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Measuring International Trade in Services

Robert E. Lipsey

1.1 Introduction

Most of the literature on international trade that has accumulated over the last 300 years has dealt with trade in goods, and almost every country has had in place for many years a system of collecting information on such trade. In the mercantilist era, a surplus of exports over imports of goods was sought as a way of acquiring gold, and imports of goods were carefully watched and counted as a source of tax revenue. As a result, there has been an apparatus in place for measuring the inflow and outflow of goods in every country for centuries, based on counting and appraising the value of goods as they crossed the country's borders. Trade in goods among regions of a country is often studied by trying to approximate the movement of goods across regional, provincial, or state borders. Only recently, with the establishment of the single market in the European Union, have some major trading countries moved away from the traditional reliance on customs declarations at borders and been forced to invent other ways of measuring trade in goods (OECD 2001, 3).

The collection of data on trade in goods is governed by recommendations set forth in United Nations (2004), which interprets, for compilers of trade data, the methodological guidelines adopted by the United Nations

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Statistical Commission. One of the principal recommendations is that countries use ". . . crossing the border rather than change of ownership as the basic principle for compilation of trade statistics . . ." (p. 5). The geographical basis of the data is emphasized by the recommendation that the data should "record all goods which add to or subtract from the stock of natural resources of a country by entering (imports) or leaving (exports) its economic territory" (p. 74), and by the definition of the partner in terms of the "statistical territory of each country" (p. 75) or, when free zones are involved, the economic territory if the reporting country uses "the strict version of the special system of trade." The definitions are all based on geography rather than ownership.

The measurement of trade in goods for the balance of payments has a different objective. That is the measurement of changes in the ownership of goods between residents and nonresidents of a country. Because the great majority of such changes in ownership take place in connection with the physical movement of the goods, the measures are quantitatively close, and the balance of payments measures are mainly dependent on the data for the physical movement of goods and also very close to them. However, since imports are reported on a cost, insurance, and freight (c.i.f.) basis in the goods trade data, and the balance of payments concept separates freight and insurance costs from the value of the physical commodities, one adjustment that is required is to peel off those costs and, if they are purchased from foreigners, transfer them to the trade in services account.

Most of the differences between trade statistics and balance-of-payments measures for trade in goods involve the dependence of the balance of payments accounts on change of ownership rather than physical movement. Thus, the trade statistics include, and the balance of payments data exclude, goods purchased by travelers and brought home; while there is a change in location, there is no change of ownership. Trade data include, but balance of payments figures exclude, exports transferred under U.S. military agency sales contracts. Other adjustments involve, for example, timing in terms of change of ownership rather than terms of the change in the location of goods.

In contrast to exports and imports of goods, exports and imports of services do not have alternative measurements based on either physical movements or ownership. Exports and imports of services exist only in the balance of payments universe. As is observed in United Nations (2002a) and similarly in the Organization for Economic Cooperation and Development (OECD 2001), "measurement of trade in services is inherently more difficult than measurement of trade in goods.[. . .] Unlike trade in goods, for trade in services there is no package crossing the customs frontier with an internationally recognized commodity code, a description of the contents, information on quantity, origin, and destination, an invoice and an ad-

ministrative system based on customs duty collection, that is practiced at assembling these data" (p. 5). The difference is more than a question of documentation. Exports or imports of services often involve no crossing of an international boundary by the service, but only a crossing of a border by the consumer of the service. Some exports or imports of services are geographically domestic transactions made international solely by a difference in country of residence between the buyer and the seller of the service. It is a balance of payments concept more than a physical trade concept, and the definition of residence plays a crucial part in defining what trade in services is.

United Nations (2002a), following the precedent of the General Agreement on Trade in Services (GATS), broadens its concept of international trade in services beyond the balance of payments definition. The broadening adds to the balance of payments definition, the supply of services through GATS mode 3 and part of GATS mode 4. The GATS mode 3 is the supply of services ". . . by a service supplier of one [WTO] Member through commercial presence in the territory of any other Member . . ." (p. 11). The GATS mode 4, some of which is included in the balance of payments, is the supply of a service ". . . by a service supplier of one [WTO] Member through presence of natural persons of a Member in the territory of any other Member . . ." (p. 11).

Because data on foreign affiliate provision of services are very limited in most countries and there is no suggestion of a similar expansion of the concept of trade in goods in United Nations (2004), the comparisons to trade in goods here are confined to the conventional balance of payments definition, including in service trade only exports and imports of services.

The chapter begins with a discussion of the size of exports and imports of services, and their composition, by type of service. It continues with an attempt to judge how fast the growth in service exports and imports has been, relative to trade in goods and to the production of services. The next topic is the problems that arise from the lack of any accounting for flows of human capital. The final topic is the problems in the measurement of service exports and imports caused by the ambiguities in defining the location of service production, particularly service production based on intangible and financial assets. If the location of production is ambiguous, the distinction between home production and imports of services is correspondingly ambiguous, as is the distinction between home consumption and exports. These ambiguities then infect measures of the current balance and of domestic production. The measurement difficulties are exacerbated by the deliberate manipulation of the apparent location of production; for the avoidance or reduction of corporate taxes by appearing to move production to low-tax locations. The chapter ends with suggestions for measurements of service trade that would reduce some of these ambiguities.

1.2 The Size and Growth of World Exports and Imports of Services

Exports and imports of services have been something of an orphan in international measurement of trade. The report on *The Network of World Trade,* mostly by Folke Hilgerdt (League of Nations 1942) hardly mentioned exports and imports of services, except to suggest that exports and imports probably offset each other for most countries. Interest in service trade has grown recently, especially since services became part of international trade negotiations, but it is hard to say just how large these exports and imports of services are because the completeness of reporting varies greatly across countries. Some countries publish data that cover only limited types of services.

Some important participants in trade in financial services, such as Bermuda and the Cayman Islands, did not report to the International Monetary Fund (IMF) at all for many years. Bermuda announced (Bermuda 2006) that it was bringing its reporting into substantial compliance with IMF standards, and data on that basis are now available on the Bermuda Department of Statistics website, beginning with 2006. Bermuda omits from its balance of payments transactions on the income account of what it calls "exempted companies." These are firms whose business is outside Bermuda, and are not permitted to do business in Bermuda except by special license. Their contribution to Bermuda's gross national product is based only on expenditure in Bermuda. Because they are considered nonresident companies, their income is omitted from Bermuda's national accounts, including the balance of payments. However, the sales of services by these companies outside Bermuda are counted as imports from Bermuda by the countries purchasing them, although Bermuda does not consider them exports. Other offshore financial centers, such as the Cayman Islands, remain nonreporters to the IMF.

Many countries that report to the IMF do not report service exports and imports. Those that do reported exports of $US 2,487 billion and imports of $US 2,371 billion in 2005 (table 1A.1). Of these countries, the 150 that reported both goods and services exports and imports reported exports of services that were 25.4 percent of exports of goods, and imports of services that were 24.1 percent of imports of goods (table 1A.1), close to one quarter.

It is hard to judge how fast exports and imports of services have been growing because the number of countries measuring them has increased, and the number of categories covered by surveys and reporting has been growing over time, but to inconsistent degrees in different countries. For twenty-two countries that have reported service exports and imports to the IMF since 1972, and accounted for close to half of "world" exports of services in 2005, the reported ratio of service exports to goods exports grew from 21 to 28 percent between 1972–76 and 2002–6. The corresponding

Table 1.1 **Service exports and imports as percent of goods exports and imports**

	22 Countries[a]		30 Countries[b]	
Year	Credit	Debit	Credit	Debit
1972–1976	21.02	23.94	n.a.	n.a.
1977–1981	20.93	24.26	21.93	24.69
1982–1986	23.92	25.19	23.33	25.52
1987–1991	25.36	25.23	24.66	26.87
1992–1996	27.20	26.05	26.01	28.00
1997–2001	27.56	25.00	26.22	26.29
2002–2006	28.40	24.77	27.65	25.78

Source: Appendix table 1A.1.

Note: n.a. = not available.

[a] The 22 countries include Australia, Austria, Barbados, Canada, Colombia, Dominican Rep., Germany, Haiti, Israel, Italy, Jordan, Malta, Netherlands, New Zealand, Romania, Saudi Arabia, Singapore, South Africa, Sweden, United Kingdom, United States, and Venezuela.

[b] The 30 countries include the 22 countries, plus Argentina, Belgium-Luxembourg, Brazil, Denmark, Finland, France, India, and Japan.

ratio for imports barely changed, staying at 24 to 25 percent over that same period (table 1.1). For a larger group of thirty countries that have reported service exports and imports since 1977, and accounted for two thirds of "world" service exports in 2005, the ratio of service exports to goods exports grew from about 22 to 28 percent between 1977–81 and 2002–6. The ratio for imports grew from 24 to 25 percent to a peak of 28 percent in 1992 through 1996, and has since settled back to around 26 percent. Thus, there is some indication of an upward trend in the reported ratio of service to goods exports and imports since the 1970s.

Many countries are dropped from the recent IMF Balance of Payments CDs for years before 1972, presumably because the definitions and measures of service exports and imports did not match the current definitions. However, it is possible to put together series extending back to 1961 for twenty-four of the larger countries from earlier IMF data (IMF 1991). These show a decline from 27 to 25 percent on the export side and 32 to 28 percent on the import side. The extension suggests, if anything, a somewhat smaller increase in the ratio on the export side and a larger decline on the import side, but no very large changes over more than forty years.

A further indication of the trend in the world importance of service exports and imports can be gleaned from estimates for 1950 to 1954, purportedly covering the whole world (Woolley 1966, table 3). The ratios quoted here exclude investment income, treated as service trade in the source). On the export side, they show service exports 21.6 percent of goods exports, below the 1961 ratio, but almost the same as the average ratio for the first five years, starting in 1972, in table 1.1. On the import side,

the estimated ratio in 1950 to 1954 is over 24 percent, again below the 1961 ratio, but almost exactly the average of 1972 to 1976 in table 1.1. Thus, there is little indication of a strong trend in the ratio in the last fifty years if we assume that the adjustments made to the data for the earlier period by Woolley had been adopted in the official data by 1972, or at least by 2002. However, if the same omissions in the official services data remain, and they are equally important in the later period, some long-term rise in the service/goods export and import trade ratios is implied.

For the more distant past, before 1950, the picture is even dimmer. Viner (1924) claimed that Argentina was the only country for which ". . . comprehensive statistics of export and import services are officially collected and published . . ." but that the British Board of Trade "had recently begun the collection of similar statistics . . ." (p. 63, fn 1). He did report, for freight costs alone, ratios from several sources of freight charges to world imports of goods, derived by what he referred to as "Hobson's method," based on the world excess of reported imports over reported exports. This ratio fluctuated mainly between 6 and 9 percent from 1901 through 1912, but with no obvious trend.

