues to rise. In this case, the cost of outsourcing to a domestic unaffiliated supplier is higher than that of a foreign supplier. Even so, the lower risk associated with a domestic supply is still the dominant factor in decision-making, despite the firm's lack of control over the domestic supplier itself. Finally, as the degree of standardization reaches a point where the risk of outsourcing is further lowered, the foreign cost advantage then becomes the dominant factor that entices firms to enter a non-captive offshoring agreement.

Antras and Helpman (2004) showed that a highly productive firm has the ability to pay higher fixed costs than a less productive one, and is more likely to both outsource and offshore. This can further improve its cost advantage and may even force inefficient firms to shut down.

[4] On modeling strategic outsourcing, see Shy and Stenbacka (2003) , Chen, Yu, and Ishikawa (2004), and Choi and Davidson (2004) .

3 Modeling Offshoring

Offshoring has been studied with different theoretical models. The analysis of fragmentation of the value chain was initially taken up in a neoclassical framework by Jones and Kierzkowski (1990, 2001). One strand focuses on the fragmented nature of the production process that allows firms to offshore some stages of the production process.[5] This strand of literature assumes that stages of production can be separated so that firms will naturally select a source that has the least cost (after taking into account offshoring service costs in coordination, transportation, telecommunication, administration, insurance, financial services, etc.)

Another strand focuses on treating offshoring as trading tasks, which was proposed by Grossman and Rossi-Hansberg (2008). They developed the theory to study how falling costs of offshoring affect factor prices in the source country. They identify a productivity effect of task trade that benefits the factor whose tasks are more easily offshored, thus potentially generating shared gains for all domestic factors. This is in contrast to the distributional conflict associated with reductions in the cost of trading goods.

Harms et al. (2012) studied an offshoring model in which a firm's process is characterized by a strict, technologically determined sequence of production steps. It is impossible to rearrange the order of individual steps. With each step having its own cost structure, transport cost plays a significant role in a firm's offshoring decision, in which individual steps are performed. If transport cost is high, the firm will likely lump together several sequential steps of the production chain in a nearby location, some of which may not be the cheapest location.

In the remainder of this section, we illustrate a couple of simple models—one shows the gain in profit from offshoring a stage of production and the other shows the gain in profit from input trade.

3.1 Offshoring a Stage of Production

In this modern world, production processes are less direct and more fragmented than before. As products grow more sophisticated, they are formed with a greater amount of parts and standard modules. Thus, a firm often finds it more profitable to outsource some stages of production to other firms. To illustrate, let us consider two firms—a home firm and a foreign firm. The home firm's total cost function in producing a final good is

$$C = f + mq, \tag{1}$$

here f is the fixed cost, m the marginal cost, and q the outputs of the finished good.

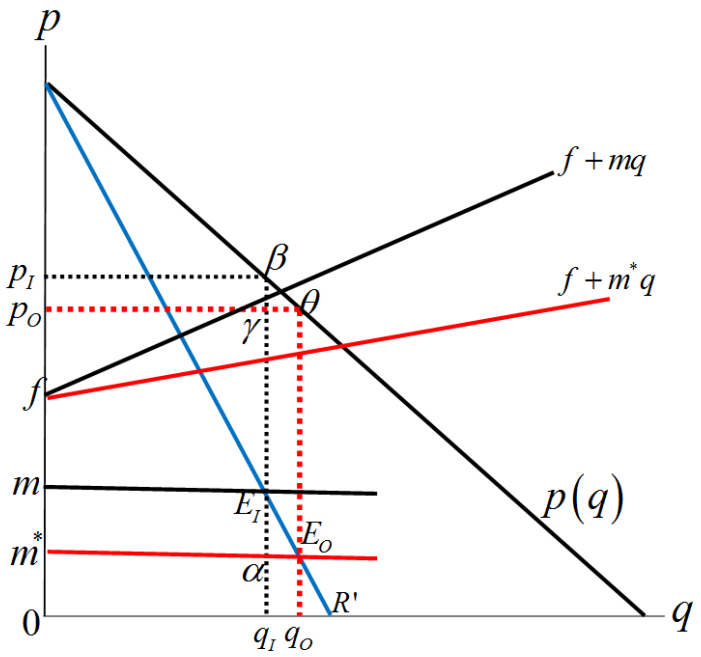
For ease of exposition, we can think of the full production process in two stages. The first stage involves the design of the product which we construe as the fixed cost, and the second stage involves the production

[5] There is a vast literature on offshoring. See, for example, Feenstra (1998, 2008), Venables (1999), Deardorff (2001), Shy and Stenbacka (2003) ,Antras and Helpman (2004), Egger and Egger (2007), and Long and Kikuchi (2010).

and assembling of parts which will incur a constant marginal cost for every unit of output. Let the foreign firm's variables be denoted by a superscript *. Assume that the home firm has a lower fixed cost but a higher marginal cost than the foreign firm. i.e., $f < f^*$ and $m > m^*$, and the world market for parts is perfectly competitive. It is easy to see that if the home firm offshores the second stage of production to a foreign firm at a marginal cost of m^* per unit of output, its profit will be higher by offshoring than producing in-house. Fig. 1 shows the firm's equilibrium outputs, prices and profits for in-house production and offshoring.

