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# Some Basic Facts about the Service Sector and Service Trade

Services are widely recognized as making up the majority of the US economy and indeed of the economies of most developed countries. There is also widespread recognition that services' share of the nation's output and employment is growing. Yet there seems to be little understanding of the service sector beyond the fact that it is large and growing—and little appreciation for the sector's role in the economy.

One reason that impressions of the service sector are fuzzy is that the sector is as diverse as it is large. Indeed, its diversity makes even defining the service sector a challenge. Some people consider everything outside of goods production—agriculture, mining, and manufacturing—to be “services.” In this expansive view, the service sector would include construction, utilities, retail and wholesale trade, finance and insurance, real estate, business services, personal services, accommodations and restaurants, and public administration. A more standard, somewhat narrower classification is presented below and is used in most of this book.

Another reason for the service sector's relative obscurity is that for decades manufacturing has been regarded by many as the most important sector. Recall that it was the president of General Motors, not of General Services, who in the 1950s famously identified the good of his company with the good of the nation.<sup>1</sup> Why this preoccupation with manufacturing? There seem to be several possible reasons.

First, when economists in the early 20th century began studying the relationship between economic structure and economic growth, the share of employment in manufacturing was observed to be positively correlated with

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1. For a more recent example see Cohen and Zysman (1987).

income per capita across countries. The notion of a close relationship between manufacturing and development became ingrained, to the point where policymakers and official statisticians routinely used the terms “industrialized countries” and “developed economies” interchangeably.<sup>2</sup> Manufacturing, in this view, was “good,” that is, associated with higher living standards. A related notion is that manufacturing jobs are “good jobs” whereas service jobs are low-skill, low-paying, “burger-flipper” jobs. Because service jobs are widely considered not to be good jobs, some policymakers and some in the media have tended to emphasize growth in manufacturing jobs at the expense of growth in good jobs in the service sector. A key focus of this book is to challenge these long-held views and shed some light on the true nature of service employment.

Another reason for the lack of attention to the service sector is that service firms (and establishments) have long been thought of as small relative to manufacturing firms (and plants). Somewhere along the way, the size of a firm or establishment came to be regarded as a measure of the importance of the sector to which it belongs. Not only is this the wrong measure of importance, but the notion that the overwhelming majority of service firms are small is also wrong, or at least misleading. This chapter presents detailed information on the size of service establishments to show that the averages hide the real picture.

Yet another reason, and perhaps the most important of all, why services get so little respect is the lack of data on the service sector. Although the official statistics on services are improving, the level of detail and the richness of the data collected for the service sector still lag far behind what is available for agriculture and manufacturing. (Of course, the data inadequacies could be both cause and effect of the relative disregard of services—perhaps fewer service data were collected *because* services were deemed unimportant.) The problem is particularly acute for information on trade in services (see box 1.1).

This chapter presents some basic facts about the service sector using official statistics; the next few chapters develop new ways of classifying the data aimed at improving one’s ability to analyze the impact of trade in services. A key feature of this analysis is that it makes use of a variety of data sources, trying to capitalize on the strengths of each and using the data in a way that minimizes potential weaknesses. At times this creates dissonance, as the numbers are not exactly the same. This is due to a variety of data issues: sampling and scope differences, minor differences in classification, differences in measurement concepts, sampling error, classification error, response and reporting errors, and so forth. The same story, however, emerges from the various datasets.

The rest of this chapter provides an overview of the role of services in the US economy. The objective is to provide a more complete and updated picture of the economic importance of the service sector and to dispel some of the misconceptions regarding the role of services.

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2. Recently, however, the International Monetary Fund, in its Global Data Source data series, renamed the “industrial countries” group the “advanced economies” group.

### **Box 1.1 Official sources of data on trade in services**

The Bureau of Economic Analysis (BEA) collects information on trade in services and presents aggregate data on international service transactions through three publication programs: cross-border trade in services data in the international transactions accounts; sales of services through affiliates of multinationals, some portion of which represent cross-border trade; and benchmark input-output tables.

The program on cross-border trade in services provides the basis for all of BEA's service trade data. As a result, this publication program provides the best sense of what trade data BEA collects:

The estimates of cross-border transactions cover both affiliated and unaffiliated transactions between U.S. residents and foreign residents. Affiliated transactions consist of intra-firm trade within multinational companies—specifically, the trade between U.S. parent companies and their foreign affiliates and between U.S. affiliates and their foreign parent groups. Unaffiliated transactions are with foreigners that neither own, nor are owned by, the U.S. party to the transaction.

Cross-border trade in private services is classified into the same five, broad categories that are used in the U.S. international transactions accounts—travel, passenger fares, “other transportation,” royalties and license fees, and “other private services.” (*Survey of Current Business*, November 2001)

Data on affiliated transactions are collected through BEA's US Direct Investment Abroad and Foreign Direct Investment in the US programs. Comprehensive benchmark surveys are collected every 5 years, and less comprehensive collections are conducted annually.

BEA collects data on US international transactions in private services with unaffiliated foreigners through 11 surveys. These surveys fall into three broad categories: surveys of “selected” services, which cover mainly business, professional, and technical services; specialized surveys of services, which cover construction, engineering, architectural, and mining services as well as insurance services, financial services, and royalties and license fees; and surveys of transportation services. These collection programs are the principal source of BEA's estimates of trade in services, but the estimates for some services are based on data from a variety of other sources, including US Customs and Border Protection and surveys conducted by other federal government agencies, private sources, and partner countries. Detailed data on international services transactions are currently available from 1986 through 2006, for cross-border trade. Service imports and exports are reported for approximately 30 (1986–91) to 35 (1992–2006) service types; for some categories additional detail is available on whether the transactions are between affiliated or unaffiliated parties. These data are available by country for approximately 35 countries and country groupings for 1986–2006.

*(continued on next page)*

### **Box 1.1 Official sources of data on trade in services (continued)**

Table A.1 in appendix A exhibits the detail on trade in services (both affiliated and unaffiliated) published by BEA over time. It shows the significant increase in detail over the past decade. The figure also shows how large the gap is between the detail available for the manufacturing sector (where information for over 8,000 export categories and over 10,000 import categories is available) and the service sector. Although the level of detail for data on trade in services is improving, the data are still far more aggregated than comparable data in the manufacturing sector. The lack of historical data and the ongoing lack of detailed industry-level data are two examples of the challenges in measuring and analyzing trade in services.

## **Size and Growth of the Service Sector**

The growing importance of the service sector is by no means a recent phenomenon. The principal facts—that services account for a majority of US economic activity and that their share of employment is growing—have been recognized, if not widely known, for decades. Allan Fisher (1935), Colin Clark (1940), and Victor Fuchs (1965) all identified the long-run trends early on.

These trends continue today. Figure 1.1 shows the shares of private employment in goods (excluding agriculture but including construction) and services in the United States for the period from 1960 to 2007.<sup>3</sup> It shows that services, broadly defined, now account for the vast majority—about 85 percent—of nonagricultural employment in the United States, having risen from about 65 percent (already a substantial majority) 50 years ago. Meanwhile the share of nonagricultural employment in the goods-producing sector has exhibited a steady decline.

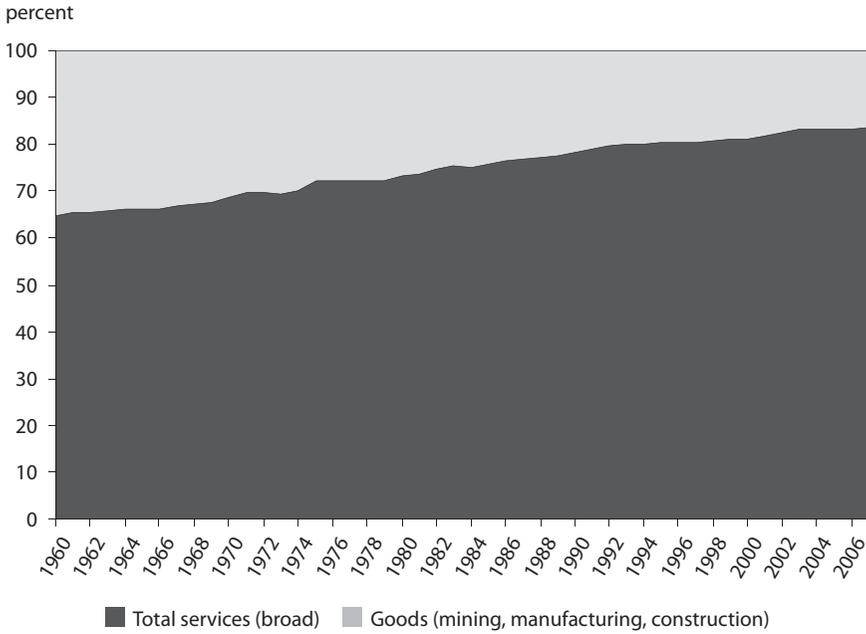
The definition of the service sector used in figure 1.1 is so broad, however, as to be of little analytical value. It also obscures some important trends within the sector. For example, business services (that is, services typically provided by one business to another—see the next section) increased from 15 percent of total nonagricultural employment in 1960 to 21 percent in 2007 (figure 1.2). Thus, whereas in 1960 the business service sector employed only half as many workers as the manufacturing sector, by 2007 business services employed just over twice as many.

