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# Trade in Services and U.S. Service Industry Employment and Wages

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## Introduction

The purpose of this paper is to try to understand the implications of the apparent expansions of U.S. export and import trade in services, the growth of U.S. firms' service production in foreign countries and foreign firms' service production in the United States, and the effects of these developments on the employment and wages of workers in the service producing sector within the United States. It is an introduction to the problems of interpreting the aggregate data on service trade that we hope to overcome later with the use of individual firm data in the second stage of the study.

Much of the attention to this topic has isolated the "offshoring" of service production as the only issue of interest, but we view the developments more broadly as involving the evolution of production and consumption, transportation and communication, in service industries. Geographical distances between producers and consumers or between buyers and sellers, and the costs of bridging those distances, have always been one of the determinants of trade and investment, in models and in history. Great changes in the technology of transportation, one of the principal service industries, reduced the cost of goods transportation in past centuries, and those reductions in costs altered the geography of trade in goods. During the 19<sup>th</sup> Century, for example, the fall in ocean transportation costs and the development of refrigerated transportation made the United States the main supplier of grains and meats to Great Britain, driving continental European suppliers out of the market despite their advantage in proximity. Among the many ramifications of those developments was a rise in human migration. One grain

producer and former supplier to Great Britain, Sweden, lost to emigration to the United States, during the late 19<sup>th</sup> and early 20<sup>th</sup> Centuries, about one and a half million people, approximately a quarter of the average population of Sweden during those years (Blomström, Lipsey, and Ohlsson, 1988, p. 5).

The fall in communication costs and the improvement in communications quality in recent decades have probably been far larger than the earlier declines in transportation costs on goods. For at least some services, communication costs are the equivalent of transport costs on goods. The fall in communication costs may have similar implications for many aspects of trade and production, widening the range of effects of differences in factor proportions and factor prices for goods industries as well as service industries, but especially the latter.

It is not only the data collection for service trade that is changing, but also the organization of the production and sales of services. Articles in the Survey of Current Business cite "...a continued shift of some affiliates' activities away from manufacturing and toward the provision of services, particularly in computer systems design and related services..." Koncz and Flatness (2007, p. 108). In the other direction, Anderson (2008) refers to "...the reorientation of some wholesale trade affiliates from importing manufactured goods for sale in the United States to manufacturing goods at U.S. facilities." (p. 196, fn. 9).

Although there have been enormous improvements in the last few years in the detail available for trade in services, the published data do not link the different types of trade to the institutions carrying out the trade. Much of service trade involves, as actors, firms operating mainly in other industries, and identified with those industries rather than

with service industries. That means that although our knowledge of the phenomenon of trade in services has expanded, we cannot, without access to individual firm data, link the activity of trade in services to the characteristics of the firms carrying out the trade or of the workers whose employment and wages we wish to study. That will have to wait on our ability to use, in the second part of the study, individual firm data that link the service trade activity to the employment, wages, profits, and growth or decline of the firms producing the services.

### The United States in World Trade in Services

One way of describing the role of the United States in world trade in services is to examine the trends in U.S. exports and imports of services, the cross-border trade included in the balance of payments accounts, and the revealed comparative advantage of the United States in that trade. Another way is to examine the provision of services to foreign consumers by foreign affiliates of U.S. firms and the provision of services to U.S. consumers by U.S. affiliates of foreign firms, much of which does not cross international borders and is not reported in the balance of payments accounts, but is an alternative to the cross-border trade.

For over a century, from the 1870s to the 1960s, the United States was more an importer than an exporter of traded services. The largest identified elements of U.S. exports and imports were transportation and travel services, except during the WW I and WW II decades, when military expenditures overseas, which are considered imports of services, were the largest service import. Transportation and travel services accounted for about equal shares of imports, while transportation services dominated U.S. service

exports (U.S. Bureau of the Census, 1975, Series U 1-25). After that, the trend switched. Exports began to surpass imports in the 1970s, and by increasing amounts through the next few decades (Lipsey, 2009, Table 1A.2). In the period since 1990, after that year's recession, which reduced net exports sharply, they began to expand, growing from \$66 billion in 2002 (Kornfeld, 2009, Table B) to \$130 billion in 2007 and \$144 billion in 2008, falling back to \$136 billion in the twelve months ending in November 2009 (U.S. Bureau of Economic Analysis, 2010).

One feature of U.S. trade in services, particularly technological service trade, is that much of it takes place within firms. For several major categories of service trade, intrafirm trade, or trade with affiliates, outweighs trade with unaffiliated firms. In the case of royalties and license fees for industrial processes, trademarks, and computer software, of \$92 billion in receipts on exports from the United States in 2008, \$56 billion was from exports of technology by U.S. firms to their foreign affiliates, and another \$ 4 billion from exports to their parent firms by U.S. affiliates of foreign firms. On payments for imports of technology into the United States, out of \$27 billion, U.S. affiliates of foreign parents paid \$15 billion to their foreign parents for technological imports and U.S. parents paid \$4 billion for such imports to their affiliates abroad (Koncz –Bruner and Flatness, 2009, Table 4.2). Thus, of U.S. service trade in the form of royalties and license fees, two-thirds of exports and about 70 percent of imports consisted of intrafirm trade.

Among other U.S. service exports, Management, consulting, and public relations services (\$27 billion in 2008), Research, development, and testing services, (\$17 billion), and Advertising (\$4 billion) were mostly intrafirm trade. Among U.S. service imports,

the same first two groups, along with Operational leasing and Installation, maintenance, and repair of equipment, were mostly intrafirm trade. For that part of intrafirm service trade that involves U.S. service industry firms and their foreign affiliates, we do have some information about the actors and their labor forces, and we therefore concentrate our attention on that part of the service trade universe.

It should also be noted that although we examine later some of the relationships between the growth of U.S.-owned affiliates abroad and employment and wages in the United States, the movement of the location of service activities is not a one way flow. Although the data on foreign-owned service industry establishments in the United States are not as full as on U.S. affiliates abroad, they do reveal a considerable amount of service production in the United States by foreign-owned firms. In 2007, for example, the value added in the United States by foreign-owned affiliates in several service industries was not too far from the value added abroad by affiliates of U.S. firms (Table 1).

Table 1  
Value Added by Affiliates in Selected Industries, 2007  
By Industry of Affiliate (\$ billion)

	Nonbank Foreign Affiliates of U.S. Firms (MOFAs)	Majority-owned U.S. Affiliates of Foreign Firms (MOUSAs)
Wholesale Trade	152	96
Information	45	35
Finance & Insur.,exc. Dep.	52	51
Prof., Sci. & Technical	61	26
Other services	134	90

Source: Barefoot and Mataloni (2009); Anderson and Zeile (2009).

