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PRODUCTION AND TRADE IN SERVICES BY U.S. MULTINATIONAL FIRMS

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ABSTRACT

Direct investment in foreign countries by U.S. goods industries represents a response to differences in labor costs to a much greater extent than the more rapidly growing investment by service industries. The latter seem to be less able to allocate different types of production to different areas of the world, probably because services are less tradable than goods; they must more often be produced where they are consumed or consumed where they are produced. Therefore, while direct investment abroad in goods industries represents an allocation of production that increases the demand for high-skill labor and for R & D input in the U.S. and decreases the demand for low-skill labor, direct investment in service industries, while it increases a firm's share of foreign markets, is likely to have little effect on the firm's demand for labor in the U.S. or on the composition of its labor force.

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Introduction

Several trends in the U.S. economy have raised the question of whether the comparative advantage of the United States has shifted towards service industries and whether the exports of these industries can help to close the apparently persistent U.S. trade deficit. One of these trends is the decline in the competitiveness of U.S. manufacturing, as reflected in the fall in the share of the U.S. in world and developed-country exports of manufactured goods and in the increasing shares of imports in U.S. consumption of manufactured products. Another is the long-term rise in the importance of service industries relative to goods-producing industries, as measured, for example, by GNP originating, and particularly by employment. One reflection of the belief in U.S. comparative advantage in service industries is the strong effort the U.S. has been making to reduce barriers to what is referred to as trade in services.

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The International Role of Service Industry Multinationals

Exports and Affiliate Production of Services as Alternatives

To understand the nature of the international market for services, some clarifications of its scope may be in order. To begin with, the analogy between trade in services, as measured in the balance of payments, and the more familiar trade in merchandise, is a very tenuous one. Merchandise trade involves the passage of goods across international borders, no matter who the buyers or sellers are. A shipment of goods from the U.S. to a foreign country is a U.S. export even if the good has been produced by a foreign company operating in the U.S. and even if it is bought by a U.S. company operating abroad. A shipment of goods from a foreign country into the U.S. is a U.S. import even if the good has been produced by a U.S. company abroad and even if it is purchased by a foreign company operating in the U.S. In contrast, there is little passage of services across these borders. By some definitions of services, there is almost none; indeed, services are defined by the fact that production and consumption take place simultaneously (see, for example, Hill, 1987). Service transactions in the balance of payments, unlike goods transactions, are largely defined by the residence of the transactors; in most cases either the producers have moved to the point of consumption or the consumers have moved to the location of production, but the transaction itself takes place within one country. There are some exceptions, in which a service, such as telecommunications, re-insurance, or some banking activities, is produced in one country and simultaneously consumed in another country, but these are not a large part of service production or trade. Both the intangibility of the services and the fact that the seller often has no information about the nationality or residence of the buyers, mean that the measurement of many ser-

vice transactions is extremely difficult and the data poor.

An additional difference between the two sectors is that while goods exports are generally the product of a country's goods-producing industries, many service exports, as reported in the balance of payments, have little to do with domestic service producing industries. It seems appropriate, therefore, to relate merchandise exports to the domestic output of goods-producing industries but of more limited significance to relate service exports to the domestic output of service industries.

The lack of association between "service exports," in the balance of payments sense, and U.S. service industries, is illustrated by the content of U.S. service exports in 1984. Of $131 billion in officially reported exports of services in that year, $86 billion, or two thirds, consisted of receipts of income on U.S. assets abroad (Krueger, 1987). This income was from capital employed in both goods industries and service industries as well as from loans to foreign governments and corporations. Another $6 billion was receipts of royalty and license fees, mostly paid by foreign manufacturing affiliates of U.S. companies to manufacturing parents in the U.S. Aside from government services, the other items, among which we might look for some relation to U.S. service industries, accounted for about $39 billion. Of this total, travel, which draws on the U.S. hotel and restaurant industries, among others, in the service sector, but which is consumed entirely within the U.S., was almost a third, at $11.4 billion. Transportation, part of which was wholly within the United States, accounted for $17 billion.

There is a good deal of evidence that service exports are underestimated in the official data. The Office of Technology Assessment has suggested a range of $69-91 billion for non-factor services in 1984, the middle of which

is about twice the official Department of Commerce figure in the U.S. International Transactions accounts (OTA, 1986, p. 38), including travel and transportation. The major revisions suggested by OTA are outside the travel and transportation items, and would multiply the estimates for those service items more than four times. However, some of the major entries suggested by OTA, such as construction, franchising (mainly auto and gasoline dealers), and licensing, were associated with U.S. companies in industries outside the service sector. In any case, the OTA estimates, excluding capital services, royalty and license fees, travel, and transportation, ranged from $27 to 43 billion in 1982, or 8 to 12 per cent of the official, presumably underestimated, total of goods and services exports.