“Other services” (a category made up mainly of personal services, that is, services typically provided to individual consumers) also saw its share of total

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3. These data are from the *Economic Report of the President (ERP)* and use a slightly different set of categories from that used later in this chapter. In the ERP the utilities sector is included in services, as part of the trade, transportation, and utilities category, whereas below it is included in the goods production category.

**Figure 1.1 Shares of nonagricultural employment in the United States, by major sector, 1960–2007**



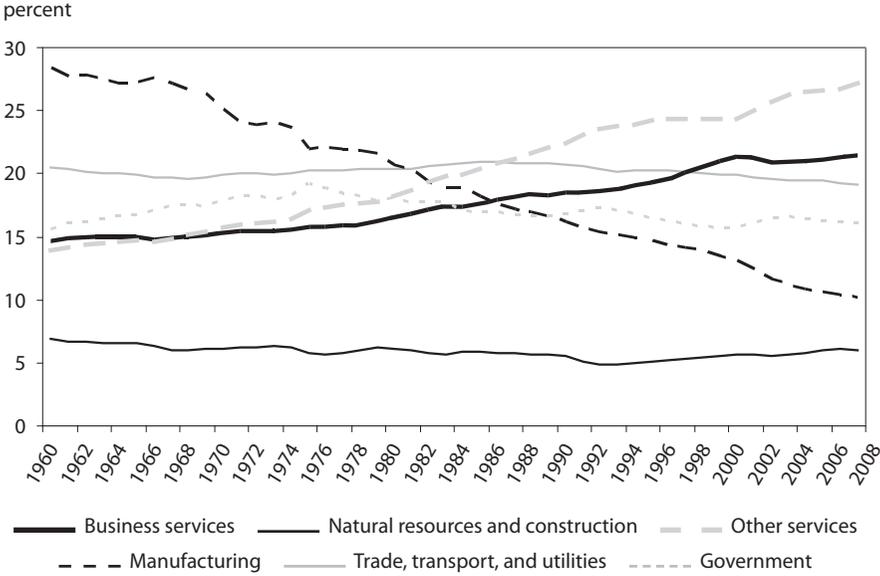
Source: *Economic Report of the President*, 2009.

nonagricultural employment increase, from 14 percent in 1960 to 27 percent in 2007 (figure 1.2). Like business services, this sector started the period with employment about half that in the manufacturing sector, but its employment grew to more than two-and-a-half times manufacturing employment. Thus, taken together, professional services and “other services” went from having about the same number of workers as the manufacturing sector in 1960 to having about five times as many in 2007. Employment in the other categories—natural resources and construction; trade, transportation, and utilities; and government—remained roughly constant over the period.

## Services in More Detail

The set of activities included in services in figure 1.1 is too diverse to meaningfully analyze in the aggregate. Any statement one could make along almost any dimension of such a broad range of economic activity would be subject to so many exceptions and would obscure so much important detail as to be misleading. Therefore, to make the analysis more tractable, this chapter focuses on two important subcategories, business services and personal services (thus omitting government services and trade, transportation, and utilities).

**Figure 1.2 Shares of nonagricultural employment in principal service subsectors and manufacturing in the United States, 1960–2007**



Note: The definition of “business services” used here may differ slightly from that used elsewhere in the book.

Source: *Economic Report of the President*, 2009.

Table 1.1 lists the major sectors of the economy using the North American Industry Classification System’s (NAICS) categories and two-digit codes. (See appendix C for a brief description of each sector.) Using this standard classification, all economic activity can be grouped into five broad categories:

- Goods production: agriculture, mining, construction, utilities, and manufacturing (NAICS sectors 11, 21 through 23, and 31 through 33).
- Trade activities: wholesale trade, retail trade, and transportation and warehousing (NAICS sectors 42, 44, 48 and 49).
- Business services: information; finance and insurance; real estate; professional, scientific, and technical services; management of companies and enterprises; and administrative and waste remediation services (NAICS sectors 51 through 56).
- Personal services: educational services; health care and social assistance; arts, entertainment, and recreation services; and accommodation and food services (NAICS sectors 61, 62, 71, 72, and 81).
- Public services: public administration (NAICS sector 92).

**Table 1.1 Economic sectors and their two-digit NAICS codes**

<b>NAICS code</b>	<b>Sector</b>
11	Agriculture, forestry, fishing, and hunting
21	Mining
22	Utilities
23	Construction
31–33	Manufacturing
42	Wholesale trade
44–45	Retail trade
48–49	Transportation and warehousing
51	Information
52	Finance and insurance
53	Real estate and rental and leasing
54	Professional, scientific, and technical services
55	Management of companies and enterprises
56	Administrative and support and waste management and remediation services
61	Educational services
62	Health care and social assistance
71	Arts, entertainment, and recreation
72	Accommodation and food services
81	Other services (except public administration)
92	Public administration

NAICS = North American Industry Classification System

Source: US Census Bureau, [www.census.gov](http://www.census.gov).

Table 1.2 provides a more detailed picture of the composition of employment and its growth by sector, including that within business services and personal services, using data from the 1997 and 2007 Economic Census.<sup>4</sup> The table reveals that manufacturing employment fell from 1997 to 2007 not only as a share of total employment but also in terms of the absolute number of workers employed. Indeed, the reduction was significant: Manufacturing employment decreased by just over 20 percent over that period. In stark contrast, business and personal service jobs grew at a relatively rapid pace: by almost 30 percent and over 20 percent, respectively, over the same period. Each of these two broad service categories now accounts for about 25 percent of total employment.

4. The Census provides more detailed information on employment by sector than is available from the *Economic Report of the President*, which, however, provides a long time series—an example of how this book’s mosaic has to be assembled from multiple sources.

**Table 1.2 Employment and wages by two-digit NAICS sector, 2007**

NAICS code	Sector	Employment			Average annual wage, 2007 (dollars)
		Thousands of workers	Share of total employment (percent)	Growth, 1997–2007 (percent)	
21	Mining	703	0.5	38	53,060
22	Utilities	632	0.5	–10	80,473
23	Construction	7,399	5.5	31	47,052
31–33	Manufacturing	13,333	9.9	–21	45,935
42	Wholesale trade	6,295	4.7	9	53,395
44–45	Retail trade	15,611	11.5	12	23,381
48–49	Transportation and warehousing	4,436	3.3	52	38,813
51–56	Business services	33,431	24.7	29	56,086
51	Information	3,428	2.5	12	65,157
52	Finance and insurance	6,563	4.9	12	75,350
53	Real estate and rental and leasing	2,249	1.7	32	37,899
54	Professional, scientific, and technical services	8,121	6.0	51	63,424
55	Management of companies and enterprises	2,916	2.2	11	91,324
56	Administrative and support and waste remediation services	10,154	7.5	38	28,614

61–81	Personal services	34,596	25.6	23	29,125
61	Educational services	562	0.4	75	25,941
62	Health care and social assistance	16,860	12.5	24	39,493
71	Arts, entertainment, and recreation	2,071	1.5	30	27,793
72	Accommodation and food services	11,588	8.6	23	14,657
81	Other services (except public administration)	3,516	2.6	8	28,389
	Federal government	2,462	1.8	—	—
	State and local government	16,400	12.1	—	—

NAICS = North American Industry Classification System

Sources: 2007 Economic Census; Census of Governments.

## Wages in the Service Sector

To summarize the preceding section: Whereas in the 1960s manufacturing was the sector with the largest share of employment, today business services and personal services each employ more than twice as many workers as manufacturing, and altogether, services account for more than half of total employment in the United States. But what about the widespread perception that, yes, there are a lot of service jobs, but they are not “good jobs with good wages” like most manufacturing jobs?