U.S. firms did own somewhat larger operations abroad in terms of value added than foreigners owned in the United States in these services, but the differences are not so large as to justify ignoring the foreign-owned operations as a source of employment in the United States. The one case for which the foreign-owned operations in the United States are much smaller than U.S. firms' service industry operations abroad, is the category of Professional, Scientific, and Technical Services, as we might expect.

In terms of employment, also, the impact of foreign-owned operations in the United States is not negligible, although the timing of the surveys of inward foreign investment makes it difficult to relate it to U.S. parent employment and wages. The size of employment by foreign-owned service industry operations in the United States in 2007 is compared with that of U.S. firms' service industry operations abroad in Table 2.

Table 2

Employment of Affiliates in Selected Industries, 2007  
by Industry of Affiliate (000)

	Nonbank Majority-Owned Foreign Affiliates of U.S. Firms (MOFAs)	Nonbank Majority-Owned U.S. Affiliates of Foreign Firms (MOUSAs)
Wholesale Trade	775.5	422.2
Information	354.5	203.2
Finance (exc. Banks) and Insurance	318.1	237.6
Prof., Sci. & Tech.	621.8	332.7
Other Services	3,031.6	2,603.4

Source: Barefoot and Mataloni (2009); Anderson and Zeile (2009).

In the service industry sectors in which the United States and U.S. firms tend to be leaders, Information and Professional, Scientific, and Technical services, and for which fears of loss of U.S. leadership and U.S. employment are most often expressed, foreign firms' employment in the United States is a little over half as large as U.S. firms' employment abroad. However, it is far from negligible, at close to one million employees.

### Comparative Advantage and U.S. Trade in Services

World production and consumption of services appear to be on a rising trend, but the reasons for that trend are difficult to analyze because essential features of service industries, such as production, consumption, prices, and trade are poorly covered by statistical data. It is widely assumed that the growth of trade in services relative to production of services and relative to trade in goods is partly accounted for by the decline of communication costs. They play the same role in determining the size of service trade that transportation costs play for the size of goods trade. Their role in the growth of service trade in general will be discussed below.

A partial solution to the deficiencies of the data is to examine comparative trends across countries, rather than absolute changes, in the hope that some of the defects of the data are common across countries.

The U.S. share of world exports of a service reflects the suitability of the U.S. as a site for production of that service. That suitability, in turn, reflects the efficiency with which the service is produced in the United States, the prices of the factors of production most used in producing it, and the demand for the service within the United States. These factors, in combination, determine what is sometimes referred to as the "revealed



comparative advantage,” of the United States in that industry. The calculation is explained more fully in Appendix A.

Some of the changes in U.S. revealed export comparative advantage have been quite large in the ten years from 1997 through 2007, the most recent span of close to a decade for fairly detailed export data covering a large part of the service exporting world. The export comparative advantage of the United States in computer services fell by about two thirds between 1997 and 2002, before stabilizing. In other words, the share of Computer and Information Services in U.S. exports of services fell from about that of the world, on average, to about half that of the world, and then remained roughly constant. The shares that were in Finance (except depositary institutions), and especially in insurance, increased substantially over the decade (Appendix A, Table A2), although the next few years may present a different picture. Other services in which U.S. export comparative advantage rose substantially were personal and cultural services, which include education and medical services, and royalties, in both of which the U.S. comparative advantage levels reached about 2½ or 3. The largest comparative advantage for the United States was in the item for royalties and license fees, principally payments for exports to U.S. affiliates abroad, about half of which were for industrial processes and most of the rest for trademarks and general use computer software. In recent years, the U.S. share in exports of these services was more than three times the overall U.S. share in exports of services.

The reported decline in the U.S. share of exports of computer services points to the difficulty of measuring service exports and imports when the main input into production is intangible. A newspaper story in 2005 reported that Microsoft had

transferred to an Irish affiliate in 1997 the ownership of software to be sold to European customers (Wall Street Journal, November 7, 2005, p. 1). The story continued that the subsidiary has "...a thin roster of employees..." and that the software was mainly developed outside Ireland (Lipsey, 2006). The reported export data suggest that some type of shift of ownership had taken place. Ireland, which had never reported exports of computer services before, started reporting in 1998 with exports of over \$5 billion, 40 percent higher than those of the United States. Ireland's reported exports of computer services reached \$26 billion in 2007, more than twice those of the United States and its export comparative advantage in computer services in the first year was over 15, while that of the United States was about .98. A further curiosity appears in reported U.S. imports of computer services, which jumped from \$2 billion to \$13 billion in 2006 after eight years of gradual growth. It is unlikely that such an increase is genuine, and likely that it represents either a corporate accounting change that transferred some technological assets from a U.S. parent to a foreign affiliate or a change in the BEA's treatment of computer services.

The pattern of changes in export comparative advantage in services was not uniform among developed countries, and it was quite different in the United States from that in the other 26 developed countries as a group (Table A3). In computer services, developed countries other than the United States showed a substantial, though decreasing and eventually disappearing, export comparative advantage, with a peak at the beginning of the period. Aside from computer services, other developed countries showed a stronger position than the United States as exporters of construction services, and a decline in comparative advantage in financial services while the United States was

advancing in that area, at least before the current financial crisis. Other developed countries showed fairly stable export comparative advantages in transportation services, in contrast to the U.S. comparative disadvantage. The United States was weak as an exporter of Other business services, but showed strong and increasing export comparative advantages in Personal and cultural services, which include education and health, and as an exporter of technology, to judge by its strong comparative advantage in royalties.

The United States was a particularly small importer of construction services and of personal and cultural services compared to the rest of the world (Table A4). Its earlier large share of communication services imports had disappeared by the end of the period. In computer services, there was a low level of imports until a suspicious jump in 2006 that is more likely to represent a corporate tax maneuver than a change in the source of technology. The United States was a major importer of insurance services and a somewhat smaller importer of technology, mainly payments to their parents by foreign-owned affiliates in the United States.

Among developed countries outside the United States (Table A5), import shares were somewhat high for communication services, computer services, financial services, and technology, as represented by royalties. They declined from high to low levels in construction services.