One reason for being suspicious about the apparent rising trend in service trade relative to goods trade is that not only has the number of countries reporting service trade to the IMF risen over the last fifty years, and even the last thirty years, but among those reporting, the number reporting particular types of service trade has increased even more. While the number of countries reporting total service exports to the IMF has not changed greatly from 1985 to 2005, the number reporting exports of, for example, construction services, rose from seven to 88; financial services, ten to 105; computer and information services, one to 100; and personal, cultural, and recreational services, four to 91 (table 1.2). In some cases, the services may not have existed in the particular countries, or may not have been exported at all. In other cases, they might have been reported under "other business services." Neither of these reasons would imply any bias in the overall ratios. However, it seems more likely that at least some of these services were traded, but no device was in place for collection of data on them, in which case the increasing numbers of reporters would imply upward bias in the measured ratios of service exports and imports to goods trade.

The same information for imports of services is provided in table 1.3. In most cases, collection and reporting of data on particular imports and exports moved together, but there were exceptions. Reports of freight imports increased faster than those on freight exports, and the same was true for reports on insurance imports and construction imports. In general, however, types of services poorly reported in import records were the same as those poorly reported in export records, and the biases are probably similar on the two sides of the account.

Table 1.2 **Number of countries reporting trade in various services from the export side**

	1975	1985	1995	2005
Total services	61	146	157	150
Transportation	60	137	153	146
Passenger	39	99	111	117
Freight	49	111	111	119
Other transportation	55	113	116	118
Travel	60	138	151	147
Government services, n.i.e.	56	119	139	138
Other services				
Communications	8	19	94	127
Construction	3	7	54	88
Insurance	44	100	117	130
Financial	2	10	61	105
Computer and information	0	1	43	100
Royalties and license fees	19	35	66	91
Other business services	60	139	145	136
Personal, cultural, and recreational	3	4	43	91

Source: IMF (2007)

Table 1.3 **Number of countries reporting trade in various services from the import side**

	1975	1985	1995	2005
Total services	62	146	157	150
Transportation	62	145	155	148
Passenger	44	102	115	123
Freight	61	145	136	133
Other transportation	51	106	113	109
Travel	60	140	154	147
Government services, n.i.e.	57	125	143	143
Other services				
Communications	9	21	92	126
Construction	4	6	64	102
Insurance	57	139	142	141
Financial	3	10	69	113
Computer and information	0	2	47	111
Royalties and license fees	26	55	85	120
Other business services	60	141	154	143
Personal, cultural, and recreational	6	10	53	99

Source: IMF (2007)

Reported imports of services were about 10 percent larger than reported exports in 1950 to 1954 (Woolley 1966, table 3). The same was true among twenty-two countries until the 1990s, sometimes by 10 percent or more, but the totals have been much closer in size since then. That same trend is shown in the data for thirty countries since 1977, with the latest figures showing exports and imports almost equal in size (table 1A.1). Either comparative advantages in service production have shifted toward these groups of twenty-two and thirty countries or there have been more improvements in measuring service exports than in measuring service imports.

If there has not been any strong trend in world service exports and imports relative to world goods trade over the last half century, as is suggested by these estimates, the growth of service exports and imports has outpaced the growth of world GDP, since the ratio of goods trade to GDP has risen substantially. The world ratio of goods exports to GDP was under 10 percent in 1960 and 1970 but had risen to more than 20 percent by 2000 to 2006 (table 1.4). World production appears to have moved from goods-producing industries (half the total in 1960, but less than a third in 2000 to 2006) to service-producing industries (table 1.5); one might have expected a corresponding shift in the composition of exports and imports from goods to services. The absence of any obvious shift in that direction implies that the growth of exports and imports relative to output has been slower in services than in goods.

The rough stability in the ratio of service exports and imports to goods exports and imports may reflect the fact that we are comparing nominal rather than deflated or real values of the two types of trade. If prices of traded services have fallen relative to prices of traded goods, the stability of the nominal ratio may conceal a more rapid growth in real service exports and imports. If relative prices of traded services have risen, on the other hand, the stability of the services/goods trade ratio would imply a decline in the importance of service trade in real terms. That question is dis-

Table 1.4 **World exports of goods as percent of world GDP**

Year	World GDP ($US billions)	Exports of goods ($US billions)	Percent (%)
1960[a]	1,504	130	8.6
1970[a]	3,275	317	9.7
1970	3,402	312	9.2
1970–1979	6,250	847	13.6
1980–1989	14,584	2,230	15.3
1990–1999	27,282	4,620	16.9
2000–2006	38,213	8,353	21.9

Sources: GDP: UN (1993b); IMF World Economic Outlook Database (2007). Exports: 1960–1984: GATT (1985); 1985–1990: GATT (1994); 1991–2006: WTO (2007).

[a]Estimates from UN(1993b).

Table 1.5 **World goods and service output as percent of world GDP**

Year	Goods[a]	Services
1960[b]	49.6	50.4
1970[b]	50.9	49.1
1970	48.4	51.6
1970–1979	47.5	52.5
1980–1989	42.6	57.4
1990–1999	35.3	64.7
2000–2006	32.0	68.0

Sources: UN (1993b); UN National Accounts Main Aggregates Database, downloaded on Dec. 19, 2007.

[a]Construction is classified as goods.

[b]Data are from UN (1993b).

cussed more fully following, in connection with U.S. trade, for which we have slightly more data. However, for the world as a whole, it should not be assumed that the rise in service prices relative to goods prices typically found in domestic price comparisons applies to prices of internationally traded services. Domestic prices of services are heavily weighted with labor-intensive services, but the composition of internationally traded services may be very different. For example, the commodity market integration that took place in the nineteenth century and continued in the twentieth has been associated with, among other determinants, ". . . changes in the technologies of communication, transaction, and transport," according to a recent study (Jacks 2006, 405). These are not the predominant components of domestic service price indexes. The same study also suggested that trade costs were ". . . more responsive to changes in monetary regimes and commercial policy than changes in the underlying technology of transport" (p. 405), even further removed from the elements of domestic service price indexes.

A rough idea of the composition of world service trade and changes in composition over the last twenty years, as reported by the IMF, is given by table 1.6. The three major elements are "transportation," "travel," and "other business services." The major change in composition that is visible in both exports and imports is the decline in importance of "Freight" and "Other transportation," reduced by about one third. Some of this reduction may be an effect of containerization and other productivity improvements, but some may be an artifact of the improvement in the reporting of "Other services" that can be seen in tables 1.2 and 1.3. The share of passenger transportation held up better than that of goods transportation. There was also a large decline in the importance of "Government services, n.i.e.," which include ". . . services (such as expenditures of embassies and consulates) associated with government sectors or international and regional organizations and not classified other items" (IMF 2004, xxvi).

Table 1.6 **The composition of world service trade, 1985 and 2005 (%)**

	Exports		Imports	
	1985	2005	1985	2005
Total services	100	100	100	100
Transportation[a]	27	21	31	26
Passenger	5	4	4	5
Freight	13	9	19	14
Other transportation	8	5	8	5
Travel	28	27	23	26
Government services, n.i.e.	7	3	9	3
Other services[b]	39	50	37	45
Communications	1	2	1	2
Construction	2	2	1	2
Insurance	2	2	3	4
Financial	2	6	1	3
Computer and information	0	4	0	2
Royalties and license fees	3	5	2	6
Other business service	25	24	21	22
Personal, Cultural, and Recreational	0	1	0	1

Sources: IMF (2007); Republic of China (Taiwan) (1987).

[a]The imports and exports of component services under "Transportation" do not add up to the imports and exports of "Transportation", presumably because not all countries report the components.

[b]The imports and exports of "Other services" are calculated by subtracting the imports and exports of transportation, travel, and government services from total services. The "Other services" total includes Taiwan, but the breakdown does not.

The composition of reported imports is considerably different from that of reported exports. The direction and size of the discrepancies between reported export and reported import totals vary across service categories, probably because reporting by developed countries is more complete than that by developing countries. Thus, reported imports of freight transportation are larger than reported exports, probably because imports of freight transportation services are mainly by developed countries, and the exports, at least nominally, from developing countries.

On the other hand, for "Financial" and "Computer and Information" services, reported exports are larger than reported imports, presumably because these are mainly export items for developed countries. "Insurance" services are an exception among business services in that reported exports are smaller than reported imports. One reason may be that exports are, relative to country size, disproportionately concentrated in Bermuda, which did not report to the IMF at all. That situation may not change much because Bermuda treats some international operations as outside its economy and excludes such transactions from its reported national income and

product accounts and trade data, while the importing countries will report importing these services from Bermuda (Bermuda 2006).

Over twenty years, the main trend in the direction of service export and import flows is that the share of industrial countries in exports has declined, while their share of service imports has risen. The share in imports of the Euro area rose, and that accounted for most of the increase in industrial country imports.

1.3 The Size and Growth of U.S. Trade in Services

The United States has been a leader in measuring service trade, perhaps because it offers a more cheerful picture of the U.S. international position than the goods trade account. In 2006, the United States reported a surplus of exports over imports in service trade of $US 88 billion, in contrast to a deficit in goods trade of $US 850 billion (U.S. Department of Commerce, Bureau of Economic Analysis [henceforth, BEA] 2007).

Services have recently been much larger relative to goods in U.S. exports (over 40 percent) than in U.S. imports (a little under 20 percent), presumably reflecting U.S. comparative advantage in service industries (fig. 1.1). Service exports were about 60 percent as large as service imports during the 1930s, became larger than imports during World War II, fell back to half in the early 1950s, and then began to grow faster. By the early 1970s service exports began to surpass imports and have done so ever since.

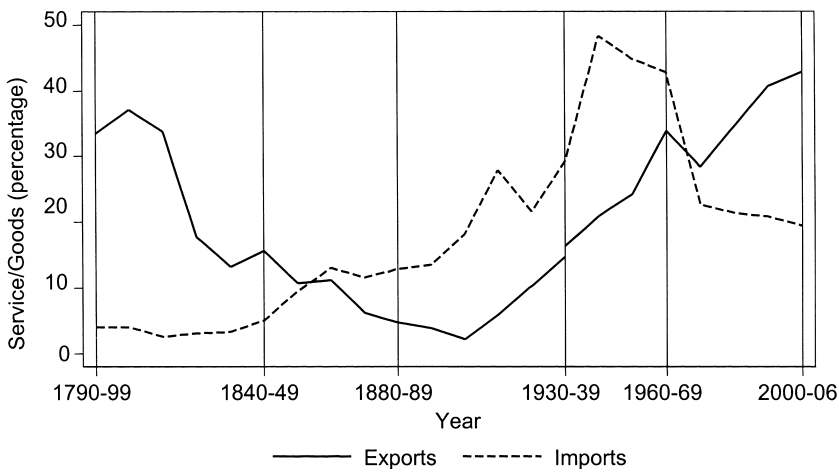

Fig. 1.1 U.S. exports and imports of services as percent of U.S. exports and imports of goods, current dollars, by decades: 1790–1999 and average of 2000–2006
Source: Table 1A.2

However, in the last five years, service import growth has outpaced service export growth (table 1A.2).