This perception is wrong.

Table 1.2 also reports average annual salaries and wages by sector, and by subsector within business services and personal services, using data from the 2007 Economic Census. The table shows that the business service sector—which, again, alone employs more than twice as many Americans as manufacturing—pays significantly higher wages and salaries, on average, than manufacturing: The average annual wage in the business service sector was about \$56,000 a year in 2007, or over 22 percent more than in manufacturing, where the average was about \$46,000 a year. Some other sectors also often classified within services, such as utilities, construction, and wholesale trade, also pay more on average than manufacturing. On the other hand, some service sector jobs, notably in personal services and the retail sector (often considered part of services) do pay lower average wages than the manufacturing sector.

## The Service Sector and the Broader Economy

Besides contributing a huge share of total output and many good jobs, the service sector provides key intermediate inputs to other sectors—including manufacturing. Banking, legal services, marketing, R&D, design, engineering, project management, software, and telecommunications all provide crucial inputs to other activities throughout the economy. These business services have the capacity to improve the quality, efficiency, and competitiveness of other firms in the economy. In addition, these services establish key linkages to the global economy—and, as a result, are key drivers of export growth (even of manufactured goods).

Joseph Francois and Bernard Hoekman (2010) review a range of studies covering a number of countries that demonstrate the broad-based impact of a competitive service sector. They cite studies showing that service sector productivity is a key driver of aggregate productivity growth differences across developed economies. They also cite a range of studies showing that increased levels of competition in the service sector—and the higher levels of service provision that such competition encourages—have a positive impact on manufacturing productivity and lead to increases in manufacturing exports.

## Characteristics of Service Producers: A Closer Look

The aggregate data presented thus far give a sense of the economic importance of the service sector but reveal little about the nature of today's individual service firms. When most Americans, including even many who work in the service sector, think about the productive side of the economy, they probably think first of large manufacturing corporations. And indeed, many of the iconic American corporations—General Motors, General Electric, and Boeing, for example—are manufacturers. In some ways the sheer scale of these large manufacturers (and perhaps the political presence they derive from their size) tends to make manufacturing seem more important than other sectors, where the typical firm and the typical operation are—in the public mind, at least—much smaller. But here, too, the picture is changing.

The first column of table 1.3 reports the average sales, employment, and wages of producers in manufacturing (NAICS 30s), business services (NAICS 50s), and personal services (NAICS 60s, 70s, 80s). These measures broadly confirm the standard preconceptions about the service sector. For example, the average manufacturing plant employs about 70 workers, about five times as many as the average business service or the average personal service establishment (15 workers for both). Sales of the average manufacturing plant's output are more than seven times that of the average business service establishment, and close to twenty times that of the average personal service establishment.

However, merely comparing averages does not fully capture the differences (or the similarities) across sectors. For one thing, the standard deviations associated with all the above averages (second column of the table) are many times the averages themselves, indicating that all these measures vary across a wide range. The final column in table 1.3 presents another measure, called the coworker mean. This measure (described in Davis, Haltiwanger, and Schuh 1996) is constructed by weighting a given establishment characteristic by employment and then taking the average; it thus represents the size of the establishment where the average worker is employed.<sup>5</sup> By this measure, the average worker in the business service sector works in an establishment that is actually significantly larger (over 1,200 employees) than the plant where the average manufacturing worker works (about 1,000 employees). The large difference between the simple establishment mean and the coworker mean results from the presence of a large number of very small establishments in the service sector. Although the service sector has many more of these very small establishments than does manufacturing, the bulk of service workers work in relatively large establishments, and this raises the coworker mean.

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5. For example, imagine that there are three plants in an industry, two of which employ 1 person each whereas the third employs 10 people. The simple average of employment across plants in this industry is thus  $(1 + 1 + 10)/3 = 4$ . However, the employment-weighted average (the coworker mean) is  $[(1 \times 1) + (1 \times 1) + (10 \times 10)]/12 = 8.5$ . This number gives a better sense of the size of the plant in which most workers work.

**Table 1.3 Sales, employment, and average wage per establishment in manufacturing and services, 2002**

Sector	Mean	Standard deviation	Coworker mean
Manufacturing (NAICS 30s)			
Sales (thousands of dollars)	19,378	151,147	380,329
Employment	72	264	1,042
Average annual wage (dollars)	34,604	13,723	39,346
Business services (NAICS 50s)			
Sales (thousands of dollars)	2,632	58,343	180,429
Employment	15	135	1,238
Average annual wage (dollars)	35,870	56,505	44,677
Personal services (NAICS 60s, 70s, 80s)			
Sales (thousands of dollars)	1,073	9,905	54,177
Employment	15	101	700
Average annual wage (dollars)	29,566	109,801	30,188

Source: Author's calculations using data from the 2002 Economic Census.

Table 1.4 confirms this by providing more detail on the full distribution of producers by number of employees in manufacturing, business services, and personal services. The top panel shows that establishments with five or fewer workers make up over half of establishments in both the business service and the personal service sectors, but only about 11 percent of manufacturing establishments. The large number of very small service sector establishments pulls down the sector's average establishment size.

The bottom panel of the table reports shares of workers by establishment size class. Here the two service subsectors look much more similar to the manufacturing sector. Although the share of employment in very small service establishments is still larger than in the manufacturing sector, the difference is much smaller. In both service subsectors, only about 9 percent of workers are employed in the more than 50 percent of establishments with five or fewer employees. In the manufacturing sector, the 7 percent of plants in this size range account for less than 1 percent of employment. At the other end of the distribution, the largest establishments (those with more than 1,000 employees) account for a similarly large share of employment (roughly 20 percent) in both business and personal services and in manufacturing. Thus, although the number of large service producers is small relative to the total population of service producers, they account for a larger share of employment in the sector than their number might suggest. This is consistent with the finding in table 1.3 that, measured by the coworker mean, the average business service worker works in an establishment that is larger than that of the average manufacturing worker.

**Table 1.4 Size distribution of establishments in manufacturing and services (percent)**

<b>Establishment employment</b>	<b>Manufacturing</b>	<b>Business services</b>	<b>Personal services</b>
<b>Share of all establishments in sector</b>			
1 to 5 workers	11.41	62.63	56.65
6 to 10	15.78	15.29	19.58
11 to 25	27.34	12.37	14.54
26 to 50	17.48	4.62	4.66
51 to 100	12.50	2.60	2.35
101 to 250	10.07	1.63	1.57
251 to 500	3.41	0.52	0.34
501 to 1,000	1.36	0.22	0.15
1,001 to 2,500	0.52	0.10	0.12
2,501 and above	0.12	0.03	0.04
<b>Share of total sectoral employment</b>			
1 to 5 workers	0.55	8.52	8.83
6 to 10	1.74	6.91	9.15
11 to 25	6.43	11.72	14.14
26 to 50	8.78	9.72	10.04
51 to 100	12.42	10.90	10.19
101 to 250	21.76	14.88	14.54
251 to 500	16.42	10.58	7.08
501 to 1,000	12.85	9.11	6.54
1,001 to 2,500	10.56	8.42	10.96
2,501 and above	8.49	9.24	8.54

Source: Author's calculations using data from the 2002 Economic Census.

Regarding wages, one sees in the less aggregated data the same patterns as in the aggregates. Although some service industries clearly do pay lower wages than manufacturing, table 1.3 shows that the average establishment in the business service sector actually pays higher average wages than the average manufacturing plant, \$35,870 per year versus \$34,604. The difference in co-worker means is somewhat larger.<sup>6</sup>

In short, while the average service establishment is small, most service workers work at large producers that pay relatively high wages.

6. These numbers on wages for the average establishment differ substantially from the average worker wages reported in the Overview because large establishments tend to pay higher wages, so taking the average across establishments results in a lower number.

## International Comparisons

As already mentioned, early studies of the process of economic development likely contributed to the widespread perception of manufacturing's greater economic importance. For example Simon Kuznets (1957), reported that the share of output in the manufacturing sector was positively correlated with income per capita across countries, but that the share of output in the service sector was not.