On the import side, capital services again accounted for most of the "service" trade, $67 billion or over 60 per cent out of $111 billion. Of the remainder of about $44 billion, U.S. travel "imports" consumed entirely outside the U.S., were $15 billion. The OTA estimates for service imports other than capital services, royalties and license fees, travel, and transportation, were about $15 to 29 billion, or about 4 to 8 per cent of goods and services imports ((U.S. Congress, OTA, 1986, p. 38, and Krueger, 1987).

Why then the strong current interest in services? That concern can be understood by looking at the service-industry activities of U.S. firms operating overseas. The total sales of all U.S. affiliates outside of goods-producing industries amounted to over $445 billion in 1982, as compared with $359 billion in manufacturing, and almost $200 billion in petroleum and coal mining and refining (Appendix Table A). That figure of $445 billion undoubtedly exaggerates the amount of activity in these service industries for several reasons. One is that it includes wholesale and retail trade, for which

much of the input and output is in the form of commodities. Excluding these, although they do also involve a substantial amount of service output, we are left with over $150 billion in service industry sales, still far above the official estimates of direct service exports. The OTA calculations show affiliate sales almost 50 per cent above direct exports, and almost three times as great outside of royalties and license fees, travel, and transportation. Furthermore, the recent IMF Working Party on the Statistical Discrepancy in World Balance of Payments Accounts suggested that there was a large degree of underreporting of foreign investment income of industrial countries (Taylor, 1987). Thus, outside the travel and transportation area, the sale of services by U.S. firms to buyers outside the U.S. is performed largely by U.S.-controlled firms operating in foreign countries. In other words, it is accomplished through direct investment rather than through trade (on this point, see also Kravis, 1985, and Lee and Naya, 1986). Not only are direct service exports considerably smaller than sales by U.S. service affiliates in foreign countries, even by the OTA estimates, but a substantial part of the direct exports consists of transactions that take place entirely within the United States. They are therefore not part of any plans for liberalizating trade in services. That must be the case for exports of almost all education and health services and most of travel services, $16 billion out of the OTA estimate of $80 billion in 1984 service exports.

Is this large overseas output of U.S.-controlled service-industry firms a reflection of U.S. comparative advantage in services? Since the output in these firms is taking place outside the U.S., it would be wrong to associate it with U.S. comparative advantage. An increase in U.S. comparative advantage in service industries would be reflected in an increase in the movement of

service-industry customers to the U.S., such as a rise in the number of foreign tourists in U.S. hotels and restaurants, a rise in the number of foreign students in U.S. universities, or a rise in the use of U.S. medical facilities by foreigners, as well as in some increase in direct exports of services.

Is an increase in service industry activity overseas by U.S. firms then unrelated to U.S. comparative advantage? The extent of such activity reflects the comparative advantage not of the U.S. but of U.S. firms in the service industries. As we have pointed out elsewhere in connection with manufacturing industries (Lipsey and Kravis, 1985 and 1987), the comparative advantage of a country's firms can be different from, and move differently from, that of the country itself. The comparative advantages of firms reflect assets that are mobile across international borders but not from firm to firm even within a country, while the comparative advantages of countries reflect assets (endowments) that are immobile across international borders but mobile between firms within the country. It is possible, of course, that the comparative advantage of a country's firms is in the same industries as the country's comparative advantage, because the firms have built up their knowledge and skills from their home operations. We might expect that to be particularly likely in service industries in which the provider of services must move to the consumer rather than vice versa.

In considering the causes and effects of changes in the extent to which U.S. firms satisfy foreign demands for services, we wish to make a clear separation between the two methods of meeting the demand. Changes in exports translate directly into changes in the use of U.S. factors of production, such as labor. Changes in U.S.-owned production abroad involve changes in the use

of internationally mobile U.S.-owned factors of production, such as capital and technology. The effect on U.S. labor is more ambiguous. The most negative effect would be displacement, if production is simply moved abroad without any change in the level. It could, instead, involve increases in the demand for labor, if production abroad captures large market shares and requires inputs of components or services from the U.S.

We begin our attempt to explain the service activities of U.S. multinational firms by describing the types of activities involved and their growth over the last 35 years or so. The characteristics of the overseas service activities are then analyzed with a view to relating them to the characteristics generally associated with U.S. comparative advantage and with changes in it.

The Scope of the Service Sector

The definition of the service sector varies among authors who write about it. Stigler (1956) excluded transportation, communication, and public utilities from the sector in his book on the service industries as did Victor Fuchs (1968) and Simon Kuznets (1966), the last describing the basic feature of service industries to be that "none of the activities represents in any significant way the production of commodities; each renders a product that is intangible and not easily embodied in a lasting and measurable form" (p. 143).