The large current importance of services relative to goods in U.S. exports is not unprecedented. In the first thirty years of balance of payments records, 1790 to 1819, U.S. service exports averaged about a third of goods exports. Two of the early periods shown in figure 1.1, 1800 to 1809 and 1810 to 1819, were affected by the Napoleonic Wars and the accompanying blockades and embargos, as Marshall Reinsdorf reminded me in a personal communication. It is not obvious how these would have affected the values of service exports and imports associated with trade, as compared with the value of trade itself, given the impacts on prices as well as quantities of trade and services, as discussed in several recent articles (e.g., O'Rourke 2006).

After the 1820s, the importance of service exports relative to goods exports trended downward, reaching a level of only 2 percent of exports of goods in the early 1900s. Then service exports began a long rise in importance, leading to the current high levels (fig. 1.1).

Services were more important in U.S. exports than in U.S. imports in the early days of the United States, usually more than twice as important through the 1840s. After the Civil War, the relation was reversed, and services were generally much more important in imports than in exports in the latter half of the nineteenth century and through the 1960s, reaching well over 40 percent of goods imports during the years when goods imports were affected by World War II and the postwar recovery. As goods imports grew rapidly starting in the 1970s, the ratio of service to goods imports receded to around 20 percent, where it has remained since the 1970s (fig. 1.1).

Services have often been treated as nontradables, and they are, in fact, less traded than goods, relative to their output. That is, exports and imports of services have been much smaller relative to the U.S. domestic output of services, than exports and imports of goods, relative to the U.S. domestic production of goods, at least since 1869. Aside from World War II, service exports were almost always less than 2 percent of domestic service output until the 1960s, according to contemporary estimates (later revised to almost 3 percent for the 1960s). Since then, they have grown to usually about 5 percent of service output. Goods exports have generally been much larger relative to goods output during the same period, often 10 to 14 percent before World War I, falling back to 7 or 8 percent from 1929 through the 1960s and then rising, to above 20 percent in most of the last decade (fig. 1.2). Service imports in current dollars were over 3 percent of U.S. domestic service output during the 1960s, and reached over 4 percent of U.S. service output in recent years. Goods imports were 10 percent of domestic goods output in most of the late nineteenth century, ranged from 5 to 8 percent of goods output most years from then through the 1960s, and

Fig. 1.2 U.S. exports of goods and services as percent of U.S. domestic output of goods and services, current dollars, by decades: 1869–1999 and average of 2000–2006

Source: Tables 1A.3 and 1A.4.

then soared, to reach 35 to 40 percent of domestic goods production since 2000 (fig. 1.3).

The relation of service to goods exports and imports and the different movements of trade/output ratios in the two sectors may reflect differences in price movements. As David Richardson pointed out in his comments at the conference, the official data on implicit prices underlying GDP and those for exports both show prices of services rising relative to those for goods. For example, between 1929 and 2006, domestic prices for services rose by over three times as much as domestic prices of goods, and export prices of services rose almost two-and-a-half times as fast as export prices of goods (table 1A.8). If we accept these price estimates, they present a very different picture of the relation of service to goods exports and imports from that in the nominal data, in some respects. In particular, they show the ratio of services to goods in U.S. exports fairly stable from the 1960s through the early 1990s, and then declining, instead of rising sharply through the 1970s and the 1980s. And they show the ratio in U.S. imports to have fallen throughout the 1990s, instead of being stable (fig. 1.4).

The translation from nominal to real, or constant dollar, terms makes much less difference to the comparisons of exports and imports to output in goods and services than to the comparison of services to goods exports and imports (figs. 1.5 and 1.6). The reason is that the reported disparity in price movements between goods and services in trade is very similar to that in domestic production.

Fig. 1.3 U.S. imports of goods and services as percent of U.S. domestic output of goods and services, current dollars, by decades: 1869–1999 and average of 2000–2006

Source: Tables 1A.3 and 1A.4.

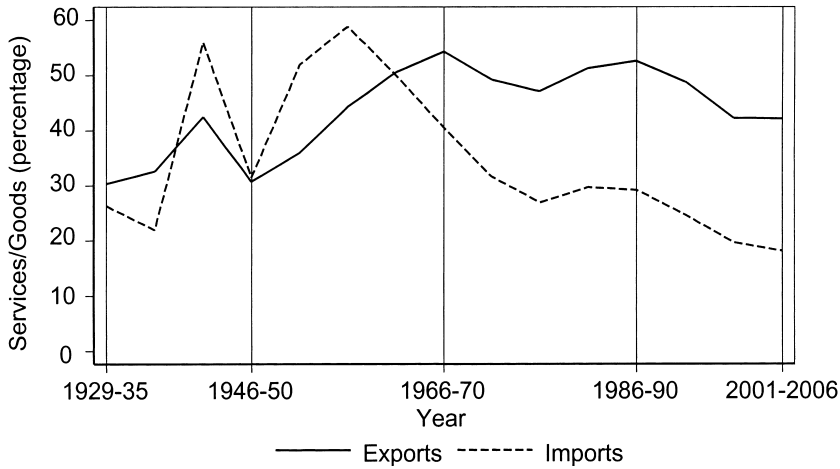

Fig. 1.4 U.S. exports and imports of services as percent of U.S. exports and imports of goods in 2000 prices

Source: Table 1A.5.

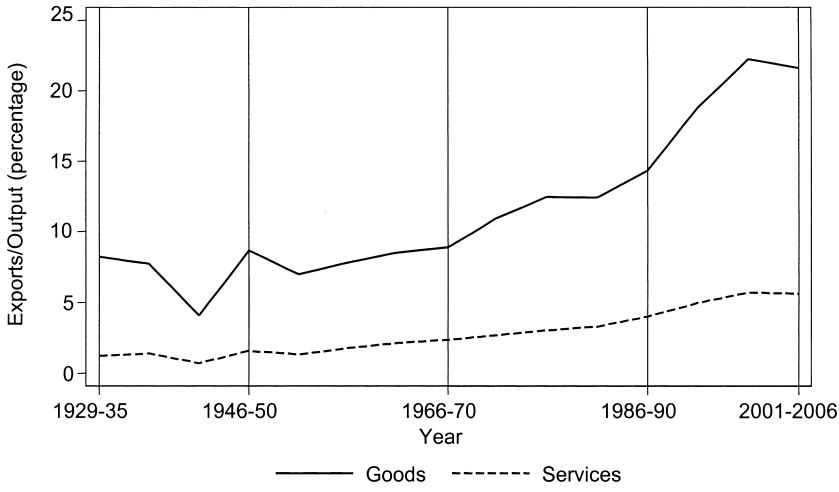

Fig. 1.5 U.S. exports as percent of U.S. domestic output of goods and services in 2000 prices

Source: Tables 1A.6 and 1A.7.

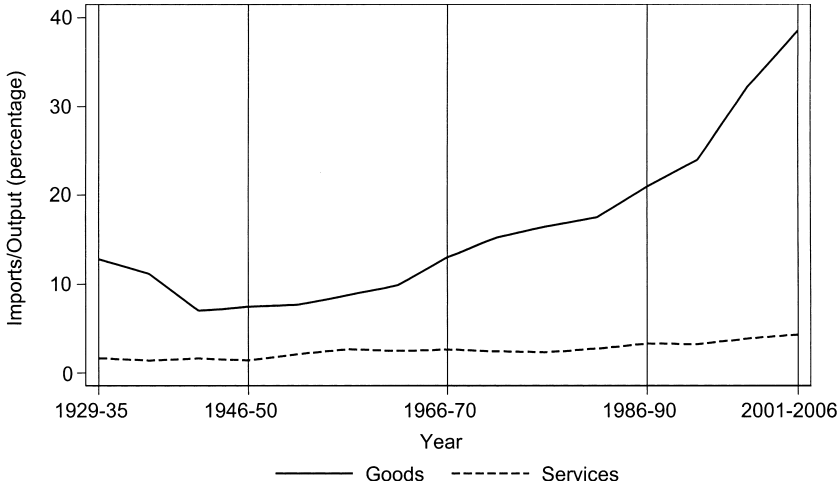

Fig. 1.6 U.S. imports as percent of U.S. domestic output of goods and services in 2000 prices

Source: Tables 1A.6 and 1A.7.

One problem with all of these comparisons in constant dollars, or in real terms, is that price measurement in the service sector, and corresponding quantity measurement, are the weakest parts of the national accounts. Two volumes of the Conference on Research in Income and Wealth (CRIW) series, Griliches (1992) and Cutler and Berndt (2001), devoted a great deal of attention to the problems of measurement of prices and output in this sector. It is hard to have much confidence in the existing measures. The problems for trade in services are worse than for domestic production, because the collection of prices for service trade is at a very early stage, as indicated in the paper by Khatchadourian and Wiesner (2006). They mention that the BLS International Price Program has collected service price indexes that cover ". . . approximately 8 percent of export service trade and 23 percent of import services trade" (p. 2). In the absence of extensive price collection, the BEA has used various crude proxies, described for earlier years in United States, BEA (1987). For freight transportation, values were extrapolated by tonnage, implying that value per ton measured price movements, and for fees and royalties and other private services, the implicit price deflator for GDP was used.

The long-term history of costs of freight transportation, one of the largest segments of international services trade (about one third of all service trade in 1950 to 1954, according to Woolley [1966]) suggests that they were falling relative to prices of goods in general. The evidence includes convergence of prices between origin and destination countries and calculations of freight rates themselves, documented in papers by many authors, some of which are discussed and summarized in Mohammed and Williamson (2004). For other major parts of international service trade, such as communication and business services, it is difficult to find price records. However, they do not seem likely candidates for large increases in price relative to goods; communication costs were almost certainly falling.

The ratios of trade to output, particularly for goods, exaggerate the importance of trade somewhat, because while the production figures are output net of purchases from other industries, export and import figures are gross of such purchases. Because such purchases are more important in goods industries than in service industries, the exaggeration of the importance of trade is greater for goods than for services.

Estimates of U.S. service trade are still a work in progress. A report by the Office of Technology Assessment (OTA) estimated that exports of services, excluding banking services, were about 60 percent higher than "Official U.S. Government figures" in 1983 and 1984, and that imports of services were 40 to 50 percent higher in those years (U.S. Congress, Office of Technology Assessment 1986, table 1). The latest official BEA calculations of service exports and imports are quite close to the OTA estimates for those years, but somewhat larger for 1984 (Sauers and Pierce 2005, table 1).

The path to the revised, and much higher, estimates of trade in services

was described in the appendix to Whichard and Borga (2002). That path began with new legislation in 1984 that permitted BEA to conduct surveys of trade in services. The first benchmark survey was carried out for 1986, and annual follow-up surveys began in 1987. Also in that year, medical service exports were estimated for the first time and primary insurance services were added to previous estimates of reinsurance transactions. Estimates of expenditures by foreign students in the United States and U.S. students abroad started in 1989. In 1990, services were redefined to exclude investment income. In 1992, trade in services between U.S. and foreign parents and their affiliates was placed on a gross, instead of a net, basis (increasing both exports and imports of services), coverage of transportation services was increased, and some new services were added to the 1991 benchmark. Truck transportation services between the United States and Canada were added to the service trade account in 1995. In 1996, BEA began what is known as the "Benchmark Survey of Financial Services Transactions Between U.S. Financial Services Providers and Unaffiliated Foreign Persons." Since then, there have been other improvements (described in Borga and Mann [2003, 2004] and in articles in later October issues of the *Survey of Current Business*) in measures of transportation services and reclassifications of software royalties and license fees, leasing of transportation equipment, compensation of employees, new sources for exports of medical services, imports of travel, and various other items.