Figure 1:

Cost saving through offshoring



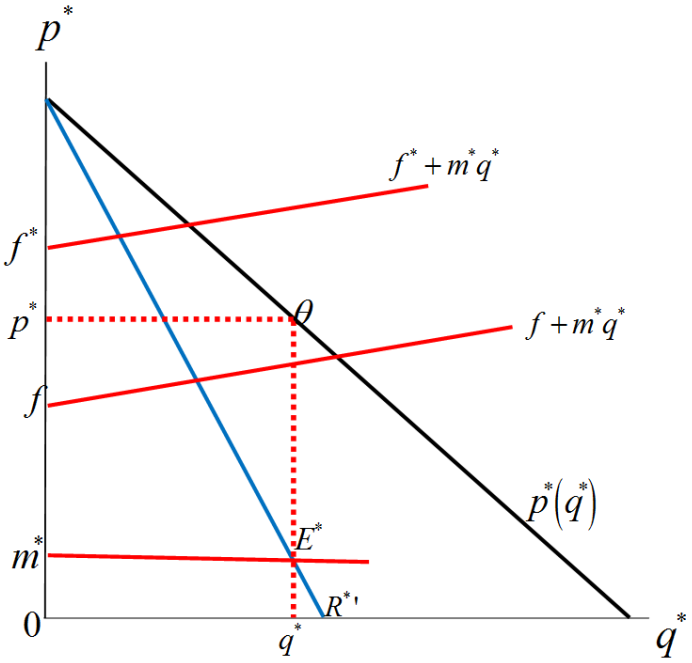
By producing in-house, the firm's total cost curve is $C = f + mq$, but offshoring the second stage production lowers it to $f + m^*q$. The inverse demand curve is $p(q)$ and R' is marginal revenue. Profit maximization under in-house production is determined by E_1 with price p_1 and output q_1. The profit is the area $p_1\beta E_1 m$ minus the fixed cost f. Under offshoring, profit maximization occurs at E_0 and the resulting price is p_0 and output is q_0. The profit is the area $p_0\theta E_0 m^*$ minus the fixed cost f. Since the R' line is twice as steep as $p(q)$, we know that the area $mE_1\alpha m^*$ is larger than the area $p_1\beta\gamma p_0$. Thus, profit for the firm is larger if they offshored second stage production than it would be if they produced in-house.

Offshoring can also go the opposite direction. In our present example, if the foreign firm offshores the design stage to the home firm, its profit will also increase. This is shown in Fig. 2.

Since the foreign firm keeps the second stage production, its optimal point E^* remains unchanged. Thus, its price and output are unchanged whether or not it offshores its first stage production. Its profit, however, increases by the savings in fixed cost $f^* - f$.

Figure 2:

Foreign firm's offshoring to the home firm



The example above can be trivially extended to a multistage production process. If stage i has a constant marginal cost m_i and if there are n stages of production beyond the initial design stage, then the total cost of in-house production is

$$C = f + \left(\sum_{i=1}^{n} m_i \right) q.$$

A firm can increase profits by fragmenting its production process and offshoring each piece of the production process to different firms in multiple locations based on the lowest price.

3.2 Gains from Input Trade and Specialization

Consider a firm that needs two intermediate inputs in the production of a final good y:

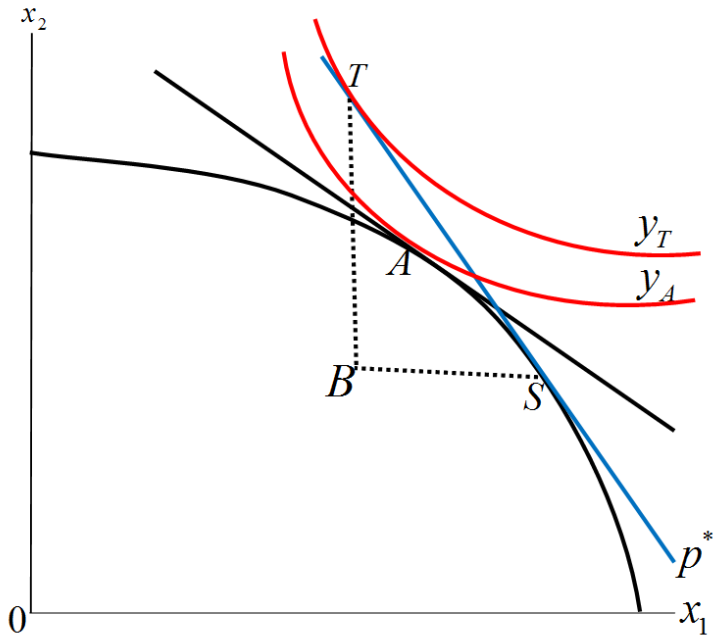
$$y = g\left(x_1, x_2\right),$$

where x_1 and x_2 are the two intermediate inputs. If the firm chooses to produce both inputs in-house, with its given resources of capital and labor, it can have the production possibility frontier (PPF) shown in Fig. 3 as the concave curve going through points A and S. y_A and y_T are two illustrative isoquant curves. If the firm produces both inputs in-house, its output point is at A which produces y_A units of output. The marginal cost ratio of input 1 to input 2 is measured by the slope of the PPF at point A. If this marginal cost ratio is lower than the world price ratio of the two inputs, $p^* = p_1^*/p_2^*$ as shown in the figure, then the

firm can choose to increase production of input 1 and reduce production of input 2 until point S is reached where the marginal cost ratio is the same as the world price ratio. The firm can then export SB units of input 1 at the world price p^* and import BT units of input 2. It can attain the input point T to produce y_T units of output. By outsourcing input 2, the firm is able to produce a larger amount of output with its given capital and labor resources. Clearly, there are gains from increasing specialization made possible by trade and offshoring.