The broadest definition of the service sector is that it includes all the industries not covered in the goods-producing sectors. That would include government, transportation, communication, and public utilities, as well as trade, finance, and personal and business services. We will use a broad definition, but excluding government services, when the data require it, but will disaggregate the data, where possible, so as to permit comments on narrower

versions of the service sector. We exclude holding companies, where possible, because they are basically a conduit for U.S. investment rather than a part of host-country service industries. They might hold portfolio investments or, if they control foreign companies, those would appear under their appropriate industry categories. Finance operations in the Netherlands Antilles are also simply conduits, in this case for their parents' borrowing.

The Importance of Service Industries in U.S. Direct Investment Abroad

The shares of service industries in total activity of U.S. affiliates in foreign countries in 1982, by various definitions of the service sector and by various measures of activity, all imperfect, are shown below. The first of these definitions of the service sector is what we will refer to in this paper as the broad definition. It covers public utilities (including transportation and communication) and construction, as well as trade, finance, and other services (see Table 1). The second is what we will refer to as the narrow definition, excluding public utilities and construction. The service sector, narrowly defined, comprises three industry groups: trade, finance, and other services.

	Shares of Service Industries in U.S. Multinationals' Foreign Operations[a]			
	Assets	Sales	Employment	U.S. Direct Investment
Service industries, broadly defined	66.9	43.7	27.5	38.0
Trade, finance, and other services[b]	64.7	40.6	25.9	36.1
Finance, and other services[c]	56.0	14.1	9.9	18.4
Other services., excl. finance	2.6	2.9	5.7	4.7

[a]Excluding all holding companies and finance companies in the Netherlands Antilles.

[b]Excluding construction and public utilities (including transportation and communication).

[c]Excluding construction, public utilities (including transportation and communication), and trade.

Source: Appendix Table A

Table 1

Shares (%) of Individual Service Industries in U.S. Multinationals' Service Sector Operations[a], 1982

	Assets	Sales	Employment	U.S. Direct Investment
CONSTRUCTION	.7	3.1	4.7	1.3
PUBLIC UTILITIES, INCL. TRANSP. AND COMMUN.[a]	3.4	7.0	5.6	5.1
TRADE				
Wholesale trade, excl. petroleum	6.8	27.6	25.5	26.7
Petroleum wholesale trade	3.8	25.8	2.6	13.7
Retail trade, excl. gasoline	1.3	6.1	24.9	4.6
Gasoline service stations	.3	2.7	.5	.3
Total Trade	12.3	62.2	53.6	45.3
FINANCE				
Banking	67.5	19.5[b]	8.5	13.1
Finance, excl. banking[c]	7.0	2.2	2.3[d]	13.1
Insurance	5.2	3.8	4.4	9.2
Real estate	.2	.1	.1	.7
Total Finance[c]	79.8	25.6	15.3	36.1
OTHER SERVICES				
Hotels etc.	.2	.4	3.0	.6
Business services				
Advertising	.2	.4	1.6	.4
Managem., consult., & P.R.	.2	.4	.7	.7
Equipment rental	.7	.7	1.8	.6
Computer and data proc. serv.	.1	.2	.7	.3
Other business services	.2	.6	3.8	.7
Total Business Services	1.4	2.3	8.5	2.8
Motion pict., telev. tape & film	.2	.3	.3	.9
Engin., archit., & surveying serv.	.2	.8	1.7	.5
Health services	.1	.2	1.0	.0
Other services, excl. oil & gas	.3	.5	2.6	.9
Oil and gas field services	1.4	2.0	3.7	6.6
Total Other Services	3.8	6.6	20.8	12.4
TOTAL SERVICE INDUSTRIES, BROADLY DEFINED	100.0	100.0	100.0	100.0

[a]Including petroleum transport, pipelines, and storage
[b]Total income
[c]Excluding affiliates in Netherlands Antilles and Holding Companies
[d]Includes Netherlands Antilles affiliates

Source: Appendix Table A

Some of the measures of the size of service sector operations available directly from the data are assets, sales, employee compensation, employment, and the amount of direct investment. Assets reflect only capital input and should be adjusted for price differences. They have the even worse drawback, as compared to net or gross property, plant, and equipment or depreciation, that the assets may not be in the same location as the foreign affiliate and may not be inputs into the affiliate's production. They may even be in the U.S. in some cases. Sales in some industries include large amounts of goods imported by the foreign affiliate and therefore exaggerate production in the affiliate, although they are the best measure of market share. Employment and employee compensation reflect labor input, and employee compensation has the advantage of combining crude labor input with a measure of human capital input or the quality or skill level of labor, as will be discussed later. Employee compensation is omitted from the table only because the shares are very similar in these aggregates to employment shares. Direct investment reflects the parents' investment in the foreign operations but not the input of foreign labor or of investment by others. It has the drawbacks of the asset measure as an indicator of total input, but these are compounded by the omission of assets financed by borrowing from sources other than the parent company. Its main advantage is its availability over time and for comparison with other countries.