One consequence of all these improvements in data collection and expansions in the list of services covered is that historical comparisons over long periods are questionable. The earliest estimates of U.S. service exports included only shipping earnings, and later also port charges on foreign ships, and foreign tourist expenditures in the United States. The closest approximation to these items in the current accounts, travel and transportation services, accounted for only 38 percent of service exports in 2006 (Koncz and Flatness 2007, 114). The same items cover more of the current imports of services, a little over half (pp. 104, 115).

Many services in the early United States were performed by foreign companies' agents or by affiliates of foreign firms, which possessed skills not common in the United States at that time. Wilkins (1989) quotes a letter to Alexander Hamilton, referring to Virginia to the effect that "'the trade of this state is carried on chiefly with foreign (British) capital. Those engaged in it [the trade] hardly deserve the name of merchants, being factors, agents, and Shop-keepers of the Merchants and Manufacturers of Great Britain . . .'." Wilkins goes on to say that the passage does not reveal whether these were ". . . salaried, or partners in the British firms," in which case they might have represented imports of services into the United States, or ". . . financially independent units that acted for British houses on a purely commission basis" (p. 40), in which case they might have represented U.S. exports of services. Wilkins also reports that America's na-

tional banking legislation of 1864 to 1865 ". . . had not provided a satisfactory basis for the largest American banks to participate in foreign trade financing . . ." and that as a result, ". . . to finance much of that trade, American enterprises depended on foreign (mainly British) banking services" (p. 463). Outside of banking, Wilkins notes that ". . . in 1914, the United States had to rely on foreign-owned shipping, foreign-owned cables, and foreign-owned radio communication" (p. 524). Shipping services were recorded in the balance of payments, but not the others.

Of course, many of the services traded currently, such as telecommunications and film and television tape rentals, did not exist very long ago, but there apparently were many services that did exist and were not recorded. It is therefore difficult to be sure how much of the apparent trend in the share of service trade in total U.S. trade is genuine.

1.4 The Definition of Residence and Trade in Educational Services

The measurement of trade in more and more services places a great deal of weight on the definition of residence, because the identification of residence can change what is, on the face of it, a domestic transaction into an international transaction. One case in which the attribution of residence changes a domestic demand on a country's resources into an international demand is that of foreign students, who are treated in the U.S. accounts as residents of the country from which they come, with the result that their costs of education and living expenses become a service export of the United States. The service that is simply domestic production and consumption or investment in human capital if a student is a resident of the United States is an export of educational services if the student is classified as a foreign resident. In other countries, the criteria for defining foreign students are diverse, including citizenship, ". . . nationality, place of birth, former domicile . . .", and in some cases can include students born in the host country (Larsen, Martin, and Morris 2002, 852).

Since many students choose to stay in the host country after their education is completed, the services exported to those students' home countries never leave the host countries. The service exports are reimported when the students become host country residents, an item missed in the balance of payments. Alternatively, the exported educational services could be thought of as turning into an import of human capital by the host country, a type of import that is not recognized in the balance of payments.

The U.S. exports of educational services more than doubled in value between 1992 and 2006, reaching $14.6 billion (Koncz and Flatness 2007), but there are no comprehensive data on what proportion of these service exports in fact never leave the United States. A hint that the share staying in the United States might be important is provided by data on intentions to stay expressed by foreign recipients of science and engineering doctor-

ates in the United States. There are data on "intentions to stay," and on "definite plans to stay." Among students from countries accounting for about three quarters of such doctorates between 1985 and 1996, an intention to stay in the United States was expressed by half in 1985, rising to 70 percent in 1995 and 1996. Among degree recipients from all countries, "plans to stay" were expressed by 68 percent in 1992 to 1995, 72 percent in 1996 to 1999, and 74 percent in 2000 to 2003. A "firm plan to stay," meaning that the student had accepted a definite offer of a postdoctoral appointment or employment in the United States, was reported from 36 to 46 percent of the doctoral recipients over 1985 through 1996, and "definite plans to stay" was reported from 35 percent in 1992 to 1995, to 46 percent in 1996 to 1999, and 51 percent in 2000 to 2003 (National Science Foundation 1998b, 2006, appendix table 2-33).

The data on plans to stay do not reveal outcomes. Some indication of the fulfillment of these plans is that of about 8,000 temporary residents receiving science and engineering doctorates in 1998, over 60 percent were still in the United States in 2003 (National Science Foundation 2006, table 3-24).

Recipients of doctorates were only a small part of the 13 percent foreign-born share in R&D scientists and engineers in the United States in 1993, although the foreign-born were more important among PhDs than among those with less education. At all degree levels, about two-thirds of the foreign-born scientists and engineers employed in the United States had received their training in the United States (National Science Foundation 1998a, table 1), for the most part, probably, from U.S. exports of educational services.

If some substantial part of education exports remains in the United States, there is no clear way to recognize that fact in the current balance of payments framework. Presumably, the students' financial assets and liabilities should enter the accounts when they become residents. The estimated total was fairly small, under $1 billion in 2002, when it was noted that the average immigrant is relatively young—younger and less wealthy than the average emigrant (Bach 2003, 43–44). Students deciding to stay permanently in the United States are in the category classified by the BEA as "legal, adjusted-status immigrants" (Bach 2006, 43). The BEA apparently estimates the assets transferred by assigning to each immigrant his or her nationality, multiplied by the average income in that country, multiplied by the average ratio of wealth to income in that country (Bach 2006, 42–43).

The former students among these adjusted-status immigrants may differ substantially from the other members of that group. For one thing, they may have more debt, although that is not necessarily the case. Of over 36,000 science and engineering doctorate recipients reporting, almost three-quarters reported no undergraduate debt at the time of graduation and almost two-thirds reported no graduate debt. The average graduate

had about $6,000 in undergraduate school debt and about $11,000 in graduate school debt (National Science Foundation 2006, appendix table 2-23). These should enter the balance of payments at the time of deciding on U.S. residence.

What would be required to complete the account for this transaction, but does not exist, is some accounting for flows of human capital. The decisions of alien importers of U.S. education to settle in the United States would then be treated as an import of human capital, analogous to the standard flows of financial capital.

The impact of exports of education services may go beyond the tendency of students to stay in the countries where they receive higher education. Even if students do not stay after graduation, they may return as immigrants, carrying back the previously exported education services. One study of immigration found that student flows explained migration to the United States more consistently than ". . . traditionally highlighted economic variables. . . ." Similar relationships could be observed for migration to a cross-section of OECD countries (Dreher and Poutvaara 2005, 17).

The idea that there is a human capital flow missing from the balance of payments data was suggested a long time ago by Alfred Marshall: "England exports to India a good many able young men: they do not enter in India's list of imports; but it is claimed that they render to her services whose value exceeds that of her total payments to them. They return to England (if they come back at all) after their best strength has been spent: they are unreckoned exports from England. But that part of their incomes, which they have saved, is likely to come back sooner or later in the form of material goods which enter into her imports. On the other hand, India counts those material goods among her exports to England: but of course she makes no entry among her imports for the expensive young men who have been sent to her" (Marshall 1923, 134–35).

1.5 Tax Havens and the Measurement of Trade in Services

There is a considerable literature, some of which is summarized in Hines (2005) and in Desai, Foley, and Hines (2006), which describes the effect of low rates of host country taxation in attracting investment and economic activity by multinationals from the United States and probably even more from other countries. Some of the activity attracted is production, but much of it involves the shifting of income to avoid or reduce taxes. Hines refers to "an impressive concentration of financial activity in tax havens" (p. 78). The thirty tax havens he lists accounted in 1999 for 0.7 percent of the world's population and 2.1 percent of world GDP, but for 4.8 percent of net property, plant, and equipment of U.S. affiliates, 3.4 percent of employee compensation, and 3.7 percent of employment. These shares prob-

ably represent production taking place in the tax havens and are not of concern in connection with the measurement of their production or export of services. However, these same tax haven affiliates accounted for 15.7 percent of gross foreign assets of U.S. affiliates, 13.4 percent of sales, and ". . . a staggering 30 percent of total foreign income . . ." (p. 78). "Much of reported tax haven income consists of financial flows from other foreign affiliates that parents own indirectly through their tax haven affiliates. Clearly, American firms locate considerable financial assets in foreign tax havens, and their reported profitability in tax havens greatly exceeds any measure of their physical presence there" (p. 78). Hines goes on to suggest that firms in other countries, such as Germany and the Netherlands, which largely exempt their firms' foreign income from taxation, have even stronger incentives to locate investment and income production in tax havens (p. 79). Desai, Foley, and Hines (2003, 68) refer to this flexibility as ". . . the ability of multinational firms to adjust the reported location of their taxable profits." While this literature refers to American firms, there has now been a series of papers describing the similar tax-minimizing activities of European firms (e.g., Ramb 2007; Egger, Eggert, and Winner 2007; Overesch 2006; and Weichenrieder 2007).

Why is this of interest in understanding trade in services? This ability of firms to shift the location of assets and profits by paper transactions internal to the firm, whether or not the transactions are reported at market values, makes the location of the firms' production ambiguous. That is true in industries, such as banking and other financial services, in which production is intangible, and assets are mostly financial and intangible assets. It is also the case in other industries in which output is intangible, or based on intellectual property. And it is the case in tangible goods industries in which much of the value of the tangible goods stems from intangible assets. The ambiguity in the location of production produces a corresponding ambiguity in measures of exports and imports, particularly in services, where there is no physical movement to observe. But even in industries where physical movements of output can be observed, it is difficult to identify the location or locations of the value added, if intangible inputs are important.