Figure 3:

Increasing specialization in input production



Similarly, a foreign firm whose marginal cost ratio is higher than the world price ratio p^* can choose to increase production of input 2 and outsource a certain amount of input 1 from other firm(s). Again, increasing specialization in the world economy can increase efficiency and raise its total production capacity.

By applying the Heckscher-Ohlin theory of trade, it is intuitively clear that if a country is heavily endowed with high-skilled labor, it will have a comparative advantage in the production of skill-intensive inputs or outputs. This skill-abundant country will be the exporter of skill-intensive intermediate inputs or final goods while importing or outsourcing intermediate inputs or final goods that are not skill-intensive.

4 The Growth of Offshoring

Due to the rapid pace of economic globalization and other factors, the world economy is simultaneously experiencing integration of trade and disintegration of production. A major portion of trade is now attributed

to the offshoring of intermediate inputs. One famous example is the production of Barbie dolls as summarized by Feenstra (1998, pp. 35–36):[6]

> As an example of outsourcing, consider the Barbie doll. The raw materials for the doll (plastic and hair) are obtained from Taiwan and Japan. Assembly used to be done in those countries, as well as the Philippines, but it has now migrated to lower-cost locations in Indonesia, Malaysia, and China. The molds themselves come from the United States, as do additional paints used in decorating the dolls. Other than labor, China supplies only the cotton cloth used for dresses. Of the $2 export value for the dolls when they leave Hong Kong for the United States, about 35 cents covers Chinese labor, 65 cents covers the cost of materials, and the remainder covers transportation and overhead, including profits earned in Hong Kong. The dolls sell for about $10 in the United States, of which Mattel earns at least $1, and the rest covers transportation, marketing, wholesaling and retailing in the U.S. The majority of value-added is therefore from U.S. activity. The dolls sell worldwide at the rate of two dolls every second, and this product alone accounted for $1.4 billion in sales for Mattel in 1995.

Another example is Topper the Trick Terrier, a robotic dog that talks and stands on its head. In 2006, 75,000 copies of the dog were produced by Qualiman Industrial Co. in Nanhai, China, for Original San Francisco Toymakers, a customer of Hong Kong-based Li & Fung. The terriers were made from various suppliers in different countries: plastic eyes and transistors from Shenzhen, China; speakers for its voice and wiring from Dongguan, China; plastic body from Malaysia; microfiber fabric for its coat from Korea; voice recognition requirements from San Francisco; plastic legs, voice-recognition programming and IC chips from Taiwan; and packaging from Hong Kong.

The growth of offshoring is closely tied to the growth of trade in intermediate goods. Campa and Goldberg (1997) used the share of imported inputs in the value of production as a measure of external orientation. They showed that for the U.S., the share doubled from 4.1% in 1975 to 8.2% in 1995. A similar phenomenon also occurred in the U.K. and Canada. Looking from the export side, Hummels, Ishii, and Yi (2001) used the share of imported inputs in the value of goods produced for exports as a measure of vertical specialization. They found that the share obtained from ten OECD and four emerging-market countries grew almost 30% between 1970 and 1990, and growth in this measure of vertical specialization accounts for 30% of the growth in these countries' exports.

From a dynamic point of view, the industrial landscape around the globe is continuously changing because of technological innovation and diffusion. The production of many tradable products has long been observed

[6] The Barbie doll story was originally reported by Tempest (1996).

to move from country to country over the life of the product. Innovations are more likely to occur in high-wage economies to save on labor costs. Before the technique of production is standardized, the high-wage country monopolizes the product with patent protection and technological lead. The product first serves the advanced economy's own domestic market while it is continuously improved upon through R&D before it becomes exportable. With the standardization of production techniques and increasing production scale, the product's price falls and it becomes more economical for production to be carried out in low-wage countries. This is the offshoring stage where the production location moves from high-wage, advanced economies to low-wage countries. This is the "product cycle hypothesis" first elaborated by Vernon (1966). Thus, the pace of offshoring depends on the rate of innovation and the rate of technological diffusion. The rise of offshoring in recent years can be partly explained by the faster pace of innovation and technological diffusion associated with economic globalization.

4.1 The Rise of IT Offshoring

Recent technological change has made it possible to offshore information technology (IT) services. For example, HP has a large customer support center in India, Citibank has offshored card processing to India, and Dell and Amazon have customer support centers in the Philippines. Even highly paid radiology services (e.g., reading x-ray films) are now outsourced to India. Other computer engineering services have also been outsourced to India and China. Ireland and India are the main countries for global IT services outsourcing. Since the IT sector is a major segment of the U.S. economy and it employs white-collar workers, this growing trend of IT offshoring has fueled anti-offshoring sentiment.