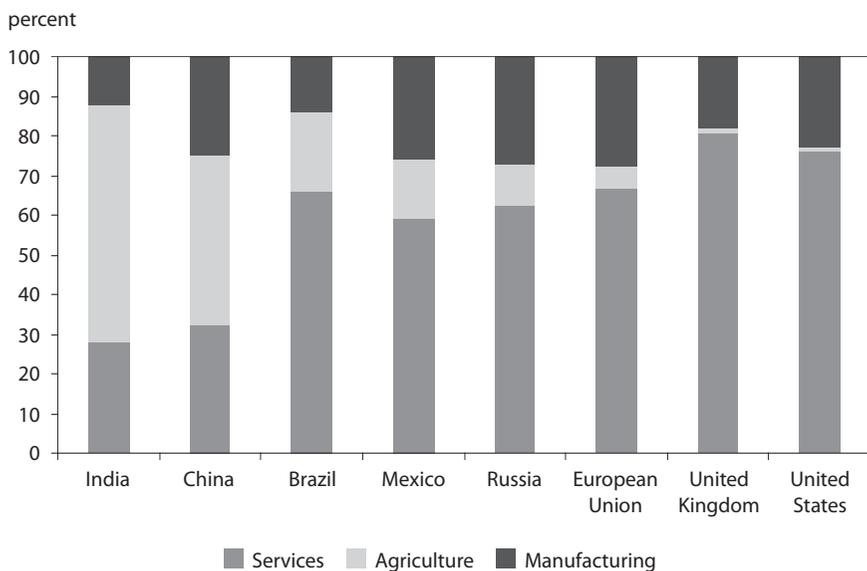
Fifty years after Kuznets's work, a reevaluation of the relationship between the size of a country's manufacturing sector and its standard of living seems in order. Figure 1.3 shows the shares of employment in services, agriculture, and manufacturing for eight large economies. In most, the service sector accounts for more than half of employment. In the more advanced economies such as the United States, the United Kingdom, and the European Union, the figure is two-thirds or more. But even in some economies with lower income per capita, such as Russia and Brazil, the service sector accounts for more than 60 percent of employment, and the figure for Mexico is almost 60 percent. Meanwhile in China and India, countries with still lower income per capita, the service sector accounts for only about a third of employment, but even this is larger than manufacturing's share. Thus, even this simple figure shows that large service sectors are not the exclusive domain of advanced economies, and there appears to be a positive relationship between the service sector's share of economic activity and living standards.

Figure 1.4, which covers a much larger group of countries, shows the same positive relationship. Here each point represents a single country, and although there is considerable variation, most countries lie close to the upward-sloping line, indicating that a larger share of employment in services and higher income go hand in hand.

Barry Eichengreen and Poonam Gupta (2009) undertake a more sophisticated analysis of the relationship between the employment share of the service sector and income per capita, and they, too, find a positive correlation overall. But they also find that the relationship does not hold for all services. Decomposing the service sector into three groups of activities, they observe that a group they call "traditional services" (retail and wholesale trade, transport and storage, and public administration and defense) actually has a negative relationship with income per capita. They observe a positive relationship for the other two groups: The first is a mixture of traditional and modern services consumed primarily by households (education, health and social services, accommodations and restaurants, and other personal services), and the second is composed of modern services that are primarily business services (including financial intermediation, computer services, communication services, and legal and technical services).

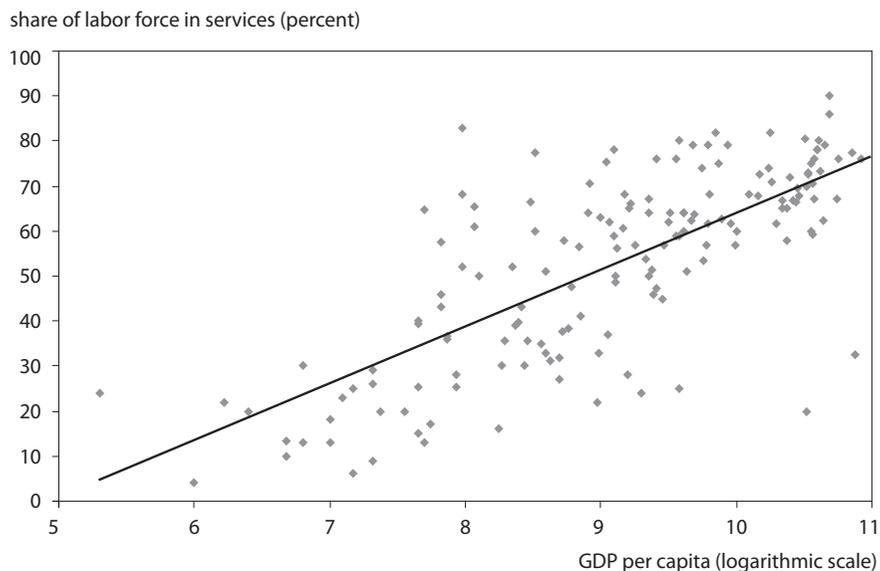
It is worth underscoring that this positive relationship is not necessarily evidence of a causal relationship in either direction. There could exist complex relationships between fundamental features of an economy that drive both income per capita and the share of employment in the service sector upward.

**Figure 1.3 Labor force shares of major sectors in selected countries**



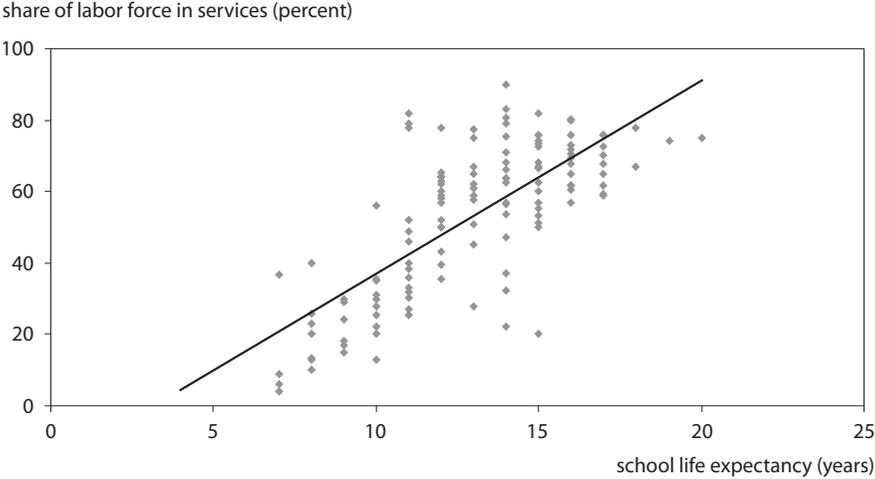
Source: CIA, *The World Factbook*, [www.cia.gov/library/publications/the-world-factbook](http://www.cia.gov/library/publications/the-world-factbook).

**Figure 1.4 Labor force share of the service sector and income per capita across countries**



Source: CIA, *The World Factbook*, [www.cia.gov/library/publications/the-world-factbook](http://www.cia.gov/library/publications/the-world-factbook).

**Figure 1.5 Labor force share of the service sector and educational attainment across countries**



Note: School life expectancy is defined as average number of years that a child remains in school.

Source: CIA, *The World Factbook*, [www.cia.gov/library/publications/the-world-factbook](http://www.cia.gov/library/publications/the-world-factbook).

One such feature is educational attainment. Figure 1.5 shows a positive relationship between the level of educational attainment (measured here as “school life expectancy,” or the average number of years that a child remains in school) and the service sector’s share of employment. Again, it is difficult to disentangle which, if either, causes which, but later chapters show that many service activities—and tradable service activities in particular—require high levels of educational attainment.

### A First Look at Trade in Services

The service sector is large and growing, both in the United States and in many other countries. Countries with high average incomes and high average educational attainment tend to have higher shares of employment in the service sector. The service sector is not made up of just a myriad small firms paying mostly low wages, but it includes some large producers offering relatively high-wage employment opportunities; many service sector jobs—particularly in business services—are good jobs that provide good wages. All these facts taken together demonstrate that the service sector is important and deserves significantly more attention than it has tended to receive.

These facts do not necessarily mean, however, that *trade* in services is important. It is possible that the service sector, however large, is largely insulated from the international economy and that most services are not tradable.

Indeed, services have long been thought of as nontradable, because the typical service requires a face-to-face presence of buyer and seller. This section shows, however, that this has always been a misconception, or at best an oversimplification, and today it is an increasingly inappropriate one. Falling costs of travel, communications, and computers and increasing access to the internet have vastly expanded the opportunities for trading services across long distances, including across borders. And, indeed, official statistics suggest that US service trade is increasing rapidly.