Reported service exports by U.S. affiliates, worldwide and from main regions, and a few selected countries, are shown in table 1.7, with comparisons to the service exports reported by the same countries, mainly to the IMF. The affiliate exports are not reported as exports in the BEA surveys, but as sales by affiliates other than local sales, divided between sales to the United States and sales to other areas outside the host countries. The comparisons are very imprecise for a number of reasons. The U.S. affiliate nonlocal sales of services are incomplete in several respects. One is that they do not include banking—an important part of service exports worldwide—because the BEA surveys of banks do not include the extensive list of questions asked of nonbanking parents and their affiliates. Secondly, the BEA

Table 1.7 **Exports of services reported by U.S. firms' affiliates and by host countries ($US, millions)**

	1999		2005	
	Sales by nonbank majority-owned affiliates to U.S. and other foreign countries	Exports of services reported by host countries	Sales by nonbank majority-owned affiliates to U.S. and other foreign countries	Exports of services reported by host countries
All countries[a]	52,167	1,159,948	134,336	2,158,986
Canada	2,482	36,117	7,919	55,313
Europe	27,639	731,685[b]	70,832	1,341,060[b]
Ireland	1,577	15,688	5,755	59,920
Netherlands	2,715	52,023	7,893	80,087
Switzerland	648	29,277	5,957	47,225
United Kingdom	12,440	119,068	33,536	209,435
Latin America and other Western Hemisphere	11,652	54,801[c,d]	23,885	82,379[c]
Central and South America	1,883	41,139[d]	4,158	65,341
Other Western Hemisphere[e]	9,769	13,662[c]	19,727	17,038[c]
Barbados	(D)	1,029	253	1,457
Bermuda	6,311	1,486	13,908	1,163
United Kingdom Islands, Caribbean[f]	881	n.a.	2,388	n.a.
Western Hemisphere, n.e.c.[g]	(D)	8,296[c]	(D)	10,504[c]
Barbados and Western Hemisphere, n.e.c.[g]	2,577	9,326[c]	(D)	11,962[c]

Middle East	586	24,656[h]	1,147	47,725[h]
Asia Pacific	8,899	270,846[i]	27,391	547,381[i]
China	118	26,248	1,103	74,404
Hong Kong	1,536	35,625	3,913	63,762
Singapore	1,562	24,933	2,946	52,742

Sources: Nonbank majority-owned affiliates sales are from U.S. Department of Commerce, Bureau of Economic Analysis, www.bea.doc.gov (downloaded in Nov. 2007). Exports of services reported by host countries are from IMF (2007). Exports of services reported by host countries for Bermuda in 1999 are from United Nations (2002b). Exports of services reported by host countries for Bermuda in 2005 are from website of Statistics Department of Bermuda, www.statistics.gov.bm (downloaded in Sept. 2007).

Notes: (D) refers to the suppression of data. n.a. = not available.

[a]U.S. is excluded.

[b]Data exclude Andorra, Gibraltar, Greenland, Liechtenstein, Serbia, Turkmenistan, and Uzbekistan in both years and in 2005, Montenegro and Slovakia are excluded also.

[c]Data include all the countries in "Western Hemisphere, n.e.c." except Cuba, French Islands (Caribbean), and United Kingdom Islands (Atlantic).

[d]French Guiana is excluded.

[e]"Other Western Hemisphere" refers to Barbados, Bermuda, Dominican Republic, United Kingdom Islands (Caribbean), and Western Hemisphere, n.e.c.

[f]"United Kingdom Islands, Caribbean" refers to British Antilles, British Virgin Islands, Cayman Islands, and Montserrat.

[g]"Western Hemisphere, n.e.c." refers to Anguilla, Antigua and Barbuda, Aruba, Bahamas, Cuba, Dominica, French Islands, (Caribbean), Grenada, Haiti, Jamaica, Netherlands Antilles, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, and United Kingdom Islands (Atlantic).

[h]United Arab Emirates are not available.

[i]In 1999, data exclude Bhutan, Brunei, Macau, Fiji, French Islands (Indian Ocean), French Islands (Pacific), Laos, Marshall Islands, Micronesia, Nauru, Papua New Guinea, Samoa, and Tonga; in 2005, the same set of countries are excluded except Macau, Papua New Guinea, Samoa, and Tonga.

data are confined to majority-owned affiliates, because minority-owned affiliates are not asked the questions about destination of sales. Third, the BEA data are heavily suppressed in publication, with very little country detail available for Caribbean countries that account for much of trade in financial services.

The data reported by the countries to the IMF have other deficiencies. They lack detail, and more important, several important countries in international trade in services, such as the Cayman Islands and Bermuda, did not report to the IMF at all in these years. However, Bermuda did report exports and imports of services in its national accounts. For the world as a whole, sales of services outside their host countries reported by U.S. affiliates account for 6 percent or less of exports of services reported by host countries. For western hemisphere countries outside of Central and South America, reported sales outside the host countries by U.S. affiliates were larger than the aggregate service exports reported by the host countries in 2005. That was particularly the case for Bermuda in both 1999 and 2005. Either Bermuda did not consider these sales to be exports or it did not consider these affiliates part of the Bermuda economy.

Table 1.8 gives some hints about the peculiarities of U.S. affiliates in various host countries in 1999. Affiliates in the area called "Other Western Hemisphere," essentially islands in the Caribbean, owned enormous assets relative to their labor input, measured by employment or employee compensation. For example, while the average ratio of assets to employment around the world was about $700,000 per employee, the ratios in the three European countries shown were all over $1.7 million per employee, and those for affiliates in "Other Western Hemisphere" were $9 million per employee. Within that group, affiliates in Bermuda had assets of over $16 million per employee[1] and those in the UK Islands in the Caribbean, $28 million per employee. While worldwide, U.S. affiliates owned assets twenty-one times their payrolls, those in "Other Western Hemisphere" had assets over 300 times their payrolls. Their activities appear to be very capital-intensive types of production.

Capital/labor ratios could differ across countries because the industry composition of production differs, even if they were identical within industries. In fact, the country differences are evident within industries. Table 1.8 shows the ratios for depository institutions and for finance (except depository institutions), and insurance. In the case of depository institutions, in which the worldwide average assets per employee in U.S. affiliates was $10 million, U.S. affiliates in "Other Western Hemisphere" owned $117 million of assets per employee. Their assets were more than 2,000

1. That exceptional level for Bermuda, in terms of the direct investment position rather than total assets, was pointed out in Mataloni (1995, 46), and attributed to the use of Bermuda as an intermediate step for investment eventually located elsewhere.

Table 1.8 **Ratios of total assets to other input measures: U.S. affiliates in all industries, 1999**

	All industries		Depository institutions		Finance (except depository institutions) and insurance	
	Employment[a]	Compensation of employees	Employment[a]	Compensation of employees	Employment[a]	Compensation of employees
All countries	696	21	10,245	168	6,637	97
Canada	360	11	2,744	106	(D)	(D)
Europe	941	22	11,766	147	11,131	121
Ireland	1,010–2,020	(D)	3,570–8,922	(D)	15,089	268
Netherlands	1,710	37	(D)	(D)	(D)	(D)
Switzerland	2,131	31	6,970	55	22,222	175
United Kingdom	1,784	38	20,080	195	13,608	121
Latin America and other Western Hemisphere	556	34	12,013	264	5,015	137
Central and South America	253	16	2,394	53	1,488	50
Other Western Hemisphere	9,375	335	117,367	2,347	(D)	378
Bermuda	16,287–32,574	(D)	0	0	27,725	398
UK Islands, Caribbean[b]	28,157	462	153,283	1,703	63,540	304
Other, Western Hemisphere[c]	4,116–8,233	(D)	(D)	(D)	(D)	(D)
Middle East	1,078	25	16,593	215	(D)	(D)
Other Middle East[d]	3,967	100	(D)	(D)	(D)	(D)
Asia Pacific	563	20	7,434	155	3,334	51
China	112	17	8,653	288	489–978	(D)
Hong Kong	1,357	35	6,402	130	4,342	30
Singapore	1,204	37	15,921	195	(D)	(D)

Source: U.S. Department of Commerce, Bureau of Economic Analysis, www.bea.doc.gov (downloaded on Sept. 23, 2005).

Note: (D) refers to the suppression of data.

[a]Thousands of dollars per employee.

[b]"United Kingdom Islands, Caribbean" comprises British Antilles, British Virgin Islands, Cayman Islands, and Montserrat.

[c]"Other, Western Hemisphere" refers to Anguilla, Antigua and Barbuda, Aruba, Bahamas, Cuba, Dominica, French Islands (Caribbean), Grenada, Haiti, Jamaica, Netherlands Antilles, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, and United Kingdom Islands (Atlantic).

[d]"Other Middle East" refers to Bahrain, Iran, Jordan, Kuwait, Lebanon, Oman, Qatar, Syria, and Yemen.

times their employee compensation, as compared with about 168 times employee compensation worldwide.

In "other finance and insurance," U.S. affiliates worldwide owned $6.6 million in assets per employee while those in Switzerland owned assets of over $22 million per employee, those in Bermuda, almost $28 million per employee, and those in "Other UK Islands," over $60 million per employee. Worldwide, U.S. affiliates in this industry owned assets almost 100 times their payrolls, but those in Switzerland had assets 175 times their payrolls and those in "Other Western Hemisphere," had assets 300 to 400 times their payrolls (table 1.8).

The data for the two finance sectors make it clear that the loading of assets on to U.S. affiliates in Switzerland and the Caribbean is not simply a result of the industry composition of investment in those countries, but represents a choice by parent companies in financial service industries to attribute assets to these locations.

The assets of U.S. affiliates, in countries where the ratio of assets to labor inputs is particularly high, are not primarily physical assets, as can be seen from table 1.9. The worldwide ratio of total assets to net property, plant, and equipment in U.S. nonbank affiliates was 5.6 in 1999, but the ratio in the Netherlands was almost 14; in Switzerland, 23; in Bermuda, 27; and in UK Islands in the Caribbean, 34. Most of the assets of these asset-rich affiliates were financial assets or other assets, such as intangible or intellectual property. It would be hard to define the location of these assets, and if they are the basis for most of the output of these affiliates, one could say that only statistical convention places that output in these affiliates' host countries.

Table 1.10 displays the "profit-type return" relative to labor compensation, for those affiliates that are not only nonbank, but also majority-owned for both 1999 and 2005. Profit-type return ". . . measures profits before income taxes, and it excludes nonoperating items (such as special charges and capital gains and losses) and income from equity investments" (U.S. Bureau of Economic Analysis 2004, M-19). These ratios are clearly related to the asset/labor ratios of table 1.8, even though they exclude income on equity investments. While the worldwide ratios of profit-type return to payrolls were 56 and 84 percent in the two years, those for Ireland were 396 and 664 percent, and those for "Other Western Hemisphere" were over 600 percent in 1999 and almost twice that in 2005. They were around 1,300 and then 3,600 percent for affiliates in Bermuda, 3,000 percent and more for those in Barbados, and well over 1,000 percent in UK Islands and other countries in the Caribbean area. The extremely high ratios of capital income to labor income were achieved by placing large amounts of financial and intangible capital in the affiliates in these countries, although the capital may be far away from where an innocent observer might think production took place.

Table 1.9 **Ratio of total assets to net property, plant, and equipment by nonbank affiliates of nonbank U.S. parents, 1999**

	Ratio of total assets to net property, plant, and equipment
All countries	5.65
Canada	4.22
Europe	7.44
Ireland	10.78
Netherlands	13.95
Switzerland	23.20
United Kingdom	8.59
Latin America and other Western Hemisphere	4.66
Central and South America	3.11
Other Western Hemisphere	15.40
Barbados	(D)
Bermuda	27.57
United Kingdom Islands, Caribbean[a]	34.33
Other, Western Hemisphere[b]	4.04
Bermuda and other, Western Hemisphere[b]	13.10
Middle East	2.19
Other Middle East[c]	1.49
Asia Pacific	4.56
China	2.90
Hong Kong	7.86
Singapore	7.02

Source: U.S. Bureau of Economic Analysis (2004)

Note: (D) refers to the suppression of data.