Among Asian nations, offshoring is also on the rise. KPMG International (2006) conducted a survey of 305 senior executives from companies in Asia Pacific with about 43% based in Singapore, Hong Kong, Malaysia, Japan, Australia and New Zealand, and slightly less than half were based in India and China. The survey found that half of the 305 respondents outsourced IT services, while a third outsourced accounting, debt collection and tax processing. Some companies also outsourced data collection, report writing, human resource operations and supply chain management. Among countries within the region, 61% of Singapore-based respondents outsourced IT services, followed by Hong Kong (59%), India (55%), Australia (51%) and China (46%). In aggregate, majority of companies in Asia outsourced to India (55%), followed by China (36%), Singapore (20%), Hong Kong (16%), Malaysia (9%) and the Philippines (7%).

The increasing amount of business services offshored to Indian firms shows India's potential as a major business services exporter. Indian service providers such as Tata Consultancy Services, Infosys Technologies and Satyam Computer Services have grown to be big sellers of business services in the world.

McKinsey (2003) reported that U.S. companies offshored $26 billion in IT and business process (BP)

services to 12 major markets (not counting major EU markets) in 2001. U.S. companies had an estimated 70% share of the global offshoring sector, which was valued at approximately $35 billion that year.

In the balance of payments accounting, the U.S. is a net exporter of services. In fact, U.S. firms capture a major share of foreign business outsourcing, such as banking and accounting services. U.S. service providers such as IBM Global Services and HP Services are global giants. In particular, U.S. firms are dominant in servicing the securities market. Most banks and other financial institutions in Asia such as brokerage firms, mutual funds and insurance companies outsource their huge back office and custodian services to U.S. firms. Asian Investors (2004) reported that in 2003, top U.S. player State Street Bank had $9.4 trillion assets under its custody globally, with $363 billion from Asia. The corresponding figures at JPMorgan Chase & Co. were $7.6 trillion and $337 billion; Bank of New York, $7.9 trillion and $206 billion; and Citigroup, $5.7 trillion and $143 billion respectively.[7]

5 Offshoring and Firm Characteristics

Offshoring of manufacturing processes has been in existence for a long time and in recent years, services offshoring has picked up its pace. Similar to manufacturing, the U.S. is more likely to export high-skilled business services and offshore those that are less skill-intensive. Jensen and Kletzer (2008) confirmed that there was a positive relationship between exports per worker in business services and average industry wage levels.

According to Jensen and Kletzer (2008), the dividing wage level above which the U.S. has a comparative advantage is about $40,000 in skill-intensive industries. They estimated that the number of jobs at risk of offshoring was about 15–20 million, with many (40–50%) of these jobs in the manufacturing sector. Trade liberalization and increases in offshoring will result in the loss of low-skill jobs but there will be gains in the number of high-skill jobs in the U.S., especially in the services sector. So far, services offshoring have had a negligible impact on net employment and median earnings in the U.S. Since the employment share of relatively low-wage industries like manufacturing (60%) is higher than business services (33%), the risk of manufacturing job loss can be expected to remain higher than that of the services industry.

There is strong cross-industry and intra-industry evidence that high-skill, high-wage service sectors in the U.S. have high export participation rates. There have been several studies regarding the characteristics of U.S. manufacturers that export their plants and firms. U.S. manufacturing exporters are more productive and skill-intensive, pay significantly higher wages, and are more likely to grow and survive than nonexporters.[8] The growth of exporters thus improves aggregate productivity (Bernard and Jensen 2004).

[7] For more information about IT offshoring, see e.g., International Data Corporation and The Outsourcing Institute.

[8] See Bernard and Jensen (1995, 1999, 2007), and Bernard, Jensen, Redding and Schott (2007).

Jensen and Kletzer (2008) found remarkably similar characteristics between exporting firms in the services sector and those in the manufacturing sector described above. Business service exporters also tend to have larger sales and employment volumes, pay higher wages and have higher sales per worker than nonexporters across industries. Comparing exporters to nonexporters in the same industry, business services exporters are about 70% larger in terms of employment, 100% higher in sales and pay 20% more in average wages than nonexporters.

These findings about firm characteristics and export performance suggest that the expansion of international trade as a result of trade liberalization or offshoring will increase aggregate U.S. productivity, which in turn will raise the nation's standard of living. The increase in average industry productivity is attributed to the elimination of inefficient firms and the expansion of efficient firms that capture larger exports shares. Thus, trade and offshoring are the driving forces behind a higher standard of living. Such a conclusion, of course, applies only in the aggregate, but trade and offshoring inevitably requires the reallocation of some factor resources, which creates some unavoidable income distribution implications.

6 Offshoring and Economic Welfare

Offshoring is often blamed for job loss in the U.S. Economists, however, view offshoring as just another form of trade in goods and services and the accompanying job relocation as a move toward more efficient allocation of resources. Higher imports may be associated with faster economic expansion and may not be the cause of lower employment. This is supported by empirical results. Between 1946 and 2002, changes in employment were positively correlated with changes in imports in the U.S. (Labonte (2004)). Thus, when imports increased, so did employment. Nonetheless, this does not imply that higher imports causes higher employment, but it does indicate that higher imports are not correlated to lower employment.