But what is service trade? This section describes what the term means and gives a number of examples. It then documents the falling costs of computer hardware, communications, and travel and the increasing access to the internet, which are facilitating ever-greater trade in services. I also examine official US government statistics for evidence of increasing trade in services—and point to some of the shortcomings in those statistics.

## What Is Trade in Services?

Most of us are accustomed to thinking of trade as trade in goods. Commodities such as wheat, copper, and crude oil, as well as manufactured goods such as clothing, furniture, consumer electronics, automobiles, and jet aircraft, have long been shipped all over the world. One can visit any port or border crossing and see evidence of this kind of trade. Or one can visit the nearest mall or big-box superstore and find an abundance of goods bearing the label “Made in \_\_\_\_\_,” where the blank might be filled in by the name of virtually any country in the world. So when one speaks of “trade in goods” or “merchandise trade,” it is not difficult to conjure up a clear mental image.

Trade in services, however, is somewhat harder to conceptualize. Because services are intangible, the image of a service being traded comes less readily to mind. Yet services are traded, and in a variety of ways. The General Agreement on Trade in Services (GATS) provides a useful definition of what is meant by “trade in services”:<sup>7</sup>

For the purposes of this Agreement, trade in services is defined as the supply of a service:

- (a) from the territory of one Member into the territory of any other Member;
- (b) in the territory of one Member to the service consumer of any other Member;
- (c) by a service supplier of one Member, through commercial presence in the territory of any other Member;
- (d) by a service supplier of one Member, through presence of natural persons of a Member in the territory of any other Member.

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7. See General Agreement on Trade in Services, available at [www.wto.org](http://www.wto.org).

The GATS definition embodies what are generally referred to as the four “modes” of trade in services:

- Mode 1 is cross-border provision, for example, when software is produced in one country and shipped via the internet to another.
- Mode 2 is consumption abroad, for example, when a vacationer travels to a resort in another country and purchases hotel accommodations, meals, and other services there.
- Mode 3 is commercial presence in a foreign country, for example, when a restaurant chain opens a branch outside its home country.
- Mode 4 is temporary movement of natural persons across borders, for example, when a business consultant travels to visit a foreign client.

Box 1.2 provides more specific examples of the different kinds of trade in services.

Mode 3, also called foreign direct investment—both outward investment by US companies abroad and inward investment by foreign companies into the United States—is undoubtedly beneficial. For example, the expansion of US service firms abroad allows them to take advantage of their successful business models around the world when trade in services via the other modes is not possible. Such investment increases total firm sales and generates profit flows to the US headquarters of these firms, which benefit the firms’ owners and their US workers, increase the US tax base, and offer a range of other benefits both here and in the foreign markets being served. Unfortunately, identifying and measuring the impact of these benefits on the US economy is devilishly difficult. Therefore, for the sake of tractability, and because this book is primarily about the effects of service trade on US workers, I focus on the other three modes.<sup>8</sup> The employment effects of foreign direct investment on the home country are unlikely to be as large as the effects of the other modes. Likewise, although foreign firms that make direct investments in the United States offer new employment prospects for US workers, it seems likely that even in the absence of these investments, the level of economic activity undertaken in the United States would be similar.

## Some Real-World Examples

I have reviewed some broad definitions of service trade, and box 1.2 lists a number of hypothetical examples. But do these transactions happen regularly in the real world? Are there firms out there that actually trade services internationally—besides the formerly high-flying financial service firms that crashed a

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8. Looking at economic activity through the lens of corporate ownership, as opposed to the location of economic activity, is nonetheless a legitimate perspective for a range of questions. On this topic see Baldwin, Lipsey, and Richardson (1998). See also Graham and Krugman (1995) for a classic study of foreign direct investment and its benefits.

### **Box 1.2 Some examples of trade in services**

The following people are all exporting services:

1. An advertising executive developing a TV commercial for a foreign client
2. A secretary at a law firm answering a call from a foreign client
3. A cabby who drives a foreign businessman from the airport to the hotel
4. The cast of a television show that will be broadcast abroad
5. A doctor operating on a foreign patient
6. The doorman and the bartender at a posh hotel serving foreign guests
7. An accountant unraveling the financial affairs of a foreign corporation
8. An engineer designing a bridge to be built in another country
9. A caterer preparing a meal to be served at a foreign embassy
10. A management consultant advising a foreign client

The following persons or companies are all importing services:

1. Every reader of this book who has taken a foreign vacation
2. An auto company that asks a foreign firm to design a new model
3. Someone who buys a ticket to a performance by a foreign orchestra
4. A student attending a foreign university
5. A businessman who extracts information from a foreign data base
6. A housewife who goes to “Jean Pierre” for the latest French hairstyling
7. A consumer who has a camera repaired abroad
8. An investor who buys securities at a foreign stock exchange
9. The actress who has her legs insured in London with a Lloyd’s broker
10. A traveler who uses a credit card issued by a foreign bank.

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*Source:* Excerpted from Feketekuty (1988).

few years ago? Are they providing good jobs at good wages for normal people in middle America? Or are they phantoms that show up only in the statistics—a figment of economists’ imaginations? Although the purpose of this book is to provide as detailed a statistical portrait of the service sector and of trade in services as possible, it is also true that statistics do not always give the full picture. In an attempt to flesh out the analysis, therefore, this book also includes examples of real-life firms that are trading services.

Box 1.3 provides the first such example. The newspaper article reproduced there describes two water treatment technology companies in Wisconsin, Envirex and Zimpro, both owned by the German engineering firm Siemens. What is interesting is that not only is engineering services an important line of business for both companies, but for at least one of them, international

sales make up a large part of its business: Chad Felch, a chemist at Zimpro, notes that 80 percent of the company's business was international in 2007. Also interesting is the article's observation that the global market for water and wastewater treatment systems is growing faster than the domestic market, providing expanding opportunities for exports. The article mentions that Siemens' water treatment group is growing at 30 percent per year and has more than doubled in size since Siemens purchased US Filter.

This article is one example of how US firms export services almost invisibly. Envirex and Zimpro are located deep within the American heartland. Their engineering service output is intangible, not packaged into containers and shipped to some distant port by truck or train. How many firms like these are in the US economy? How many workers do they employ? What are the skills required of their workers? Are these "good jobs at good wages"? These are some of the themes this book explores and the questions it tries to answer.

For now it is worth noting that Siemens, itself a global technology firm, purchased two companies in Wisconsin to acquire cutting-edge know-how. That those companies are now owned by Siemens does not change the fact that workers based in the United States are providing engineering services around the world. This is an example of how the United States can export high-tech, high-value services.

## **Factors Contributing to Growth in Service Trade**

Because services are traded in so many different ways (recall the four modes listed above), a variety of different technological changes could facilitate increased trade in services. This section describes a number of these changes.

### *Falling Travel Costs*

Because modes 2 and 4 involve the travel of either the consumer or the producer of a service, any decline in the cost of travel can lower the costs of importing and exporting services. And travel costs have indeed fallen dramatically in recent decades: As figure 1.6 shows, international passenger airfares have been cut by more than half since 1987. Lower airfares make it less expensive to travel to consume or produce services.

### *Falling Costs of Information and Communications Technology*

The past two decades have also witnessed a revolution in information and communications technology. Three related trends have vastly increased the ability of people and firms to transfer knowledge around the world without having to go there personally. First, dramatically falling prices of information technology (IT) hardware led to the widespread adoption of personal computers, first in the developed world and now increasingly in the developing world. Second, the increased interconnectedness of all this hardware

### **Box 1.3 Siemens catches a wave**

It's a burgeoning idea on the shores of Lake Michigan: As drinkable water becomes scarce in parts of the United States, Asia and the Middle East, demand is bound to proliferate for new technologies that can clean, conserve and recycle water.

Business leaders are trying to figure out whether metro Milwaukee's modest hub of water engineering companies can expand enough to replace a portion of the region's shrinking manufacturing base.

Siemens AG of Germany, which relies on two Wisconsin acquisitions to drive growth in its water technologies division, has already made up its mind about the state's role.

"Wisconsin easily is the most important state for us in the US because of those two companies," said Roger Radke, president and chief executive of Siemens Water Technologies Corp. in Warrendale, Pa.

Radke regularly visits those two Siemens facilities in Wisconsin: Envirex in Waukesha, Siemens' global R&D center for biological water treatment systems; and Zimpro Environmental near Wausau, which develops industrial water treatments.