As might be expected, export comparative advantages in services for the 75 or so developing countries for which we have data were very different from those of the developed countries (Table A6). The strong comparative advantage in Communication may reflect the growth of answering services, but the very large increase for computer services may represent more of what future specialization may be like. Developing

countries have moved ahead as exporters of construction services and are also exporters of personal and cultural services and of travel services, but hardly visible as exporters of financial services. The high degree of specialization in insurance services may reflect the nominal role of affiliates in low-tax countries, especially in reinsurance, although the large role of Bermuda as an exporter to the United States is not visible in the Bermuda trade data.

Aside from the changes in comparative advantage, which explain country shares in the world's exports and imports of services, a major explanation for the growth in importance of service trade in general is the reduction in the cost of communication. That is the cost of transportation of a service that applies to all producing countries. In that case, the share of that service in every country's exports and imports might rise, and the share of that service in each country's exports would be positively correlated with the share in imports.

The detail on US service trade was very coarse until recently, but we can compare, from the data in Koncz-Bruner and Flatness (2009), the correlation of changes in export shares and changes in import shares for 11 services since 1997, 15 services since 2001, and 27 services for the latest period, 2006 to 2008. For the two shorter periods, there is no significant correlation between the share of a service in US exports of services and the share in U.S. imports of services. However, for the longest period, since 1997, there is a significant positive correlation between the export and import shares. In general, for the United States, if a service gained in its share in exports, it also gained it in imports as well. That positive relationship suggests that changes in transport or communications costs for the services, which affect exports and imports in the same

direction, rather than changes in the nature of US comparative advantage, were primarily responsible for much of the growth of service trade. However, changes in measurement and in definitions also produce parallel movements of export and import shares.

Another development that may explain some of the growth of service trade is the increased effort to measure it. That increased effort is represented by the addition of many new surveys in the United States, but also in parallel efforts in other countries. Theoretically, the service trade not recorded specifically was nevertheless counted and reported in catchall or miscellaneous categories, but it is likely that some of it was never identified as services. There has also been an effort to identify service transactions previously incorporated in measures of trade in goods, and move them to the service category, although this affects mainly the measures of services supplied to foreigners by U.S.-owned affiliates. One of the major changes has been the shift to treatment of wholesale and retail trade services as a category of services supplied rather than burying them as part of goods supplied. In 2007, for example, the calculation added \$263 billion in wholesale and retail trade services supplied to foreign residents through U.S. MOFAs (Majority-Owned Foreign Affiliates) to previously estimated U.S. MOFA sales of services to foreign residents of \$701 billion in all services (Koncz-Bruner and Flatness, 2009, Table G). The same conceptual change on the side of services supplied to U.S. residents through MOUSAs (Majority-Owned US Affiliates) of foreign firms added \$202 billion to the former measure of sales of services to U.S. residents of \$484 billion.

#### Changes in U.S. service trade and in U.S. service industry employment and wages

The linking of changes in U.S. service trade to changes in employment and wages in the U.S. as a whole and in U.S. service industry firms is difficult. That is partly

because the measurement of service trade is uncertain and changing substantially, and partly because comprehensive data on the U.S. labor force in services are difficult to match with the trade data. One way to link the labor and trade changes is to trace them within the firms that have played a large part in the changes in service trade, U.S. service industry multinationals operating in the United States and foreign countries, and foreign-owned service industry multinationals operating in their home countries and also in the United States and other countries. Our reliance on these data is encouraged by the judgment by the BEA that "...direct investment is the larger channel of delivery for both U.S. sales and U.S. purchases of services in international markets..." (Koncz and Flatness, 2008, p. 20).

The wage data available in BEA data are average wages, and employment is total employment, not distinguished by type of labor in terms of skill, occupation, or education. It is therefore not possible with these data to distinguish between changes in the wage for given types of labor and changes in the composition of the labor force, a distinction that would require matched employer-employee data that are not part of this study and would require a separate project.

#### Employment in U.S. affiliates and in parent firms at home

One possible source of any impact on U.S. labor of U.S. multinational firm (MNC) trade in services and production of services abroad is the competition in the world market between services produced by the parent firms in the United States and services produced by foreign affiliates of U.S. firms and sold in their host countries or exported to the United States and to other countries. If we judge by employment, there are strong indications that employment grew more quickly in the foreign affiliates than in the parent

companies in a majority of the service industries. One extreme exception was the category of “Management of nonbank companies and enterprises,” which involved a change in definition that added to “management and consulting services” allocated expenses charged by a parent company to its affiliates for “general overhead and stewardship” (Koncz and Flatness, 2008, p. 34). The management and consulting services industry has been eliminated in all the regressions in the following tables because the coverage of the category changes sharply between beginning and end years..

Aside from that one industry, there was only a positive, but weak relationship between the growth of employment in the foreign affiliates of firms in an industry and that in U.S. parent firms in the same industry (Table 3). The relationship was marginally significant in the comparison of 2005-2007 to 1999-2001.

There was a general tendency for U.S. service industry firms to shift their employment toward their foreign locations. The growth of employment by parent companies in a U.S. service industry was positively related to the growth of employment abroad in affiliates in that industry but the relationship was significant only at the 10 percent level (Table 3). Thus, across U.S. service industries, there is no evidence linking faster growth in overseas employment in general to slower growth in home (U.S.) employment and weak evidence that employment growth at home and abroad were positively related.

Since most worries about the effects of overseas service production are about the competition of overseas affiliates in low income countries, we crudely test this possibility by dividing overseas service operation between those in developed (higher- income) and

Table 3

Regressions relating the growth of employment in U.S. parent firms in the United States to the growth of total employment in U.S. nonbank affiliates abroad, and in developed and developing countries <sup>a</sup>

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28 service industries	
<u>2007/1999</u>	
Coefficient of affiliate employment & standard error	.167(.189)
Adj. RSQ & Prob. > F	-.008(.388)
Coefficients for developed and developing countries	
Developed	-.123(.190)
Developing	-.063(.019)
Adj. RSQ & Prob.> F	.252(.010)
25 service industries	
<u>(2005-2007)/(1999-2001)</u>	
Coefficient of affiliate employment & standard error	.198(.107)
Adj. RSQ & Prob. > F	.092(.077)
Coefficients for affiliate employment in developed and developing countries	
Developed	.361(.187)
Developing	-.127(.034)
Adj. RSQ & Prob. > F	.328(.004)

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<sup>a</sup> These are approximate identifications. The country breakdowns in published BEA data permit only rough assignments to the two groups. Developed countries are defined here as Canada, Europe, Japan, and Australia, and all others are defined as developing.

those in developing (lower- income) countries. The test must be crude because we do not have data for individual firms at present, as we will eventually, or complete country distributions of affiliates. We must therefore rely on industry data to divide affiliates between those industries in which affiliates are mostly located in developed countries and those in which they are mostly located in developing countries.