Some services are more prone to outsourcing than others. These include banking and financial services, customer support services, research processes, IT operations, engineering design, education and medical services, legal support services, software development, etc. Even person-to-person offshoring is on the rise. As reported in the news recently, American parents offshore childcare services to India and American students hire Indian personal math tutors through online tutoring services.

Due to large wage gaps in some occupations, there is strong incentive for firms to offshore for cost savings. For example, Garner (2004) reported that the average salaries of computer programmers in the U.S. were between $60,000 and $80,000 in 2002, but in India, it was only between $5,880 and $11,000.

McCarthy (2004) found that in 2002, job losses in the U.S. due to offshoring reached about 200,000 to 300,000 jobs annually and projected that it would rise to about 340,000 jobs per year between 2010 and 2015.

He further predicted that the cumulative job loss would reach 3.4 million by 2015, with an accompanying $151 billion in wage loss. He identified this outflow of jobs from nine occupational categories that were prone to outsourcing, such as management, architecture, engineering, computer and mathematical operation. But the estimated number of offshored jobs turned out to be a miniscule 0.53% of the 56.7 million jobs in these nine occupational categories in 2002.

Thus, the potential job loss, though different among industries, is not as large as feared. According to Garner (2004), an annual loss of 100,000 service jobs was only 0.1% of total employment. Moreover, he argued that offshored tasks might require related functions to be performed in the U.S. to serve American customers.

To study the trade displacement costs to workers, Kletzer (2001) divided the import competing manufacturing sector into low, medium and high import competing groups. She found that across all three groups of industries, about two-thirds of displaced workers were reemployed within two years, and about half of those reemployed ended up with jobs that paid roughly as much or more than their previous jobs, while the other half experienced wage cuts of 15% or more. Interestingly, the rate of reemployment and wage changes for trade-displaced workers were quite similar to those who were displaced by non-trade factors. This suggests that displacements in all industries may be the result of a common factor—most likely technological change.[9]

Separately, Jensen and Kletzer (2005) found that more than 75% of service workers who lost their jobs due to trade found new jobs within six months. The median wage of those re-employed, however, was 11% below their previous median wage.

Economists typically argue that the total number of jobs is chiefly determined by macroeconomic policy, business cycles and technological changes, while trade policy tends to affect the composition of jobs. Brainard and Litan (2004) noted that despite declining trade barriers, import surges and the rapid pace of innovation, the U.S. economy added 30 million workers to its payrolls since 1985, surviving the 2001 recession and the relatively slow growth in jobs during the recovery. Moreover, this growth in jobs came with a 20% rise in median family income over the last two decades.

Bhagwati, Panagariya and Srinivasan (2004) pointed out that those who think that all or most service jobs will be outsourced to India and China are both empirically and theoretically mistaken. The empirical mistake is that not all service jobs can be outsourced. About 70% of jobs in the U.S. are in service industries. Services such as catering, retail, hotels, restaurants, tourism and personal care which requires the buyer and seller to be present in the same place cannot be outsourced. The theoretical mistake is that the possibility of offshoring all jobs in the manufacturing and services industries due to low labor costs is at odds with the

[9] Kletzer (2004) developed a set of stylized facts of trade-related job loss in relation to worker characteristics and labor market consequences.

law of comparative advantage.

Leamer (2007) pointed out that offshoring occurs mostly to mundane and standardized types of work. Complex jobs that require higher skills are more difficult to offshore. High-skilled workers benefit from the vast increase of low-skilled workers in the world. Offshoring promotes growth in developing countries, raising income and creating more demand for high-skill products. In addition, he argued that a lot of transactions are not suited to the arms' length approach. Instead, they require the establishment of long and familiar business relations. Contrary to Friedman's view (2005), *the world is not flat* according to Leamer.

As Indian and Chinese wages rise due to the expansion of offshored jobs from developed countries, it is likely that the wage gap between advanced and developing countries will narrow. The appeal of offshoring will then diminish. In fact, as reported by Range (2008), recent sharp wage increases in India's IT sector, coupled with a downturn in the U.S. economy and the decline of the U.S. dollar, has prompted some U.S. firms such as GE to dispose of their Indian back office operations.

Since early 2009, IBM has offered laid off North American employees to work with the company's operations in foreign countries including India, Nigeria and Russia. In the past, an offshore posting was considered a "perk," provided with various expatriate subsidies to compensate for meaningful additional costs such as filing extra tax returns and higher housing costs. Presently, job postings in third world countries are offered at local wages and employees receive only some assistance with moving and visas.

Over the years, offshoring has undoubtedly contributed to the economic growth of many developing countries, which has led to currency appreciation and higher standards of living. Because of this, it is possible that we are about to see the tides turn as manufacturing activities are being 'reshored' back to the U.S. due to rising costs in these developing countries. For instance, Boston Consulting Group (BCG) (2011) found that labor costs in China are increasing at about 17% per year, which is eroding the cost advantage of offshoring. Also, higher transportation costs and logistical issues with the global supply chain also start to eclipse the attractiveness of low foreign wages, providing the driving force toward a 'manufacturing renaissance' in the U.S. Although American wages are currently lower than pre-recession levels, the cost of manufacturing in the U.S. is still higher than that of China. Nevertheless, this may not remain the status quo as BCG predicts that net labor cost for manufacturing in China and the U.S. will converge by 2015.