Yet even within Siemens, Wisconsin is facing global competition.

Siemens—which is Europe's biggest engineering company—just opened a \$36 million water technology R&D center in Singapore to help it crack booming markets such as India and China, where 15% growth rates for water technologies are triple the pace of growth in the US.

In what is shaping up as a full-blown global technology race with a profusion of rivals from China to India, Siemens is recruiting 50 additional scientists to work in Singapore. Those new engineers and researchers will complement the existing worldwide research roster of 150 at Siemens Water Technologies, which also operates big water research centers in Germany and Britain.

Nor is Siemens, with \$104 billion in sales, the only globe-straddling giant that competes in water infrastructure, Radke said. General Electric Co., a US rival to Siemens in scale and scope, has its own "eco-imagination" strategy that banks on big growth in water projects.

#### **Acquisition, innovation**

Worldwide spending on water treatment is \$45 billion a year and growing, Radke estimates. Hot technologies from Siemens include membrane filters and "closed-loop" reactors that recycle water within factories.

Siemens entered the global water business in 2004 with the acquisition of the US Filter Corp., which had acquired Envirex and Zimpro in the mid-1990s in an early wave of consolidation.

*(continued on next page)*

### **Box 1.3 Siemens catches a wave** *(continued)*

Zimpro got started in the 1930s making artificial vanilla flavoring only to learn that it could adapt its processes for treating wastewater. Today, it employs 222 people.

Siemens employs another 205 people at Envirex in Waukesha. Envirex installed its first wastewater treatment equipment more than 100 years ago and more recently has been developing biological treatment reactors that reduce the enormous volumes of sludgy byproducts, thus lowering treatment and transportation costs.

With 30% annual growth, Siemens Water Technologies has more than doubled in size since acquiring US Filter.

Siemens also has been acquiring water-technology firms in Asia, a region that lacks sufficient clean-water resources to fuel its economic and population expansion, Radke said.

Nearly all economists agree on the global scope of the water crisis.

Top World Bank officials have predicted that the wars of the 21st century will be fought over water, not oil.

Radke notes that nearly 2 billion people lack access to safe water....

#### **Prize-winning research**

Siemens drew attention to Wisconsin last month when it awarded a prestigious “Inventor of the Year” prize to a chemist at Zimpro in Rothschild, near Wausau.

Siemens—a multinational conglomerate in multiple industries that employs 55,000 scientists and researchers, spends \$8 billion annually on R&D and applied for 5,060 patents last year—awards only 12 such prizes a year. In 2007, only one went to an American: Chad Felch, 35, who applied Zimpro industrial technologies to the production of crude oil from tar sands in Alberta, Canada. Felch’s work, which makes the process more environmentally compatible, helped Siemens book a contract worth \$60 million in Canada.

Felch said growth in the wastewater sector is being driven by companies that are trying to reduce or even eliminate the discharge of wastewater.

“They’re keeping all the water in a closed loop, said Felch, who has a chemistry degree from UW-Stevens Point. “They produce water and re-use it within their facilities.”

Felch said he often flies to oil-producing nations such as Norway and Bahrain. “Our business was about 80 percent international last year,” he said.

*(continued on next page)*

### **Box 1.3 Siemens catches a wave** *(continued)*

Competition may be intense, Radke said, but the field is also wide open.

Water engineering remains a relatively young and fragmented industry, Radke said. Many older companies that build municipal treatment plants haven't invested in new technologies in decades. US Department of the Interior data show that US water treatment industries spend far below 1% of their sales on development of new technologies.

That means Milwaukee retains a chance to champion freshwater research, as its business leaders urge, in the way that Madison mines stem-cell technology.

Asked if the global water industry has its own Silicon Valley yet, Radke said he doesn't know of any.

That title, he said, remains up for grabs.

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*Source:* John Schmid, "Siemens Catches a Wave," *Milwaukee Journal Sentinel*, January 20, 2008, [www.jsonline.com/business/29578294.html](http://www.jsonline.com/business/29578294.html). Reprinted with permission.

via the internet has made it nearly effortless for users of those computers to share information with each other. Third, rapidly falling telecommunications costs have enabled firms to expand the geographic reach of this technology to encompass most of the world. These related developments have created an unprecedented opportunity to exchange information across large distances economically, creating a platform for dramatically increased trade in services.

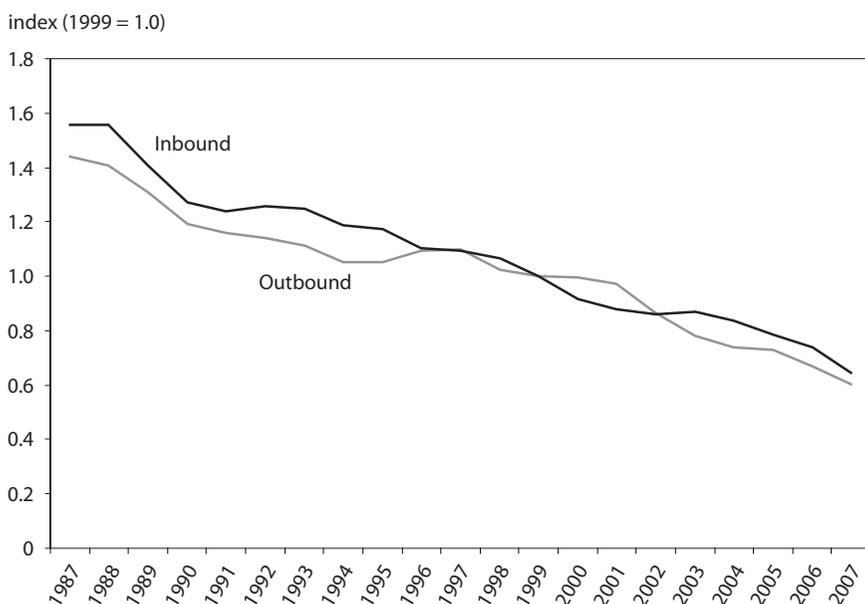
The OECD reports that prices of leased telecommunications lines have fallen significantly over the past 15 years:

Leased lines are symmetrical transmission channels provided permanently for the duration of a contract. Leased lines are provided to businesses as a way to connect offices to each other or link back to a telecommunications provider. They are commonly used as a way for companies to manage their own telecommunications services. However, leased lines are also used by alternative carriers as an element of their own networks until they become full facilities-based operators....

The price for a 2Mbit/s leased line has fallen dramatically over the past 14 years. A two-kilometre line in 2006 is 64% less expensive than it was 14 years ago in nominal terms. Longer-distance connections have fallen even further. The price of a 200 kilometre line in 2006 is only 27% of the price a company would pay in 1992." (*OECD Communications Outlook 2007*, p. 224)

Figure 1.7 confirms this decline in telecommunications costs, showing that billed revenue per minute for international telecommunication services provided in the United States has declined sharply since 1992.

**Figure 1.6 US international airfares, 1987–2007**



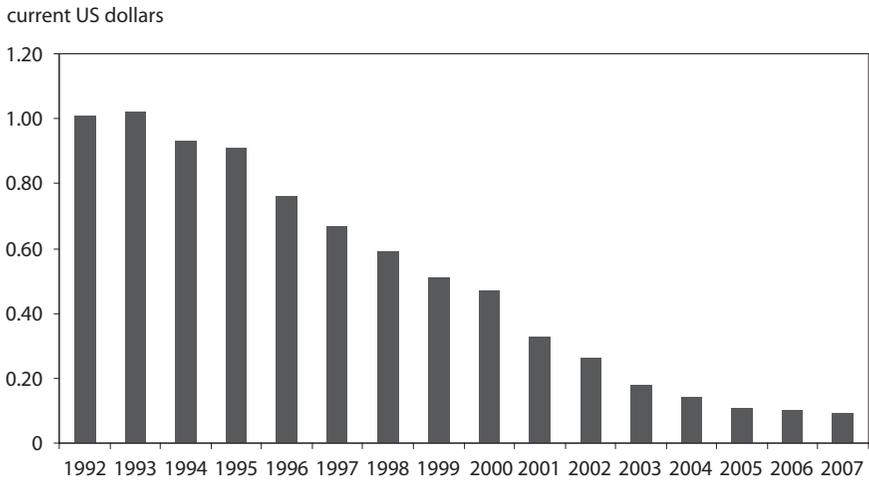
Source: Bureau of Labor Statistics, [www.bls.gov](http://www.bls.gov).