The results of this test are that adding more employees in service industry affiliates in developing countries is significantly associated with slower growth of



employment in the parent firm at home. Adding employees in affiliates in developed countries seems to result in larger employment in the parent firm, although that relationship is not as strong.

If we wish to include the growth of MOUSAs (Majority-Owned U.S. Affiliates) of foreign firms in the United States in the explanation of changes in U.S. parent firm employment and wages, many compromises must be made. For example, the dates of the BEA's inward investment surveys do not match the dates of the outward surveys, the published industry breakdowns in the two surveys do not match, and some quantities must be estimated by using midpoints of published ranges rather than exact measures. Some rough calculations on the available data, incorporating the necessary compromises, are shown in Table 4.

Table 4

The Relation of U.S. Service Industry Parent Employment to Employment in U.S. MOFAs in Developed and Developing Countries and Foreign MOUSAs from Developed and Developing Countries\*  
1999-2007

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12 service industries

Coefficient of MOFA employment in, and standard error	
Developed countries	.133 (.130)
Developing countries	-.034(.052)
Coefficient of MOUSA employment from, and standard error	
Developed countries	-.047 (.024)
Developing countries	-.0003 (.003)
Adj. RSQ & Prob. > F	.122 (.332)

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\*See Table 3

As in the second set of equations in Table 3, increases in MOFA employment in developed countries were associated with increases in parent employment, but increases in employment in developing country MOFA employment were associated with decreases at home. Neither coefficient is statistically significant. Increases in employment in MOUSAs were a negative influence on U.S. parent employment, although the only coefficient close to statistical significance was the one for affiliates of developed country firms.

#### Employment in U.S. affiliates abroad and wages in parent firms at home

Another effect of producing abroad might be to reduce or hold back on increases in the wage levels of workers in the United States, as firms expand their activities abroad. Table 5 gives the results of a test of that possibility, relating the growth of affiliate employment over the latest 5 years or so to the growth in parent wage levels.

We find no statistically significant relationships in these equations. The closest seems to be that in industries in which overseas employment grew in developed countries, parent firm wage levels tended to rise more than in other industries, but it should be stressed that no statistically significant differences emerged.

The results for average wages are less definitive than those for parent employment. There is no clear evidence that more rapid additions to employment in affiliates, at least at the levels of such additions in this period, affected wages in the parent firms, whether the employment was added in developed or developing countries.

Another possible influence of international investment on wages is through the effect of foreign firms' service industry operations in the United States on wages in U.S.

Table 5

Regressions between growth of employment in U.S. nonbank affiliates abroad and growth in average wages in U.S. parent firms in the United States <sup>a</sup>

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29 service industries

2007/1999

Coefficient of affiliate employment and standard error	-0.083(.106)
Adj. RSQ & Prob. >F	-0.014(.437)

Coefficients for Employment in Developed and Developing Countries

Developed	.091(.112)
Developing	-.004(.011)
Adj. RSQ & Prob. > F	-0.04(.655)

26 service industries

(2005-2007)/(1999-2001)

Coefficient of affiliate employment and standard error	-.159(.088)
Adj. RSQ & Prob.>F	.083(.084)

Coefficients for Employment in Developed and Developing Countries

Developed	-.160(.113)
Developing	-.016(.021)
Adj. RSQ & Prob.> F	.065(.171)

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<sup>a</sup> See Table 3.

parent service firms' operations within the United States. That possible influence is explored in Table 6.

The results for average wages are less definitive than those for parent employment. There is no clear evidence that more rapid additions to employment in affiliates, at least at the levels of such additions in this period, affected wages in the parent firms, whether the employment was added in developed or developing countries.

Table 6

Regressions relating growth in average wages in U.S. parent firms in service industries to employment in U.S. service industry MOFAs and foreign MOUSAs in the United States, 1999-2007\*

12 service industries

Coefficient of MOFA employment in, and standard error	
Developed countries	.265 (.127)
Developing countries	-.122 (.051)
Coefficient of MOUSA employment from, and standard error	
Developed countries	.017 (.024)
Developing countries	.007 (.003)
Adj. RSQ & Prob.> F	.378 (.122)

\*See Table 3

Another possible influence of international investment on wages is through the effect of foreign firms' service industry operations in the United States on wages in U.S. parent service firms' operations within the United States. That possible influence is explored in Table 6.

While these calculations should not be given great weight because of the weakness of the data used, including the small number of service industries for which we could roughly match inward and outward FDI data, they do tend to confirm some impressions from other sources. In particular, they reinforce the suggestion that service firms' investments in developed countries have different functions and different consequences from investments in developing countries. Additions to employment in U.S. service industry affiliates in developed countries are associated with increases in average parent wages in the United States. That increase might reflect a shift to higher-

skill services at home in the United States, as medium-skill services move to other developed countries. It would also be compatible with the possibility that U.S. industries expanding in developed countries abroad are the ones that are prospering and widening their markets. On the other hand, growth of employment in developing countries was associated with lower wages in the parent companies in the United States, as if the firms that invest in low-income countries have abandoned some of their higher-skilled services but are left with a core of immovable low-skill services. The growth of employment in the United States of affiliates of developed-country firms does not have any visible impact on U.S. parent wages but growth in employment in affiliates of developing-country firms tends to raise average U.S. parent wages, as might be the case if these affiliates tended to drive U.S. parents out of low-skill services.

These are speculations that can only be suggested by these inadequate data on whole industries. They cannot yield strong conclusions, but do suggest possibilities to check in the second phase of the study with individual firm data.

Some useful evidence on changes in the composition of the U.S. service sector labor force as a whole is given in a recent paper by Ebenstein, Harrison, McMillan, and Phillips (2009) based on the Census Bureau's CPS data. They divide the Service sector labor force from 1979 through 2002, by level of education, ranging from Less than high school, the lowest level, through High-school degree, Some college, College degree, and Advanced degree. The employment pattern shifted substantially among the groups, with a large decline in the lowest education class, much of it concentrated in recessions, but adding up to a substantial reduction in the share of that group in total employment over the period. The share of high school graduates increased, with only minor fluctuations,

but the rate of increase diminished over time. The share of workers with college degrees or advanced degrees increased at an accelerating rate. The sharp differences among the trends in education groups' shares of the service labor force as a whole suggest that any findings about changes in average wages in particular industries or firms could reflect changes in labor force composition. That was apparently the case for the service industry labor force as a whole and could, therefore, be more important for some of the individual industries in our wage calculations or for individual firms in our future calculations..