The following passage from Mankiw et al.'s testimony for the Congress in 2004 succinctly summarizes various aspects of the gains from offshoring:

> New types of trade deliver new benefits to consumers and firms in open economies. Growing international demand for goods such as movies, pharmaceuticals, and recordings offers new opportunities for U.S. exporters. A burgeoning trade in services provides an important outlet for U.S. expertise in sectors such as banking, engineering, and higher education. The ability to buy

> less expensive goods and services from new producers has made household budgets go further, while the ability of firms to distribute their production around the world has cut costs, and thus, prices to consumers. The benefits from new forms of trade, such as in services, are no different from the benefits from traditional trade in goods. Outsourcing of professional services is a prominent example of a new type of trade. The gains from trade that take place over the Internet or telephone lines are no different than the gains from trade in physical goods transported by ship or plane. When a good or service is produced at lower cost in another country, it makes sense to import it rather than to produce it domestically. This allows the United States to devote its resources to more productive purposes.

For a detailed examination of the costs and benefits of offshoring, let us first consider the effect of offshoring from the export side. If an outsourced good is also a U.S. export, then domestic exporters will face more competition and their product prices will fall. A fall in export prices, other things equal, decreases gains from trade. The increase in foreign production will raise foreign income, and that in turn will increase demand for U.S. goods or assets. This will push U.S. exports prices up, resulting in increased gains from trade for the U.S.

Next, we will consider the effect of offshoring from the import side. Lower production cost on outsourced goods will drive lower prices. U.S. buyers—both consumers and producers—will directly gain from imports of these final and intermediate goods. Domestic import-competing products will face higher competition and their product prices will fall. Output, employment, wages and profits in the affected industry will likely fall as well. This is the negative impact of outsourcing. Although the net effect of increased trade or outsourcing may be ambiguous in theory, it is likely that its gains outweigh losses. Therefore, it is fair to conclude that offshoring improves welfare.

As discussed earlier, offshoring makes U.S. firms more competitive and more efficient, which should help improve average standard of living. By offshoring, U.S. firms can free up resources to develop new areas of operation and engage in more research and development. Offshoring is just one form of trading governed by the law of comparative advantage. The established result on the gains from trade for a nation applies to offshoring as well.

Mukherjee and Tsai (2009) discussed the changes in welfare of an outsourcing country from the perspective of a product-market structure. They established a model with two asymmetric producers in the domestic country which show that international outsourcing may lower domestic welfare by deterring the entry of new producers. In this case, the welfare loss from the effects of competition may outweigh the gain from outsourcing such as lower cost.

Not all offshoring will result in the permanent displacement of U.S. workers. In some cases, it may create

services that were not available previously. If some tasks can be performed cheaply abroad, cost reduction may enable the outsourcing firm to diversify into new products and services.

Mann (2003, 2005) showed that offshoring production operations and trade made IT hardware 10% to 30% cheaper than it would have been otherwise. She calculated that the price reduction accelerated real GDP growth in the U.S. by 0.3% per year between 1995 to 2002. Offshored IT hardware production by U.S. multinational firms resulted in a net positive trade balance. Also, IT investments creates jobs within the sector, which diffuses into non-IT sectors that employ two-thirds of IT jobs. With the rising demand for skilled workers, the average salary of all IT occupations reached $62,000 in 2002. Mann believes that the globally integrated production of IT software and services will follow a similar pattern, where prices will fall and IT will be further diffused throughout the U.S. economy.

Agrawal and Farrell (2003) presented an interesting analysis of the mutual national benefits of offshoring $1 from the U.S. to India. They showed that every $1 offshored to India in 2002 created a net benefit of $0.33 to India and $1.12–$1.14 to the U.S. Of the $0.33 net benefit to India, $0.10 net profit went to the offshored sector, $0.10 to labor, $0.09 to the Indian supplier sector, and $0.03 and $0.01 in tax revenues to central and state governments, respectively. On the other hand, the net benefit for the U.S. consisted of: $0.58 savings accruing to U.S. investors and customers, $0.05 to the U.S. exporters of intermediate inputs to India, $0.04 to the transfer of profits by U.S.-based providers in India back to the U.S., $0.67 to net direct benefit retained in U.S. and $0.45–$0.47 of indirect benefit to the value created from reemployment of U.S. labor.

Offshoring results in reduced costs, which has the same effect on the economy as growth or technical change. Nonetheless, the caveat in this instance is the possibility of deteriorating terms-of-trade for the growing nation. If a country's export goods become much cheaper as a result of growth, the adverse effect on national welfare may outweigh the beneficial effect of offshoring, resulting in overall welfare loss. This is the case of immiserizing growth originally expounded by Johnson (1955) and Bhagwati (1958) .