[a]"United Kingdom Islands, Caribbean" comprises British Antilles, British Virgin Islands, Cayman Islands, and Montserrat.

[b]"Other, Western Hemisphere" refers to Anguilla, Antigua and Barbuda, Aruba, Bahamas, Cuba, Dominica, French Islands (Caribbean), Grenada, Haiti, Jamaica, Netherlands Antilles, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, and United Kingdom Islands (Atlantic).

[c]"Other Middle East" refers to Bahrain, Iran, Jordan, Kuwait, Lebanon, Oman, Qatar, Syria, and Yemen.

In the case of one service imported into the United States, insurance services, data are available for imports in recent years from all sources, not only from U.S. affiliates (table 1.11). A few islands in the Caribbean, with small populations and labor forces, were responsible for over half of U.S. imports of insurance services in 2001 and 2004, and almost half in other years. Extreme specialization is not impossible, but it is hard to think of what resources in these islands produced all these insurance services. One might suspect that the labor input took place in the home countries of the firms nominally operating in Bermuda and that the capital input was from financial assets that had no real geographical location and were under the

Table 1.10 **Ratio of profit-type return to compensation of employees by majority-owned nonbank affiliates of U.S. nonbank parents**

	1999	2005
	Ratio of profit-type return to compensation of employees	Ratio of profit-type return to compensation of employees
All countries	0.557	0.840
Canada	0.586	0.848
Europe	0.439	0.579
Ireland	3.964	6.639
Netherlands	0.793	0.878
Switzerland	0.867	1.614
United Kingdom	0.333	0.291
Latin America and other Western Hemisphere	0.771	1.555
Central and South America	0.466	0.978
Other Western Hemisphere	6.161	11.709
Barbados	30.884	34.967
Bermuda	13.007	36.062
United Kingdom Islands, Caribbean[a]	4.249	8.833
Other, Western Hemisphere[b]	1.655	6.347
Bermuda and other, Western Hemisphere[b]	6.714	15.794
Barbados and other, Western Hemisphere[b]	4.798	8.008
Middle East	1.084	1.837
Other Middle East[c]	5.887	9.403
Asia Pacific	0.755	1.178
China	0.670	1.498
Hong Kong	0.898	0.953
Singapore	1.420	2.978

Sources: U.S. Bureau of Economic Analysis (2004) U.S. Department of Commerce, Bureau of Economic Analysis, www.bea.doc.gov (downloaded Sept. 2007).

[a]"United Kingdom Islands, Caribbean" comprises British Antilles, British Virgin Islands, Cayman Islands, and Montserrat.

[b]"Other, Western Hemisphere" refers to Anguilla, Antigua and Barbuda, Aruba, Bahamas, Cuba, Dominica, French Islands (Caribbean), Grenada, Haiti, Jamaica, Netherlands Antilles, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, and United Kingdom Islands (Atlantic).

[c]"Other Middle East" refers to Bahrain, Iran, Jordan, Kuwait, Lebanon, Oman, Qatar, Syria, and Yemen.

control of the parent companies, but could be placed under the ownership of any affiliate, anywhere.

The allocation of financial assets to low tax countries is probably the most common distortion of the location of production, and along with production, exports and imports. However, other intangible assets are subject to similar manipulation and the creation of phantom flows of trade. Ireland and Bermuda have been favorite locations for transfers of such as-

Table 1.11 U.S. payments for insurance services, 2001–2006 ($US, millions)

	2001	2002	2003	2004	2005	2006
All countries	16,706	22,150	25,234	29,090	28,540	33,582
Canada	343	554	498	664	652	645
Europe	7,121	11,915	12,404	11,836	14,618	17,177
Netherlands	110	142	166	41	11	15
Switzerland	1,232	2,316	2,574	3,029	4,928	5,594
United Kingdom	2,978	3,848	4,134	3,344	3,186	3,134
Latin America and other Western Hemisphere	9,082	9,462	12,110	16,334	12,988	15,437
Other Western Hemisphere	9,032	9,383	12,059	16,257	12,935	15,334
Bermuda	7,167	7,499	10,034	11,805	10,227	12,685
Other, Western Hemisphere[a]	1,867	1,884	2,025	4,450	2,708	2,648
Africa	2	4	1	24	30	18
Middle East	4	3	5	12	8	11
Asia and Pacific	132	205	201	206	240	286

Sources: Borga and Mann (2004); Nephew et al. (2005); Koncz, Mann, and Nephew (2006); Koncz and Flatness (2007).

[a]"Other, Western Hemisphere" refers to Anguilla, Antigua and Barbuda, Aruba, Bahamas, Cuba, Dominica, French Islands (Caribbean), Grenada, Haiti, Jamaica, Netherlands Antilles, St. Kitts and Nevis, St. Lucia, St. Vincent and the Grenadines, Trinidad and Tobago, and United Kingdom Islands (Atlantic).

sets as software and drug patents (see, e.g., Simpson [2005], which lists many companies' Irish affiliates).

Publicly available data do not report individual company transactions, but these moves by various firms seem to have made their mark in a number of places in aggregate data. It is difficult to compare 1994 and 1999 BEA numbers by industry because of the shift from the Standard Industrial Classification (SIC) to North American Industry Classification System (NAICS) industry classifications, but this and similar transactions may have figured in the more than tenfold growth over that period in the sales of U.S. affiliates in Ireland classified as "Electronic and Other Electric Equipment" or "Services" in 1994, or as "Computers and Electronic Products" or "Professional, Scientific and Technical Services" in 1999, from $2.5 billion to $26 billion (U.S. Bureau of Economic Analysis 1998, 2004). There was a considerable growth in employment also, but only from 14,000 to 36,000 (BEA 1998, 2004). Software is not the only corporate asset subject to international shifting for tax purposes. One news article on such shifts referred to ". . . patents on drugs, ownership of corporate logos, techniques for manufacturing processes and other intellectual assets . . ." and quoted a tax lawyer as calling such moves routine, "'international tax planning 101.'" He added that "'most of the assets that are going to be relocated as part of a global repositioning are intellectual property . . . that

is where most of the profit is. When you buy a pair of sneakers for $250, it's the swoosh symbol, not the rubber, you pay for" (Johnston 2002).

1.6 The Definition of Residence: What does the Current Account Balance Measure?

The U.S. Review Committee for Balance of Payments Statistics (1965) suggested that "balance of payments data are peculiarly elusive" because "[t]he basic criterion for a balance of payments transaction is that it is between a domestic and a foreign 'resident.' [. . .] The application of this set of concepts to concrete situations may involve subtle distinctions, and it is often difficult to determine residence even when all the facts are known.[. . .] Distinctions based on the balance of payments concept of residence have not ordinarily been important in the affairs of business firms, governments, or households; the concept, therefore, is not normally reflected in their records. The balance of payments statistician seeking data on international transactions from these records finds himself asking questions that are likely to be new and alien to the company's or the agency's normal way of thinking" (pp. 16–17).

As the importance of intangible assets has grown, particularly for the United States, it may no longer be true that questions of residence are new or alien to the thinking of companies, but the way they have become familiar to companies is different from the way that economists think of them. For companies, issues of residence, or the location of intangible assets, are important as tools for minimizing taxes, and companies can manipulate the residence of assets in ways that do not fit with economists' concepts of trade and production.

What are the economist's concepts of trade and the current balance? Meade (1951) defined exports as an element of ". . . demands for goods and services which directly or indirectly cause a demand for factors of production (i.e. for the productive services of land, capital, enterprise and work) . . ." whose incomes are recorded in the national income. Imports, correspondingly, lead to a demand for ". . . the productive resources of other countries" (p. 34)

If the object in the balance of payments is not to measure the physical movement of goods or services, and trade in services does not involve a change in ownership, what is the goal of the measurement? Writings about the balance of trade, and particularly about the balance of payments, have often had a whiff of mercantilism about them. That used to be especially clear in the references to "favorable" or "unfavorable" balances. These terms have virtually disappeared, but they reflected the traditional purpose of the calculations, which was to know whether a country was gaining or losing gold. In an international regime aiming at stability of exchange rates, the substitute was the question of demand for and supply of a coun-

try's currency. One reflection of that aim was the effort to define "autonomous" and "accommodating" transactions, as in Meade (1951, 11–16). In the United States, there was a search for the appropriate measure of balance-of-payments deficits or surpluses, the need for which stemmed from the fact that "leading countries have established fixed parities for their currencies and have undertaken to maintain exchange rates within prescribed margins of those parities" (U.S. Review Committee for Balance of Payments Statistics 1965, 2). That purpose too has become obsolete. The Bureau of Economic Analysis, describing concepts underlying the balance of payments in 1990, does not provide a purpose for the calculation, but defines it simply as ". . . a statistical summary of international transactions . . . defined as the transfer of ownership of something that has an economic value measurable in monetary terms from residents of one country to residents of another" (U.S. Department of Commerce 1990, xiii). The article explaining alternative frameworks for the international accounts (Landefeld, Whichard, and Lowe 1993) refers to the "standard balance of payments" as providing ". . . indicators of returns to domestic versus foreign factors of production . . ." (p. 51), echoing Meade's description.

A more recent textbook defines a country's current account balance as ". . . the change in the value of its net claims on the rest of the world—the change in its net foreign assets" (Obstfeld and Rogoff 1996, 4). The issue of residence remains. An intangible or financial asset has no real geographical location; its only definite location is its ownership. A multinational corporate owner can choose to move the ownership of an intangible asset to an affiliate anywhere in the world. By moving a piece of paper from one pocket to another, the firm changes the apparent geographical location of an asset, of production from that asset, and the direction of trade flows from its output. Production that had been taking place in the home country now takes place in the country of assignment of the asset. The home country, or other former nominal location of the asset, which had been credited with its output, is now reported to be importing that output. Has anything really happened? Can we accept that there has been a change in the reality we are trying to measure, or are we being fooled into thinking that some economic event has taken place when it has not?

In the cases of international service trade based on intangible assets, if the assets producing these services are exported to some countries by placing them on the books of the affiliates incorporated there, what local resources are used in producing these services? What is the flow of services from these exporters that is equivalent to the flow of goods measured in the goods trade accounts? What would be the significance to the U.S. economy of a rise in the deficit from these imaginary international flows?

If there are what appear to be large distortions in the service trade data, or extreme flexibility in assigning production of services to locations, they raise questions about the meaning and purpose of the balance of payments

accounts. The producers of the accounts often justify procedures by conformity with IMF (1993) and the SNA (United Nations 1993a), without much discussion of the underlying purposes of the measurement. They rarely discuss the implications, if any, of moving from a world in which production and trade consist mostly of goods produced by physical capital and labor to a world in which most output is in the form of services, much of it produced by intangible assets, and much of goods output, also, is from intangible inputs. And they rarely discuss the implications of moving from a world in which production within a firm is located in a firm's home country to a world in which production within a firm combines inputs located in many countries or worse, inputs with no definite geographical location.