The advantage of comparing affiliate employment growth with parent employment and wage growth is that the data are available for the same classification of industries. A parallel analysis can be carried out for employment in foreign affiliates of U.S. firms and employment and wages in all firms in the same industries in the United States, but it is confined to the period 2002-2007 for an exact match of the industries in the two data sets.

The relation between growth in U.S. affiliate employment abroad and growth in the same industries in the United States is described in Table 7. In industries in which U.S. multinational firms expanded their employment abroad within their affiliates in high-income countries, U.S. domestic employment also rose. There is no indication from the employment data that these overseas expansions in high-income county affiliates came at the expense of employment in the same industries at home. The data suggest instead the impact of rising demand for services of these industries in both the United States and other high-income countries, combined with the comparative advantage of U.S. multinationals in these industries on the employment of workers in these industries both at home and abroad.

Table 7

Regression between growth of employment in U.S. nonbank affiliates abroad and growth of employment in the corresponding industries in the United States, 2002-2007 <sup>a</sup>

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23 service industries

Coefficient of affiliate employment and standard error	.147 (.038)
Adj. RSQ & Prob.>F	0.374 (.001)

Coefficients for employment in developed and developing countries

Developed	.169 (.060)
Developing	.002 (.006)
Adj. RSQ & Prob. > F	.231 (.031)

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<sup>a</sup> See Table 3.

High growth of employment in U.S. service firms' affiliates in developed countries did correspond with low wage growth in the same industries at home, as if the employment abroad competed with expansion at home in the industry as a whole, even if not significantly with expansion of employment in the parent firms (Table 8).

A Comparison with the Results for Manufacturing

The Ebenstein *et al.* (2009) paper deals mostly with employment and wages in manufacturing, but it is useful to compare some of the results with those we find in service industries. Their paper finds strong relationships between a U.S. employee's predicted wage level growth and the growth of affiliate employment by the industry in low-income and high-income countries. For 1997-2002, the period closest to the one

Table 8

Regression between growth of employment in U.S. nonbank affiliates abroad and average wages in the corresponding industries in the United States, 2002-2007 <sup>a</sup>

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23 service industries	
Coefficient of affiliate employment and standard error	-0.028 (.011)
Adj. RSQ and prob. > F	.176 (.024)
Coefficients for employment in developed and developing countries	
Developed	-0.040 (.015)
Developing	.001 (.001)
Adj. RSQ and prob. > F	.196 (.048)

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<sup>a</sup> See Table 3.

studied in this paper, the industry fixed-effect wage growth among employees of U.S. firms in industries increasing their employment in low-income countries was a decline of 11 per cent, while wage growth in industries increasing their employment in high-income countries was a rise of 11 percent. In services, in contrast, we found, with our much cruder data, positive effects of growth in affiliate employment in developed countries on U.S. industry employment, but negative effects on industry wages. The difference in wage results may reflect genuine differences between the two sets of industries in the paths of wages, or they may reflect the different structures of manufacturing and service industries.

Despite the ambiguities in the data and the inherent difficulty of measuring flows of services provided to a large extent by intangible assets, certain tendencies seem to



emerge, similar for services to what has been observed for goods. The role of technology and worker skill levels in determining the preservation or enlargement of the number of jobs is one, reflected in the types of services in which the United States has retained or increased its comparative advantage. It is also reflected in the more positive effects on parent employment of the parent's production in developed countries.

The same implications of the skill bias of shifts in trade in services appear in a study by Kierkegaard (2008), with an emphasis on IT services. "Low-wage/low-skilled IT-related jobs are swiftly disappearing, while high-wage/high-skilled IT-related jobs continue to be created at a brisk pace." (p. 413).

While it may appear that parent production in high- and low-income countries are two aspects of the same phenomenon, they may not be. Production in low-income countries is more likely to represent a defensive reaction for the parent. It is a way of exiting from a line of production no longer viable in the home country because of changes in cost or technology, without losing all the capital, in terms of consumer goodwill, brand names, consumer familiarity and confidence, and technological knowledge that the firm has accumulated. Production in high-income countries is more likely to represent an expansion of a successful continuing operation, still in the growing stage, that has outgrown the limitations of the home market. One is intended as a substitution of one production location for another and the other is intended as an expansion of production.

In the current recession, trade in services has been much more resilient than trade in goods (Borchert and Mattoo, 2009). It is less dependent than goods trade on financing, since production and consumption are simultaneous, or close to it in many cases, it is not

subject to the fragmentation that tends to magnify the effects of goods trade declines by counting the same products several times as they pass along a firm's production chain, and the demand for services is, in general, less income-elastic than demand for goods. The authors fear that the contribution of service trade to recovery and growth is threatened by the many protectionist moves incorporated into various countries' stimulus measures.

### Concluding Remarks

The uncertainties surrounding the data on trade in services and their relation to data on the domestic economy make any conclusions about the effects of trade tentative and subject to error, especially until the second part of the study, based on individual firm data, has been completed. However, several aspects of the aggregate data seem to point to at least a rough picture of the direction in which trade in services is moving the economy.

Perhaps the strongest fear about the effects of trade in services, accentuated by the shock of rising imports of relatively skill-intensive services, was that the large decline in costs of communication was leading to a loss of domestic markets for worker skills, formerly protected by high costs of communication, biases against foreign service suppliers, and low skills in foreign labor forces. That anxiety produced a flood of studies of "offshoring" or "foreign outsourcing" and of projections of possible future job and wage losses for American workers. While the increase in foreign worker and foreign firm skill levels continues, it appears that the consequences are more complex than predicted at first.

Our own survey and analysis of the data suggests several aspects of service industry trade and investment that indicate that the impacts on employment and wages are, at least so far, not as unfavorable as has been projected. One is that the United States has continued to enjoy a strong and so far increasing, comparative advantage in exports of technology, as represented by royalties and license fees. Other comparative advantages in exporting of services are in insurance and other financial services, and particularly in personal, cultural, and recreational services. Most of these are high-skill services and the lead of the United States over both other developed and developing countries seems to be undisturbed. The main exception, computer and information services, where the U.S. appears to export very little, seems to be affected by differences between the United States and other countries in the way the data are classified and by the tendency of U.S. multinational firms to transfer these assets to their affiliates in other countries with lower corporate tax rates. The comparative advantage of the United States in cross-border trade in high-skill services is magnified if the supply of services to foreigners through affiliates of U.S. firms is included.