The theoretical possibility that growth in low-wage countries may hurt high-wage countries is emphasized by Samuelson (2004) . He presented a model with two countries (one high-wage and one low-wage) and two goods (one with high value-added and one with low value-added). He showed that if the low-wage country's massive workforce can produce the high value-added good and if its relative productivity in that particular good rises, the developed country's terms of trade will deteriorate drastically, causing its national welfare to decline. Leamer (2007), in his review of Friedman (2005), calls this "immiserizing outsourcing," and argues that it is unlikely to occur in the U.S. In an empirical test, Farrell and Rosenfeld (2005) showed that the data suggest an absence of Samuelson's result. They pointed out that despite huge populations, low-wage countries do not have large numbers of university graduates with the skills needed to work for a multinational

company (a proxy for their ability to produce high value-added goods). Currently, only approximately 13% of them have the necessary skills. Thus, the number of workers with comparable skills in high-wage countries still far outweighs the number in low-wage countries. For example, the number of skilled workers is 10 times higher in the U.S. than in China. Furthermore, the empirical result shows that the terms of trade for the U.S. have been stable or even slightly improved since 1990. Finally, the evidence shows that offshoring most often occurs to relocate lower value-added services to low-wage countries, not high value-added services. This will further enhance productivity growth in high-wage countries.

Thus, even in a two-good and two-country model of trade, the available data does not support the possibility of immiserizing offshoring. Furthermore, countries trade in a large variety of goods and factors. This creates opportunities for all countries to specialize and develop their comparative advantage.

From a global point of view, offshoring will drive more efficient allocation of resources in the world economy. There should be unquestionable gains from offshoring for the world as a whole. Therefore, the problem with offshoring are distributional issues within a nation. Workers who lose their jobs due to offshoring suffer from dislocation. They stand to lose from offshoring if they become unemployed or unable to find new jobs with comparable pay. Many economists argue that there are numerous jobs that are non-tradable and dislocated workers may ultimately find new jobs in those sectors. Unless the economy has a structural problem with unemployment, the distributional issues should be handled via macroeconomic policies, wage insurance or job training programs.

7 Policy Considerations

Offshoring involves the reallocation of resources and requires some adjustment costs. The attempt to negate these costs have prompted the ideas of instituting protectionist trade policies and active industrial policy to target certain sectors, industries or firms. Both ideas are theoretically unsound, and was dubbed "two dumb ideas" by Treffler (2005).

Presently, the most pressing concern about the cost of offshoring is the issue of displaced workers—how to help them find new jobs and avoid hardship while unemployed. Here, we discuss the current U.S. government programs aimed at dislocated workers and some proposals for reform.

7.1 Current Programs

There are a few current programs in the U.S. for those unemployed due to trade or other causes:[10]

1. Unemployment insurance: All U.S. citizens are eligible for unemployment insurance regardless of

[10] For a summary of current federal programs, see Levine (2004) .

the reason behind the job loss. The worker can be dislocated because of a myriad of reasons—domestic or foreign competition, outsourcing, technological change, poor management or personal performance, a shift in product or service demand, or a change in government policies. Full-time, involuntarily displaced workers receive up to 26 weeks of benefits that average around 50% of their earnings in previous jobs. This program accounts for 80% of the budget for displaced workers. In light of the recent financial crisis and the persistent high unemployment rates, the U.S. government extended unemployment benefits twice—once in 2009 and again in December 2011. Presently, displaced workers are eligible to receive a 53 week extension of unemployment benefits under the 'Emergency Unemployment Compensation' program and another 20 additional weeks from the Extended Benefits program.[11]

2. Trade Adjustment Assistance (TAA): The U.S. also provides TAA to workers who lose their jobs or experience a reduction of hours and wages because of foreign competition. TAA offers an additional 52 weeks of income support once workers displaced by trade have exhausted their regular and extended unemployment benefits and have met the job training requirement. These workers can receive search and relocation allowances, as well as tax credits for health insurance.[12] But the TAA training program has often suffered budget shortfalls. As shown by Farrel and Rosenfeld (2005), TAA recipients averaged 80 weeks of unemployment in 2001–2003, as opposed to only 14.1 weeks for all displaced manufacturing workers. Between 2008 to 2010, the number of workers covered by TAA increased about 50% from 146,000 to 214,000. This is due to the expansion of eligibility to farmers, fishermen, service workers (including Internet service) and workers whose employers have shifted production overseas. In addition, the TAA received better funding in order to increase health insurance during training and the number of caseworkers a state can hire. The additional funds were also used to support communities dealing with plant closures and businesses managing trade competition. Up until 2011, more than 360,000 workers have received or been certified for job training and education under the 2009 TAA expansions, which were a part of President Obama's economic recovery package. However, the Senate failed to extend the 2009 TAA expansions before its deadline causing the TAA to revert to its 2002 rules. Service workers were no longer eligible to apply for TAA relief and neither will workers who lose their jobs because of trade with countries that don't have a free trade agreement with the U.S., such as China. Eight months later, the U.S. Congress finally passed a bill to extend TAA in October, 2011. The new bill will bring TAA back to its 2009 expansions.

In terms of TAA's overall success, Reynolds and Palatucci (2012) found that the program was effective in

[11] See Huffington Post (2011).

[12] TAA was first established by the Trade Expansion Act of 1962 that provides Trade Readjustment Assistance (TRA) and relocation allowances. Subsequently, a training component was added in the Trade Act of 1974 and later expanded in 2002 in the Trade Adjustment Assistance Reform Act of 2002. The current law extends trade adjustment assistance to workers producing digital products such as software code.

targeting displaced workers who have greater reemployment difficulties. Despite the job training requirement, their results do not show any statistical evidence that the TAA actually improves the employment outcome of its beneficiaries.