The issue here is not what tax havens and the shifting of assets do to home and host country tax revenues. The focus is on the tiny tax havens, because some of them have so little production outside of tax avoidance activities that it is relatively clear what is going on there. However, much the same problem in measuring flows of services must exist, more hidden, in larger countries. The question is whether we are, by our ways of measuring, creating phantom international flows of some services that may not be crossing international borders at all. Services that are produced and consumed entirely within the United States without crossing borders may appear to be produced in some Caribbean Island or other tax-favored location and exported to the United States. What do we learn about the economy of the United States or of the exporting country from observing these phantom flows? Some host countries have answered that question by excluding from their national accounts the activities of these offshore enterprises.

The possibility that some imports or exports of services do not actually cross international borders was illustrated by a recent court proceeding in a bankruptcy case (*Wall Street Journal* 2006b). "Funds flowed freely between the Bermuda entity and New York units and throughout Refco . . . it employed no one at all at its headquarters address in Bermuda. New York-based employees ran the unit." An arrangement recently challenged by the IRS involved a transfer of major drug patents to a subsidiary in Bermuda that caused the U.S. parent company to pay royalties to a Bermuda subsidiary although the patents had been developed by the parent company in the United States (Drucker 2006).

Various ways have been suggested for incorporating production by foreign affiliates into international accounts by producing accounts on what is referred to as an ownership rather than a residency basis. One such suggestion was proposed in National Research Council (1992) by a national Academy of Sciences panel chaired by Robert E. Baldwin, and amplified in Baldwin and Kimura (1998) and Kimura and Baldwin (1998). While such accounts are not intended as replacements for the standard balance of payments accounts, and are intended for different purposes, they do, in

the process, escape from counting transactions that do not really take place by combining the operations of parent firms with those of their foreign affiliates. The Bureau of Economic Analysis now regularly publishes an ownership-based current account for the United States, explained in Landefeld, Whichard, and Lowe (1993). The latest of these is U.S. Bureau of Economic Analysis (2006).

These alternative measures are based on the ownership of the productive resources or of the firms in which production takes place, rather than the location of the resources. In this way, they net out the effects of some of what are described here as phantom transactions, although they do not remove them from the standard accounts. However, the cost is that these accounts provide no information on the location of production.

Given the ease with which the nominal location of production, imports, and exports from financial and intangible assets can be manipulated, is there a better method for tracing the path of these variables? The problem is similar to that faced by the European Commission in suggesting the need for an agreed way of allocating profits among a firm's locations, overriding the allocations on the firms' books (see, e.g., *Wall Street Journal* 2006a).

For an individual firm, the actual location of production might be better represented by ignoring the nominal geographical location of financial and intangible assets on the firm's books, attributing to parent companies the ownership of these assets, the production from them, and the trade from that production. That could be done by the statistical authorities of any of the few countries that survey the outward direct investment activities of their countries' firms, as the BEA does for the United States.

The simplest case is that of affiliate holdings in other foreign affiliates, which clearly do not contribute to production and exports in the affiliate's host country. They probably do not distort the reported host country export data, but they inflate affiliate income in those countries by including income earned elsewhere. For U.S. affiliates worldwide, these holdings were 23 percent of total assets in 2005, but they were almost half in the Netherlands and in affiliates in "Other Western Hemisphere, n.e.c.", and over a third in Switzerland and Bermuda (U.S. Department of Commerce, BEA 2007).

Under the extreme assumption that all assets other than inventories and property, plant, and equipment should be attributed to the parent firm, on the grounds that they have no specific geographical location and could be placed anywhere by the parent firm, the effect on affiliate assets would be much larger. For U.S. affiliates worldwide, assets would be reduced to 12 percent of the reported total. In Ireland and Switzerland, they would be only 6 percent. In Barbados, less than 2 percent of reported assets would remain and in Bermuda and U.K. Islands in the Caribbean, only 1 percent. From the published data, one cannot match the asset holdings with the exporters of services, as opposed to goods. It would be possible, with access to the original questionnaires, to match the portfolio holdings with the ex-

ports of goods and of services and identify firms whose service exports were produced essentially without local labor and with only assets that had no clear geographical location.

While this way of estimating exports of services could be carried out for trade with U.S.-owned affiliates, it does not solve the problem of trade with other countries' affiliates. Some host countries exclude affiliates that operate only outside the country from their national accounts. In that case, their sales of services abroad do not appear in host country export data. However, they can still be counted in the imports of services by other countries from that host country. Unless the home countries of the affiliates' parents survey their own foreign investors, there is no obvious way to attribute these imports to the country where they are actually produced.

1.7 Summary and Conclusions

Exports and imports of services are more difficult to define and measure than trade in goods, and as a consequence, their size and growth are much less certain. The reported world total value in 2005 was about 2.5 trillion of exports and a similar amount of imports, approximately one-quarter of world trade in goods.

The trend in the importance of service exports and imports is even harder to measure, because the number of services covered and the number of countries measuring service exports and imports has increased, especially since 1975. Despite those increases, there is only slight evidence of a rise in the importance of service exports and imports relative to goods trade.

Since the United States has been a leader in measuring service exports and imports, the U.S. data are more complete than those for the world. Service exports have recently been over 40 percent of goods exports, while service imports have been only about 20 percent of goods imports. However, service imports have recently been growing faster than service exports.

Attempts to translate these trends in nominal ratios of service to goods trade into ratios in real terms face the almost complete absence of data on prices of traded services. Use of domestic price measures as proxies faces the problem that even domestic service prices are poorly measured and subject to many criticisms, and the fact that the composition of domestic service production and consumption is very different from that of internationally traded services.

Relative to goods and services output, U.S. service exports and imports are much smaller than goods exports and imports, especially the imports. Service exports and imports are about 4 to 5 percent of services output, while goods imports are almost 40 percent and goods exports are over 20 percent of goods output. Both goods and services exports are at historically high levels relative to output, compared to the period since 1869, and the same is true for goods imports, which have risen steadily since 1950 after a long secular decline from 1869 to World War II. Changes in services

imports relative to services output have been much smaller: the ratio for 1990 to 1999 was almost identical to that for 1869 to 1873, but the ratio for 2000 to 2006 was 15 percent higher.

The measures of service trade, because they are not anchored in any observation of physical movement, are, much more than those of goods trade, determined by the definition of residence, since residence, rather than an observed movement of a final product, determines what is an export or import. The problem is illustrated by the case of trade in educational services, because the determination that an ostensibly domestic transaction is an import or export rests on a difference in residence between the provider and the acquirer of the service. A paradoxical aspect of this definition is that, especially in the United States, much of the exported educational service never leaves the United States because the recipients decide to become U.S. residents. What would be necessary to close this gap between the service trade measure and reality would be an account for flows of human capital that would show the service imported into the United States in the form of human capital. An alternative would be to treat the educational expenditure as an internal trade within the United States until the recipient crossed the border to return home, if he or she did so, and then enter it into exports of services. A drawback of this scheme is that it would not account for the reimport of previously exported services when the recipient of a U.S. education returned to the United States at a later date.

A serious problem for the measurement of service trade, and also for the measurement of the location of output of both goods and services, is the growing importance of intangible inputs, including intellectual assets, in production, because these assets do not have a clear geographical location. The same is true for financial assets. One consequence of this growth is the expanding use by parent firms of the placement of intangible and financial assets in low tax jurisdictions. Since the assets are intangible, including financial assets, patents, trademarks, rights to designs, and corporate logos, they have no particular geographical location, and their ownership can be moved by the parent company of a multinational to any of its affiliates. The result is that the output and exports stemming from these assets can also be attributed to geographical locations almost at will, subject to some limited regulation by tax authorities, without any relation to the actual location of any physical aspect of the production. A large part of service production, exports, and imports, and some part of goods production can begin to consist of phantom production and trade that makes no use of factors of production actually resident in the countries to which they are attributed. If that takes place to an important degree, the measures of the current balance and national output begin to lose their meaning.

For trade with U.S. affiliates, it is possible to consolidate the operations of multinational parents and their affiliates in the data, counting as trade only transactions outside the multinational firm, between segments of the firm and unaffiliated entities. The closest approximation to this is the

ownership-based accounts of the BEA. However, these are not incorporated into the international transactions accounts or national accounts in general and, as they are constructed, provide no data on the geographical location of production.

It may be that the calculation of trade flows, particularly for services—but to some extent for goods as well—and the related calculations of the location of production, have reached the stage that calculations of capital consumption reached many years ago. That stage was the decision by statistical agencies to abandon the reliance on corporate accounting for capital consumption, because corporate accounts were too distorted by differences in assumptions and by tax considerations, and to substitute statistical and econometric estimation of capital consumption based on other types of data.

Appendix

Table 1A.1 **Goods and service exports and imports by fixed sets of countries, five-year averages, 1972–2006, and year, 2005 ($US, billions)**

	22 Countries[a]				30 Countries[b]			
	Goods		Services		Goods		Services	
Year	Credit	Debit	Credit	Debit	Credit	Debit	Credit	Debit
1972–1976	375.8	355.4	79.0	85.1	n.a.	n.a.	n.a.	n.a.
1977–1981	806.1	776.0	168.7	188.3	1,101.9	1,071.3	241.7	264.5
1982–1986	924.1	964.9	221.1	243.1	1,312.9	1,305.3	306.3	333.0
1987–1991	1,512.9	1,563.1	383.7	394.3	2,167.4	2,122.4	534.4	570.3
1992–1996	2,140.8	2,164.3	582.2	563.7	3,058.0	2,925.1	795.3	819.1
1997–2001	2,739.6	2,914.7	755.0	728.6	3,810.5	3,851.7	999.2	1,012.6
2002–2006	3,785.1	4,200.7	1,072.6	1,031.2	5,272.5	5,539.5	1,456.6	1,414.8
2005	4,353.0	4,798.4	1,216.9	1,169.1	6,047.1	6,382.9	1,681.6	1,617.0

	World: 150 Countries			
	Goods		Services	
	Credit	Debit	Credit	Debit
2005	9,779.1	9,856.4	2,486.7	2,370.8

Source: IMF (2007).

Note: n.a. = not available.

[a]The twenty-two countries include Australia, Austria, Barbados, Canada, Colombia, Dominican Rep., Germany, Haiti, Israel, Italy, Jordan, Malta, Netherlands, New Zealand, Romania, Saudi Arabia, Singapore, South Africa, Sweden, United Kingdom, United States, and Venezuela.

[b]The 30 countries include the twenty-two countries, plus Argentina, Belgium-Luxembourg, Brazil, Denmark, Finland, France, India, and Japan.