IT hardware costs have also fallen dramatically. As figure 1.8, from Mann and Kirkegaard (2006), illustrates, both personal computers and semiconductor memory chips have decreased significantly in price since 1992. These falling prices have led to broader adoption of IT hardware across the US economy and around the world. As this hardware becomes ever cheaper, it becomes easier and cheaper to digitize and store ever-greater quantities of information—information that can then be exported.

A closely related technological development that has influenced the tradability of services is increasing access to the internet. Table 1.5 shows the significant increase over the past decade in the number of people around the world who can access the internet. Internet penetration in developed economies is already quite high, and it is growing rapidly in developing countries as well. Caroline Freund and Diana Weinhold (2002) find that increased access to the internet increases service trade, both exports and imports, even after controlling for changes in GDP and for exchange rate movements.

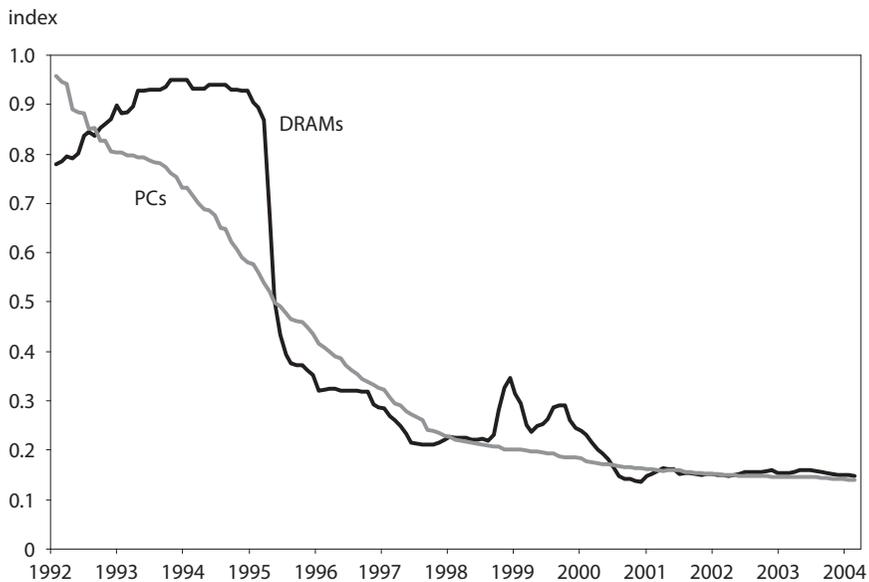
All of these technological changes, combined with the fact that the service sector now accounts for more than three-quarters of employment in many countries, create potential for increasing service trade. The next section examines the growth of trade in services that has already occurred in the United States.

**Figure 1.7 Price of a one-minute international telephone call, 1992–2007**



Source: Federal Communications Commission, International Telecommunications Data, June 2009.

**Figure 1.8 Prices of personal computers and dynamic random access memory chips (DRAMs), December 1992–February 2005**



Note: Data are Bureau of Labor Statistics price series PCU334413344131A101 (DRAMs) and PCU33411133411171 (PCs), plotted semiannually (June and December).

Source: Mann and Kirkegaard (2006).

**Table 1.5 Internet usage by world region, 2009**

<b>Region</b>	<b>Thousands of internet users</b>	<b>Internet penetration</b> (users as percent of total population)	<b>Growth in internet users, 2000–09</b> (percent)
Africa	54,172	6	1,100
Asia	657,171	17	475
Europe	393,373	49	274
Middle East	45,861	23	1,296
North America	251,290	74	133
Latin America and Caribbean	173,619	30	861
Australia/Oceania	20,783	60	173
World	1,596,270	24	342

Source: Internet World Stats, [www.internetworldstats.com](http://www.internetworldstats.com). Copyright © 2000–2010, Miniwatts Marketing Group. All rights reserved worldwide.

## Growth in Service Trade

Figure 1.9 shows that US service trade increased steadily over the decade ending in 2007. Both service exports and service imports roughly doubled, with exports growing slightly faster in the last few years of the period. Service exports now account for almost 30 percent of US exports; service imports account for about 15 percent of US imports. Their sum, total service trade, now accounts for slightly over 20 percent of US trade.<sup>9</sup> The figure also shows that the United States has consistently maintained a positive trade balance in services, with service exports exceeding service imports. This suggests that the United States has comparative advantage in tradable services.

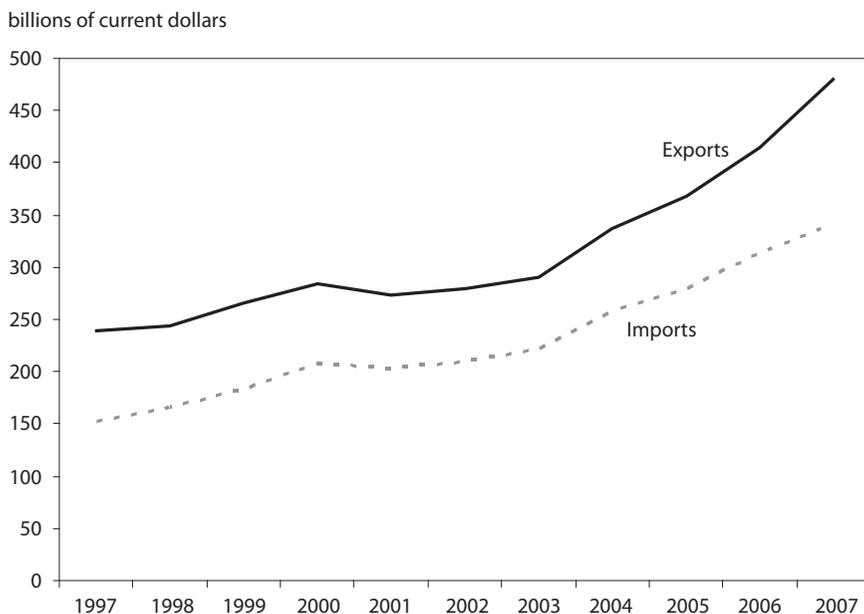
## Composition of US Service Exports and Imports

Which industries are contributing to the growth in service trade, and which services are being traded? The Bureau of Economic Analysis (BEA) divides private services into five main groups: travel, passenger fares, other transportation, royalties and license fees, and “other private services” (OPS), a catchall category that includes education, financial services, insurance services, telecommunications, and business, professional, and technical services. This book focuses on OPS for two reasons: It is an important contributor to overall growth in service trade, and it is the area that raises most concern regarding

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9. Lipsey (2009) reports that services’ share of total trade has been roughly 20 to 30 percent for decades. Service trade is growing rapidly, but so is merchandise trade, so that the share of service trade in total trade is not changing. What is changing, however, is the composition of service trade.

**Figure 1.9 US service trade, 1997–2007**



Source: Bureau of Economic Analysis, [www.bea.gov](http://www.bea.gov).

the impact of trade in services. Such concern seems to focus on sectors like engineering and computer services, not travel and tourism.