3. Alternative Trade Adjustment Assistance Program for Older Workers (ATAA): Introduced in 2002, this program enhances TAA by providing older trade-induced displaced worker (over 50 years old) earning less than $50,000 with half the wage difference between the new and displaced jobs for up to two years (annual limit of $10,000). The ATAA has had a very small impact, with only 288 participants from 2001 to 2003 (Farrel and Rosenfeld, 2005). When the TAA was extended in 2011, the Reemployment Trade Adjustment Assistance (RTAA) program was instituted to provide assistance to older workers who were certified eligible for 2009 TAA program but had been denied for ATAA. The assistance offered to older, dislocated workers under RTAA is similar to that of the ATAA.

4. Worker Adjustment and Retraining Notification Act of 1988 (WARN)**:** This act requires employers to provide at least 60 days advance written notice about mass layoffs and plant closings to workers or their representatives, as well as state and local government officials. The law applies to closings and layoffs of a certain size.

5. Workforce Investment Act of 1998 (WIA): This act provides re-employment services through one-stop employment centers. Services offered include job search assistance, counseling and access to training (often through training vouchers). It mainly targets dislocated workers who are unlikely to be recalled to their former jobs. Unlike TAA, training for dislocated workers through WIA is not an entitlement. Tax incentives are also provided to encourage people to utilize their own resources to acquire new skills.

7.2 Some Reform Proposals

Since the negative effects of offshoring are subject to much debate, there are numerous proposals that can be found in academic literature and the press on how to address and lessen its impact on social welfare. Here we briefly discuss some of them.

Kletzer and Litan (2001) recommend a wage insurance program that pays a 30%–70% income subsidy to all involuntarily displaced full-time workers for lost wages over a period of two years. The payment will be carried out through the federal-state unemployment insurance system and will begin only when the displaced worker is reemployed. To qualify for this subsidy, the displaced full-time worker will need to have two or more years of tenure in their previous job. This program will also provide a federal health insurance coverage subsidy for up to six months or until a new job is found (whichever is earlier). They estimated that the program would cost only $1.5 billion to $7 billion under various designs. They contended that such a program would reduce worker anxiety over trade liberalization or labor-saving innovation, and would

help speed the reemployment of dislocated workers. It would also address the issue of fairness regarding the TAA's coverage of only trade-induced displacements.[13]

McKinsey Global Institute (2003) proposes a private wage insurance program. It requires that businesses purchase insurance for displaced workers to cover lost wages during the median period of unemployment in their occupational group and provide them with a portion of lost wages upon reemployment in full-time jobs. Since any insurance program has inherent adverse selection and moral hazard problems, some argue that the government should provide universal wage insurance to remove adverse selection.

Labonte (2004) suggests that the use of fiscal transfers to local communities, such as the Empowerment Zone/Enterprise Communities Program, can provide an "insurance" against the economic effects of significant job losses for the community as a whole. In the same vein, some economists also favor federal assistance for regional economic development such as infrastructure improvements and grants to attract jobs that might otherwise be offshored.

In the long run, the key issue is improving U.S. competitiveness in world markets and accelerating productivity growth to raise the standard of living. Numerous policy proposals have been discussed in Garner (2004), Levine (2004), GAO (2005), Brainard and Litan (2004) and Farrell and Rosenfeld (2005), amongst others. The following are some important ones:

1. Emphasize education to build human capital. Institute "human capital tax credits" for businesses that pursue worker training programs or for individual education expenses. Particularly in today's fast changing world, further education will provide the workforce with more flexible skills, which will enable displaced workers to find new jobs more easily.

2. Grant tax credit for R&D.

3. Increase government spending on infrastructure and technology that can support innovation, such as broadband Internet connections.

4. Remove foreign trade barriers against American exports. This is especially important for the export of services.

5. Strengthen foreign protection of intellectual property rights.

6. Encourage immigration of high-skilled workers.

[13] As early as 1991, Akerlof et al. had argued that, in the German unification case, a wage subsidy to workers in East Germany would prevent wage losses, and would pay for itself through savings in unemployment insurance. Also, Phelps (1994) proposed a wage subsidy to the lowest paid workers in the U.S. He argued that much of the cost would be recouped through increased tax revenues and reduced social expenditures on unemployment.

7. Make health and pension benefits portable so that displaced workers can retain access to medical care and retirement plans.

8. Correct tax distortions that may artificially encourage offshoring, such as the current tax deferral system on non-repatriated foreign earnings. The Obama administration in February 2012 proposed a business tax reform framework that provides incentives for the U.S. firms to create jobs and investment in the U.S. Some of the framework include:[14]

   (a) Cut the corporate tax rate from 35% to 28% while eliminating dozens of tax loopholes.

   (b) Introduce minimum tax on income earned by overseas subsidiaries of U.S. corporations, while allowing a foreign tax credit for income taxes on that income that are paid to the host country.

   (c) Eliminate tax deductions for moving operations overseas and give a 20% income tax credit for expenses on moving operations back to the U.S.

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[14] See The President's Framework for Business Tax Reform.

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