Table 1A.2 **U.S. trade in goods and services, decade averages, 1790–1999 and average of 2000–2006 ($US, millions)**

	Services		Goods	
Year	Exports	Imports	Exports	Imports
1790–1799[a]	14.5	2.2	43.5	53.9
1800–1809	28.2	3.9	75.9	96.4
1810–1819	20.2	2.1	59.8	82.0
1820–1829[b]	12.4	2.3	69.7	74.1
1830–1839	13.0	3.9	98.7	118.0
1840–1849	18.4	5.8	118.0	113.8
1850–1859	24.8	26.3	231.6	277.1
1860–1869[c, d]	29.4	43.5	263.6	333.7
1870–1879	35.2	60.8	566.7	525.9
1880–1889	36.8	91.9	780.8	714.3
1890–1899	37.6	104.2	980.3	770.0
1900–1909[e]	36.8	209.6	1,705.1	1,157.7
1910–1919	251	642	4,255	2,304
1920–1929	530	869	5,151	4,034
1930–1939	398	659	2,710	2,261
1930–1939	440	660	2,700	2,260
1940–1949	1,610	2,200	7,730	4,550
1950–1959	3,570	5,310	14,760	11,840
1960–1969	9,390	9,890	27,740	23,130
1970–1979	28,270	24,490	99,730	108,710
1980–1989	86,870	73,320	251,370	344,090
1990–1999	223,890	150,350	550,550	724,790
2000–2006	348,843	275,843	813,329	1,423,786

Sources: 1790–1860: North (1960, tables A-4, B-2, and B-3); 1861–1900: Simon (1960, table 27); 1901–1939: U.S. Bureau of the Census (1975, table U 1–25, 864–66; 1930–2006: BEA website, http://www.bea.gov/bea/di1.htm (downloaded on Dec. 24, 2007).

[a]From 1790 to 1819, exports of services include only freight earnings; imports of services include only payments for insurance; exports of goods include exports of merchandise and sales of ships.

[b]From 1820 to 1860, exports of services include freight earnings, port charges, and tourist expenditures; imports of services include freight payments to foreign ships and tourist expenditures; exports of goods include exports of merchandise and sales of ships.

[c]Exports and imports of goods in 1860 include specie.

[d]From 1861 to 1900, exports of services are equal to total shipping income plus foreign tourist expenditures plus port outlays of foreign passenger steamships; imports of services are equal to total shipping payments plus U.S. tourist expenditures. Exports of goods are the sum of exports of merchandise and the sales of ships.

[e]From 1901 to 1970, exports of services are sums of transportation, travel, and other transactions; imports of services are sums of transportation, travel, direct military expenditures, and other transactions.

Table 1A.3 **U.S. trade in and output of services, current prices, 1869–2006**

Year	Exports ($US, millions)	Imports ($US, millions)	Output of services ($US, billions)	Output (%)	
				Exports	Imports
1869–1873	37	59	1.6	2.34	3.74
1872–1881	35	64	2.1	1.68	3.12
1882–1891	38	100	3.0	1.27	3.38
1892–1901	36	112	3.9	0.93	2.86
1902–1911	43	249	7.7	0.55	3.23
1912–1921	405	766	15.1	2.68	5.07
1922–1931	450	854	28.7	1.57	2.98
1930–1939	398	659	31.6	1.26	2.09
1930–1939	440	660	31.6	1.39	2.09
1940–1949	1,610	2,200	79.6	2.02	2.76
1950–1959	3,570	5,310	156.2	2.29	3.40
1960–1969	9,390	9,890	310.9	3.02	3.18
1970–1979	28,270	24,490	771.7	3.66	3.17
1980–1989	86,870	73,320	2,074.8	4.19	3.53
1990–1999	223,890	150,350	4,040.2	5.54	3.72
2000–2006	348,843	275,843	6,458.1	5.40	4.27

Sources: Exports and Imports 1869–1900: Ten-year averages calculated from Simon (1960). Exports and Imports 1901–1939: Ten-year averages calculated from U.S. Bureau of the Census (1975, table U 1–25, 864–66). Exports and Imports 1930–2006: Ten-year averages calculated from BEA website, http://www.bea.gov/bea/di1.htm (downloaded on Dec. 24, 2007). Output of Services 1869–1931: U.S. Bureau of the Census (1975, table F 71–97, 231). Output of Services 1930–2006: Ten-year averages calculated from BEA website, http://www.bea.gov/bea/dn1.htm (downloaded on Dec. 24, 2007).

Table 1A.4 U.S. trade in and output of goods, current prices, 1869–2006

Year	Exports ($US, millions)	Imports ($US, millions)	Output of goods ($US, billions)	Output (%)	
				Exports	Imports
1869–1873	438	545	4.2	10.45	13.01
1872–1881	656	561	5.0	13.09	11.20
1882–1891	783	751	7.0	11.26	10.80
1892–1901	1,099	777	8.3	13.23	9.35
1902–1911	1,829	1,299	14.9	12.26	8.71
1912–1921	5,140	2,781	31.7	16.22	8.77
1922–1931	4,487	3,761	46.9	9.56	8.01
1930–1939	2,710	2,261	39.5	6.86	5.72
1930–1939	2,700	2,260	39.5	6.83	5.72
1940–1949	7,730	4,550	106.1	7.29	4.29
1950–1959	14,760	11,840	195.5	7.55	6.06
1960–1969	27,740	23,130	317.5	8.74	7.29
1970–1979	99,730	108,710	691.0	14.43	15.73
1980–1989	251,370	344,090	1,544.2	16.28	22.28
1990–1999	550,550	724,790	2,611.8	21.08	27.75
2000–2006	813,329	1,423,786	3,615.6	22.49	39.38

Sources: Exports and Imports 1869–1900: Ten-year averages calculated from Simon (1960). Exports and Imports 1901–1939: Ten-year averages calculated from U.S. Bureau of the Census (1975, table U 1–25, 864–66). Exports and Imports 1930–2006: Ten-year averages calculated from BEA website, http://www.bea.gov/bea/di1.htm (downloaded on Dec. 24, 2007). Output of Services 1869–1931: U.S. Bureau of the Census (1975, table F 71–97, 231). Output of Services 1930–2006: Ten-year averages calculated from BEA website, http://www.bea.gov/bea/dn1.htm (downloaded on Dec. 24, 2007).

Table 1A.5 U.S. exports and imports of services and goods in 2000 prices, five-year averages, 1929–2000 and average of 2001–2006 ($US billions)

	Goods		Services		Services/goods (%)	
	Exports	Imports	Exports	Imports	Exports	Imports
1929–1935	17.8	27.6	5.4	7.3	30.39	26.28
1936–1940	21.5	31.2	7.0	6.8	32.59	21.88
1941–1945	18.0	30.6	7.7	17.2	42.59	56.01
1946–1950	44.5	38.2	13.7	12.0	30.72	31.50
1951–1955	42.4	46.5	15.3	24.2	36.00	51.94
1956–1960	53.7	60.1	23.8	35.3	44.37	58.81
1961–1965	69.2	80.1	35.0	40.1	50.57	50.08
1966–1970	91.4	134.5	49.6	54.5	54.30	40.57
1971–1975	134.1	186.6	66.0	59.0	49.26	31.63
1976–1980	183.7	243.7	86.6	65.7	47.12	26.97
1981–1985	208.8	295.2	107.2	87.7	51.34	29.71
1986–1990	298.4	437.1	157.0	127.7	52.61	29.22
1991–1995	452.3	577.0	221.0	142.7	48.86	24.73
1996–2000	682.8	989.7	289.0	194.6	42.32	19.67
2001–2006	786.4	1,403.2	331.8	253.7	42.19	18.08

Source: BEA website, http://www.bea.gov/bea/di1.htm (downloaded on Sept. 25, 2007).

Table 1A.6 **U.S. exports and imports of goods and output of goods in 2000 prices, five-year averages, 1929–2000 and average of 2001–2006**

	Output of goods ($US, billions)	Exports and imports of goods as percent of output	
		Exports	Imports
1929–1935	215.3	8.24	12.84
1936–1940	278.5	7.72	11.21
1941–1945	439.3	4.09	6.97
1946–1950	513.5	8.66	7.43
1951–1955	606.2	6.99	7.67
1956–1960	687.3	7.82	8.74
1961–1965	811.5	8.53	9.87
1966–1970	1,031.9	8.85	13.03
1971–1975	1,221.8	10.97	15.27
1976–1980	1,476.1	12.45	16.51
1981–1985	1,685.3	12.39	17.52
1986–1990	2,083.2	14.32	20.98
1991–1995	2,403.1	18.82	24.01
1996–2000	3,070.9	22.24	32.23
2001–2006	3,641.4	21.59	38.53

Source: BEA website, http://www.bea.gov/bea/di1.htm (downloaded on Sept. 25, 2007).

Table 1A.7 **U.S. exports and imports of services and output of services in 2000 prices, five-year averages, 1929–2000 and average of 2001–2006**

	Output of services ($US, billions)	Exports and imports of services as percent of output	
		Exports	Imports
1929–1935	441.6	1.22	1.64
1936–1940	505.5	1.39	1.35
1941–1945	1,073.3	0.71	1.60
1946–1950	870.6	1.57	1.38
1951–1955	1,149.3	1.33	2.10
1956–1960	1,336.6	1.78	2.64
1961–1965	1,646.0	2.13	2.44
1966–1970	2,111.9	2.35	2.58
1971–1975	2,460.7	2.68	2.40
1976–1980	2,854.0	3.03	2.30
1981–1985	3,259.1	3.29	2.69
1986–1990	3,923.7	4.00	3.26
1991–1995	4,459.1	4.96	3.20
1996–2000	5,079.0	5.69	3.83
2001–2006	5,899.6	5.62	4.30

Source: BEA website, http://www.bea.gov/bea/di1.htm (downloaded on Sept. 25, 2007).

Table 1A.8 **Implicit price indexes for goods and services in U.S. output, exports, and imports, five-year averages, 1929–2000, and average of 2001–2006 (2000 = 100)**

	Goods			Services		
	Output[a]	Exports	Imports	Output[b]	Exports	Imports
1929–1935	17.41	15.31	8.37	7.03	7.23	9.34
1936–1940	16.92	15.57	8.31	6.81	8.42	10.40
1941–1945	20.91	22.63	11.37	7.54	15.01	14.22
1946–1950	27.09	28.59	17.97	10.33	17.18	18.72
1951–1955	30.35	31.83	23.62	12.33	19.57	19.67
1956–1960	32.77	33.64	23.20	14.48	21.09	19.52
1961–1965	34.47	34.78	22.77	16.19	22.47	20.99
1966–1970	38.23	39.46	24.54	19.22	25.26	23.44
1971–1975	46.94	55.47	40.58	25.86	33.79	33.67
1976–1980	63.82	85.39	74.69	37.42	48.08	53.37
1981–1985	82.83	106.26	100.28	55.23	67.20	68.87
1986–1990	90.43	104.92	101.71	68.65	77.15	79.40
1991–1995	99.38	107.13	106.44	83.11	90.00	92.30
1996–2000	100.47	101.80	99.62	94.98	96.71	97.98
2001–2006	100.30	103.60	102.83	112.11	106.48	110.95

Source: BEA website: http://www.bea.gov/bea/dn1.htm (downloaded on September 25, 2007).

[a]Output of goods is measured as final sales.

[b]Includes government consumption expenditures, which are for services (such as education and national defense) produced by government. In current dollars, these services are valued at their cost of production.

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