Our tests of effects of US firms' foreign operations on domestic employment and wages were inconclusive, but mostly suggested that high employee skill remains a basis for the success of U.S. firms and their participation in trade in services. One indication of this link is that the growth of affiliate employment in developed countries, presumably relatively skilled, tends to be associated with increases in home employment, while growth in developing countries, presumably lower skilled, is more frequently associated with decreases in employment at home. Within the United States, it is the growth in employment of firms from developed countries, presumably relatively skilled, that seems

to compete with U.S. parent employment. Wage relationships were weak, but there is some indication that more employment in affiliates of developed country firms, was associated with lower wages in U.S. parents, but higher wages in the whole U.S. industries in which they operated.

One interpretation of the effects of U.S. firms' operations is that expansions of U.S. affiliates in developed countries are very different in motivation and effects from expansions in developing countries. The former may be thought of as "aggressive" expansions by firms that are prospering in the United States and want to exploit their firm technologies or other firm-specific comparative advantages in wider markets. The latter are "defensive" expansions that are by firms that no longer find it as profitable to produce in the United States because of changes in costs or competition, but wish to continue to produce where costs are more suitable in order to continue to exploit their capital in the form of consumer loyalty, reputation for quality, or other firm-specific assets. Because the motivations are different, the effects of an increase in foreign operations are different. The firms that expand in high-income countries are expanding markets, not at the expense of home production. The firms that expand in low-income countries are replacing uneconomical home production with more economical foreign production, but are not mainly expanding their markets.

We expect different responses of parent employment and wages in these two cases. The results only sporadically fit the expectation, but rarely showed the opposite relationships. We hope that the work with individual firm data will confirm or disprove this speculation.

More broadly, we do not find that expansions of service production abroad substitute for service production that would otherwise take place in the United States. Although we do not have direct indicators of employee skills, several of the other studies cited do, and they point to the continued specialization of the United States in services (and goods) embodying high skills, at least so far. The study of IT employment by Kierkegaard emphasizes that dependence for the IT industry, but it is probably more general than that. The crucial issue may be how to maintain and increase skill levels rather than how to affect trade flows.

## Appendix A: Data on Trade in Services

Any present study of the determinants and consequences of U.S. trade in services must be a work in progress, because not only is the trade changing rapidly, but the data available to study it are changing even faster. The main reason for the changes in data availability is the growing number of surveys conducted by the Bureau of Economic Analysis (BEA) of the U.S. Department of Commerce. The improvements in the BEA data from 1990 through 2003 are summarized in Borga and Mann (2003), and subsequent additions and improvements are described in the October articles on Service trade in later years in the Survey of Current Business. That growth stemmed from the realization that the basis for analysis of the implications of trade in services was very weak. As a result of the expansion in knowledge, there have been large changes in the definitions and measures of U.S. trade in various services and its attribution to producing industries. A few of these recent changes and the problems they raise for analysis, are illustrated by Table A1, which compares, for two types of service, the estimates of U.S. exports and imports of services in 2006 between two recent BEA reports, the 2007 and 2008 annual Survey of Current Business articles on trade in services.

Table A1

U.S. Exports and Imports of Selected Services, 2006,  
as Reported in 2007, 2008, and 2009  
(\$ billion)

	Reported in		
	2007	2008	2009
U.S. Exports of Services			
Royalties and License Fees	\$62	\$72	\$71
Financial Services	43	47	48
Bus., Prof., and Tech. Services	96	90	86
Management & Consulting Services	7	22	21
Operational Leasing	11	10	6
Other Bus, Prof., Tech. Services	55	34	36
U.S. Imports of Services			
Bus., Prof., & Tech Services	58	61	61
Computer & Information Services	11	14	13
Management & Consulting Services	7	19	19
Other Bus., Prof., & Tech. Services	29	18	18

Source: Koncz and Flatness, 2007 and 2008; Koncz-Bruner and Flatness, 2009.

The largest changes, in management and consulting services, are attributed to a recognition as international flows of services of parent firm charges to affiliates for parent services to them.

The revisions in concepts of service trade also encompass the treatment of the delivery of services to consumers in one country by affiliates of firms headquartered in another country as a form of trade in services even though they do not appear in trade data in the balance of payments. For many services provided to foreign consumers by U.S. firms and to the United States by foreign-owned firms, delivery is mainly through U.S.-owned affiliates in foreign countries and through foreign-owned affiliates in the United States. For example, the earlier estimate of “sales of services” by U.S. majority-

owned affiliates to foreign countries in 2005 was \$528 billion, while the later estimate of “services supplied” was \$725 billion (Koncz and Flatness, 2008, p. 38). The largest additions were for wholesale and retail trade services, transferred from manufacturing, where they had been hidden in the prices of manufactured goods. In the United States, the largest increases from estimates of sales of services to services supplied by majority-owned affiliates of foreign-owned firms was also for wholesale and retail trade, partly offset by a reduction in the estimate of insurance services, adding up to a revision from \$388 billion to \$527 billion (*ibid.*).

Although it is common to speak about exports and imports of services as analogous to exports and imports of goods, the meaning of the terms “exports” and “imports” is different in the goods and services universes, and the differences account for many of the difficulties of measuring trade in services. The measurement of exports and imports of goods has been governed by rules set forth in United Nations (2004) and by the United Nations Statistical Commission, amplified by United Nations (2008), basing the concepts on the event of the crossing of a national border. The measurement of goods trade for the balance of payments is different in principle; it has as its objective the measurement of changes in the ownership of goods between residents and non-residents of a country. However, since the great majority of changes in ownership take place in connection with the movement of goods across national borders, the distinction between the two measures is not of great quantitative importance, aside from the separation of insurance and freight costs from the prices of imported goods and their transfer to the service accounts.



The story is very different for trade in services. Exports and imports of services frequently cannot be observed crossing national borders, and in many cases, do not cross national borders. They are part of the balance-of-payments universe, and many of the difficulties of measurement arise from the fact that many service trades cannot be observed. Since they cannot be observed, they are subject to manipulation to reduce corporate income taxes. That is a subject on which there is an extensive literature applying to the United States and many other countries, some of which is referred to in Lipsey (2008), pp. 46-47.