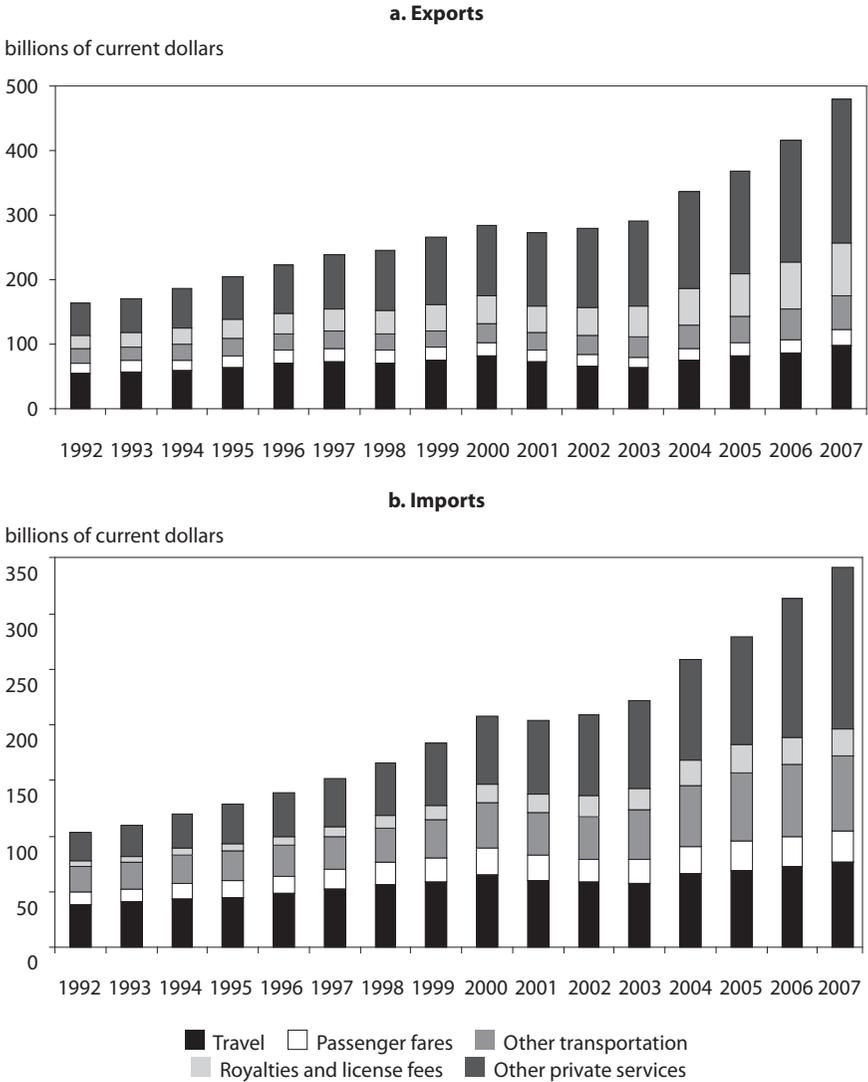
Figure 1.10 shows the composition of US service exports and imports by the BEA’s categorization from 1992 to 2007. Although all of the categories show growth over the period, OPS grew the fastest, with both imports and exports more than doubling. OPS also contributed the most to overall service growth, accounting for more than half of the increase in service exports and about half of the increase in service imports.

Import and export data for the components of OPS are available only starting in 1997; these data are shown in figure 1.11. Business, professional, and technical services (BPTS) is the largest of these at the end of the period and contributed the most to OPS growth over the period, for both imports and exports. Financial services and insurance services also enjoyed significant growth over the period, and indeed both grew faster than BPTS, but neither contributed as much to total growth in OPS as did BPTS.<sup>10</sup>

Together, BPTS, financial services, and insurance services account for a significant share of service sector growth over the past 15 years.

10. Financial services and insurance services both present even greater measurement challenges than other types of services. See Borga (2009) for more information on how the BEA constructs estimates of insurance and financial services trade.

**Figure 1.10 Composition of US service trade, 1992–2007**

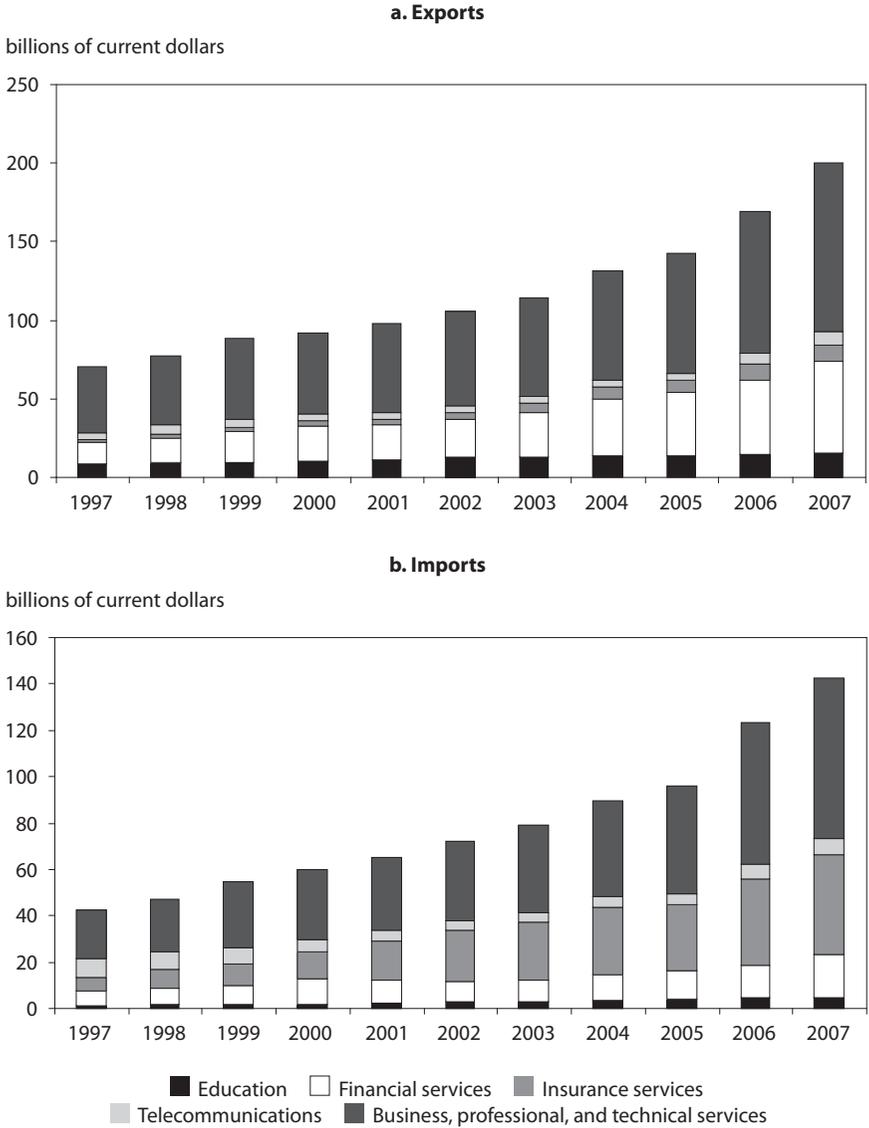


Source: Bureau of Economic Analysis, [www.bea.gov](http://www.bea.gov).

### Shortcomings of Service-Sector Data

While the aggregate data on trade in services used in previous sections are instructive, to truly understand the potential impact of trade in services on the US economy requires significantly more detailed data for a longer period of time. To understand how increased trade in services has affected and is likely

**Figure 1.11 Composition of US “Other Private Services” trade, 1997–2007**



Source: Bureau of Economic Analysis, [www.bea.gov](http://www.bea.gov).

to affect the US economy requires both more detailed information on trade flows than is currently available and the ability to link it to detailed information on domestic producers.

For example, to understand how increased trade in services might affect the US economy, international trade theory and previous empirical work in the manufacturing sector stress some key information needs:

- prevalence of trade in services (how many activities?), scale (how much is being traded?), and direction (who is trading with whom?) of trade in services;
- how trade in services has evolved over time;
- intensities of the factors used in service provision; and
- factor intensity differences across locations.

As discussed in chapter 4, this type of data is available for the manufacturing sector, and the research community has learned a great deal about how trade affects the manufacturing sector.

Unfortunately, currently available data do not provide anywhere near detailed enough data on trade in services or enough historical data to adequately examine the potential impact of trade in services. Appendix A briefly describes the significant challenges researchers face in trying to analyze the potential impact of trade in services and provides some suggestions for improvement. As an example of the issues, a comparison between merchandise trade data and service trade data is instructive. Currently, data on exports and imports of over 8,000 product categories are published monthly for goods trade of most countries. In contrast, only recently have about 30 categories of service trade become available for a far more limited set of countries (see table A.1 in appendix A). The next chapter introduces a methodology to construct data to overcome existing inadequacies; subsequent chapters use these data to examine the potential impact of trade in services on the US economy.

## Summary

The service sector is large and growing. Business services, a focus of this book, employ more than twice as many people as the manufacturing sector and are growing while the manufacturing sector is shrinking. Business service jobs are good jobs: Average wages in business services are more than 20 percent higher than average wages in manufacturing.

Trade in services is also growing rapidly. Service exports account for almost 30 percent of US exports. The category of service trade (“other private services”) that has contributed the most to service export growth consists of the types of services produced by business service firms.

To understand the implications of increased service trade for the US economy, higher resolution is needed about which activities are being traded and, perhaps more important, which activities could be traded. The next chapter develops a methodology to identify at a very detailed level which service activities are being traded within the United States and thus are, at least in principle, tradable internationally. Subsequent chapters utilize this methodology and examine tradable service activities and the implications of increased trade in services in more detail.