The core problem of the measurement of output, and especially trade, in services is that a large part of the input is either financial assets or intangible assets such as production or distribution techniques, patents, copyrights, trademarks, corporate logos, computer programs, designs, etc. The reported location of these assets can be shifted around the world by the firms that own them, moving their reported location from where they are produced, if that can even be identified, to locations in low tax countries. These countries then appear in the data as the producers and exporters of the services from these assets, although they did not create them and may contribute nothing to the production from them except their low tax regimes.

The main sources for data on trade in services covering many countries are the International Monetary Fund Balance of Payment Statistical Yearbooks and CD-ROM, but many countries that report to the IMF do not report exports and imports of services. In order to follow world trends, we construct a fixed panel of approximately 150 countries that have reported service exports and imports to the IMF for the period from 1997 through 2007. Not every country reports trade in every service category, even the

broad ones we use, and we can only assume that the countries that omit a category are not major exporters in it. The categories reported by almost all respondents are travel and transportation and “Other business services” aside from computer and information services, financial services, and insurance. The smallest number of reported exporters is for royalties.

We use the export distributions by type of service to calculate measures of “revealed comparative advantage.” These are analogous to the measure for goods export defined in Balassa (1965), except that these measures might be better described as “revealed comparative advantage in exports of services,” since it is the share of a service in a country’s exports of services compared to the share of that service in the service exports of the roughly 150 countries that we treat as the world.. Table A2 through A6 report our calculations of revealed comparative advantage in service exports for several groupings of countries and an analogous calculation for U.S. service imports. We treated as developed, following the IMF World Economic Outlook,<sup>27</sup> entities, Australia, Austria, Belgium, Canada, Cyprus, Denmark, Finland, France, Germany, Greece, Hong Kong, Luxembourg, Netherlands, New Zealand, Norway, Portugal Singapore, Spain, Sweden, Switzerland, The United Kingdom, and the United States. The data for New Zealand appeared to contain a large discontinuity in 2003 and were roughly adjusted to eliminate it.

**Table A2: Revealed U.S. Export Comparative Advantages in Individual Services**

Year	Commun. services	Computer & info. services	Constr. services	Financial services	Insurance services	Other business services	Personal, cultural, & recreat. services	Royalties & license fees	Transp.	Travel
1997	0.82	0.97	0.46	0.93	0.46	0.64	1.39	2.79	0.83	1.07
1998	1.03	0.68	0.52	0.94	0.62	0.66	1.41	2.86	0.78	1.05
1999	0.80	0.79	0.84	0.89	0.58	0.72	1.61	2.77	0.75	1.02
2000	0.65	0.62	0.42	0.91	0.75	0.73	1.57	2.73	0.75	1.08
2001	0.72	0.56	0.52	0.96	0.67	0.80	1.83	2.77	0.73	1.05
2002	0.67	0.51	0.41	1.08	0.57	0.84	1.65	2.95	0.74	1.01
2003	0.70	0.51	0.45	1.14	0.69	0.83	1.75	3.05	0.74	0.98
2004	0.63	0.45	0.49	1.29	0.86	0.79	1.64	3.10	0.72	0.97
2005	0.57	0.44	0.48	1.22	1.02	0.78	1.51	3.13	0.76	1.00
2006	0.71	0.50	0.58	1.43	1.02	0.64	2.36	3.16	0.76	0.97
2007	0.70	0.48	0.57	1.42	0.91	0.65	2.45	3.32	0.74	0.98

\*These data do not incorporate the latest revisions in U.S. service trade data.

Source: International Monetary Fund, Balance of Payments Yearbook

**Table A3: Revealed Export Comparative Advantages in Individual Services, All Developed Countries Except the US**

Year	Commun. services	Computer & info. services	Constr. services	Financial services	Insurance services	Other business services	Personal, cultural, & recreat. services	Royalties & license fees	Transp.	Travel
1997	0.90	1.29	1.13	1.27	1.14	0.99	0.93	1.28	1.05	0.89
1998	0.90	1.28	1.11	1.25	1.03	1.01	0.83	1.26	1.05	0.89
1999	0.90	1.24	1.08	1.24	1.05	1.02	0.89	1.25	1.04	0.89
2000	0.90	1.09	1.07	1.24	1.01	1.05	0.94	1.25	1.04	0.86
2001	0.94	1.02	1.06	1.24	1.05	1.08	0.99	1.25	1.03	0.84
2002	0.95	1.01	1.02	1.23	1.16	1.08	0.88	1.24	1.02	0.85
2003	0.96	1.00	1.02	1.23	1.16	1.08	0.92	1.24	1.01	0.86
2004	0.93	0.99	1.01	1.24	1.15	1.08	0.91	1.24	1.02	0.85
2005	0.91	0.95	1.01	1.26	1.09	1.07	0.94	1.26	1.00	0.84
2006	0.88	0.91	1.01	1.27	1.14	1.07	0.95	1.26	0.99	0.83
2007	0.88	0.89	0.98	1.28	1.14	1.07	0.94	1.28	0.98	0.83

**Table A4: Share of Individual Service in US Imports, Compared to World**

Year	Commun. services	Computer & info. services	Constr. services	Financial services	Insurance services	Other business services	Personal, cultural, & recreat. services	Royalties & license fees	Transp.	Travel
1997	2.35	0.39	0.13	0.91	1.24	0.58	0.07	1.16	1.03	1.10
1998	1.89	0.42	0.16	0.85	1.39	0.59	0.05	1.20	1.05	1.09
1999	1.55	0.46	0.15	0.67	1.51	0.70	0.04	1.19	1.06	1.03
2000	1.19	0.42	0.15	0.79	1.67	0.68	0.04	1.28	1.08	1.03
2001	1.02	0.43	0.16	0.76	2.05	0.68	0.04	1.30	1.05	1.01
2002	0.88	0.34	0.15	0.69	2.19	0.68	0.05	1.41	1.00	0.96
2003	0.83	0.39	0.15	0.62	2.18	0.68	0.06	1.26	1.03	0.89
2004	0.82	0.38	0.12	0.69	2.23	0.67	0.12	1.30	1.02	0.89
2005	0.77	0.36	0.08	0.69	2.18	0.71	0.26	1.31	1.07	0.90
2006	0.86	1.47	0.22	1.15	2.35	0.59	0.38	1.19	1.01	0.89
2007	0.91	1.47	0.21	1.35	2.53	0.58	0.40	1.18	0.97	0.91

**Table A5: Share of Individual Service in Imports of All Developed Countries Except the US, Relative to the World**

Year	Commun. services	Computer & info. services	Constr. services	Financial services	Insurance services	Other business services	Personal, cultural, & recreat. services	Royalties & license services	Transp.	Travel
1997	1.12	1.28	1.11	1.15	0.80	0.94	1.05	1.22	0.96	1.06
1998	1.11	1.22	1.10	1.14	0.77	0.97	0.98	1.20	0.95	1.05
1999	1.10	1.16	1.00	1.14	0.71	0.98	0.99	1.15	0.95	1.05
2000	1.13	1.11	1.00	1.10	0.63	1.00	1.10	1.15	0.97	1.03
2001	1.11	1.10	0.92	1.08	0.69	1.03	1.14	1.15	0.96	1.02
2002	1.08	1.08	0.87	1.11	0.75	1.04	0.98	1.13	0.96	1.02
2003	1.09	1.10	0.84	1.14	0.78	1.03	0.98	1.12	0.95	1.03
2004	1.08	1.09	0.85	1.14	0.77	1.04	1.03	1.11	0.95	1.04
2005	1.10	1.08	0.79	1.17	0.75	1.04	1.04	1.12	0.92	1.04
2006	1.12	1.08	0.77	1.19	0.76	1.03	1.08	1.10	0.92	1.03
2007	1.12	1.09	0.77	1.21	0.76	1.03	1.08	1.12	0.91	1.04

**Table A6: Revealed Export Comparative Advantages in Individual Services: All Developing Countries**

Year	Commun. services	Computer & info. services	Constr. services	Financial services	Insurance services	Other business services	Personal, cultural, & recreat. services	Royalties & license fees	Transp.	Travel
1997	1.30	0.14	0.60	0.20	0.59	1.03	1.19	0.17	0.85	1.33
1998	1.33	0.11	0.63	0.20	0.91	0.96	1.57	0.15	0.85	1.37
1999	1.34	0.17	0.72	0.18	0.83	0.93	1.39	0.14	0.86	1.40
2000	1.32	0.69	0.78	0.19	0.98	0.83	1.21	0.15	0.85	1.47
2001	1.20	0.92	0.80	0.20	0.82	0.72	1.02	0.14	0.89	1.53
2002	1.17	0.95	0.93	0.21	0.45	0.71	1.40	0.17	0.95	1.51
2003	1.15	1.01	0.94	0.20	0.44	0.73	1.27	0.16	0.97	1.49
2004	1.23	1.04	0.98	0.19	0.50	0.75	1.29	0.19	0.95	1.50
2005	1.27	1.16	0.98	0.19	0.73	0.77	1.18	0.19	1.00	1.49
2006	1.37	1.26	0.97	0.19	0.58	0.78	1.14	0.23	1.03	1.49
2007	1.35	1.31	1.07	0.20	0.60	0.81	1.18	0.18	1.05	1.47

## Appendix B: Bibliographic Notes

The most comprehensive summary of current issues involving trade in services is Mattoo, Stern, and Zanini, Editors, A Handbook of International Trade in Services. Much of the volume concentrates on issues involved in international negotiations on trade in services, but there are also chapters on measuring trade in services, barriers to trade, problems of measurement, and other general topics. There are also separate descriptions of trends in China and Latin America and chapters dealing with individual service sectors, such as transport, telecommunications, and health services. There is a particularly informative chapter on “The Temporary Movement of Workers to Provide Services (GATS mode 4).

The recent literature on U.S. service trade has continued to concentrate on measuring the extent of, or predicting the future extent of “offshoring” or “offshore outsourcing” by U.S. firms, and their effects on employment and wages in the United States, particularly in goods-producing industries.

One service industry frequently mentioned as a candidate for offshoring is health services, which has been described as vulnerable to foreign entry via what is called “mode 1” in the GATS (General Agreement on Trade in Services) classification, cross-border supply, in such areas as radiology, where contact between customer and supplier is not necessary. A paper by Herman (2009) reviews the worldwide data on various types of trade in health care services and concludes that cross-border trade is “minimal and rather insignificant” (p. 5). However, trade in health services by modes 2 (consumption abroad) and 4 (presence of natural persons) appears to be more significant, although the

data on both are somewhat ambiguous. The former may be affected by personal income tax considerations and the latter by the difficulty of distinguishing it from migration.

A more general summary of the prospects for health services trade is offered in a paper by Cattaneo (2009) which covers a wide range of services and of modes of supply. It reviews the current state of trade in each of the four GATS modes and includes several brief case studies of country policies and measures to promote both exports and imports of health services. The conclusions are optimistic about prospects for future development of health services trade and the potential benefits to exporters and importers.

A broader view, mainly concentrating on IT industries, is taken in a paper by Kierkegaard (2008) that emphasizes the “rapidly deepening skill bias affecting these types of employment” (p. 413) in the United States. The paper expresses some skepticism about the elasticity of supply of highly skilled IT workers, even in India. The paper suggests that the growth of the most successful service-exporting firms in foreign countries will lead them to expand their own affiliate operations in the United States to take advantage of the highest-skill workers.

Another analysis of the consequences of the growth of service exports on the exporting country is the paper by Ahmed (2009) on service exports from India. The simulations project large wage increases in the wages of skilled workers as a consequence of the growth in the service export sector, confirming Kiekegard’s expectations about wages in the IT sector. The simulations also project losses for capital in manufacturing and agriculture.

A recent (unpublished and undated) study of IT workers based on two surveys (Tambe and Hitt, n.d.), one of human resource managers and one of workers, concluded

that IT work was “...the most commonly offshored type of work,” leading to displacement rates of 1-2% per year. The study found that jobs not requiring “interpersonal skills” were particularly subject to displacement.

An analysis of the impact of service exports from India by Ahmed (2009) found, in agreement with Kierkegaard’s analysis, discussed in the text, that the growth of India’s service exports had significantly increased skilled labor wages and skilled, relative to unskilled labor, wages. It had also reduced returns to capital in agriculture and manufacturing.

The impact of foreign-owned service affiliates in Italy on locally-owned manufacturing firms is analyzed in Nicolini *et al.*, which finds that the entrance of foreign MNEs in service sectors has a positive influence on local firms’ total factor productivity through forward linkage.

A paper by Ebenstein, Harrison, McMillan, and Phillips (2009) deals mainly with effects of trade and offshoring on manufacturing workers, but also contains useful information from the Current Population surveys on the service sector. That includes data on the education level of the service industry labor force. In manufacturing, the industries in which firms expanded employment in high-income countries showed average wage increases in the United States, while industries expanding in low-income countries showed average wage decreases in the United States.



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