From these calculations, we find that the broadly defined service sector accounted for two thirds of the total assets employed in foreign affiliates, but for less than half of labor input, sales, and U.S. investment. A large share of the assets is in banking and much of it is provided not by U.S. investors but by local depositors. Service industries outside of trade, finance, construction and public utilities, accounted for under 6 per cent of assets, sales, and

employment.

Within the service sector, defined to include all except goods production, banking was a large part, over two thirds of assets, about 20 per cent of sales, and about 9 per cent of employment (Table 1). Wholesale and retail trade accounted for only a bit over 10 per cent measured by assets, but for over half of service industry sales and employment. The other services' share is largest, over 20 per cent, measured by employment, but was less than 7 per cent of sales and 4 per cent of assets.

Trends in the Importance of the Service Sector in U.S. Direct Investment

To follow trends over time in the importance of the service sector, we must compromise on definitions of both scope and activity, because breakdowns by detailed service industry of data on assets, sales, and employment were published in less detail before 1982. We can follow one measure of the share of service industries in U.S. firms' operations abroad back to 1929: that is, their share in the book value of direct investment. The defects of this measure were mentioned above, but it is the one for which the historical record is most readily available.

Two very different trends are evident: one for public utilities, including transportation and communication, and the other for the remaining parts of the broadly defined service sector. U.S. direct investment in foreign public utilities was concentrated in the 1920s; their share of the investment stock hit a peak sometime during the early 1930s and declined rapidly after that. By 1985, their share was only 2 per cent of the total, something like one tenth of their earlier importance.

Share of the Service Sector[a] in Total U.S. Direct Investment

	Including Petroleum Trade & Services		Excluding Petroleum Trade & Services			
			Excluding Holding Companies		Including Holding Companies	
	Construct. & Public Util.	Other	Construct. & Public Util.	Other	Public Util.	Other
1929					21.4	12.3
1936					24.5	11.3
1943					17.7	16.9
1950		NA		11.7	12.1	12.1
1957	13.7	16.8	9.0	11.5	8.4	11.9
1966	7.5	20.6	5.3	16.0		
1977	4.1	31.9	2.3	26.6		
1982	2.4	35.7	1.6	27.8		
1985	2.1	36.1	1.5	29.9		

[a]Construction, Public utilities (including transportation and communication), Trade, Finance (including banking) and other services, excluding finance affiliates in the Netherlands Antilles, and, where possible, holding companies.

Source: Lipsey (1988), Table 8.A.1.

The share of other service industries, aside from what appears to have been an aberration in 1943, was a little over 10 per cent of U.S. direct investment from 1929 through the mid-1950s. After 1957, it began to grow, doubling by 1985. It is that growth in the importance of the more narrowly defined sector, trade, finance, and other services, that is the basis for the belief that the importance of service industries in U.S. investment has been increasing rapidly.

Of the three major components of this narrowly defined service sector, the ones responsible for the sector's growth after 1950 were trade (largely wholesale trade) and finance, especially the latter. The finance part of the service

sector grew from 3 ½ per cent of total direct investment to over 15 per cent. Other nonfinancial services accounted for a very small part of aggregate investment and even for a small part of investment in the service sector.

	Share in Total U.S. Direct Investment[a]							
	1929	1936	1950	1957	1966	1977	1982	1985
Trade, incl. petroleum	NA	NA	NA	11.4	12.4	16.4	17.1	15.6
Trade, excl. petroleum	4.9	5.8	6.5	6.6	8.8	12.4	11.8	12.0
Banking	7.4	5.4	3.5	.5	.6	3.2	5.0	6.3
Other Finance				3.3	4.3	8.1	8.9	9.3
Other services, excl. petrol.			1.7	1.2	2.4	2.9	2.2	2.3
Total incl. pet. trade	NA	NA	NA	16.0	19.0	30.6	33.2	33.5
Total excl. pet. trade	12.3	11.2	11.2	11.1	15.4	26.6	27.9	29.9

[a]Excluding holding companies and financial affiliates in Netherlands Antilles from 1950 through 1985

Source: Lipsey (1988), Table 8.A.1

Some perspective on the growth of the narrowly defined service sector in U.S. direct investment may be derived from a comparison with foreign direct investment in the U.S.

	Share of the Service Sector[a] in Total Direct Investment		
	U.S. Investment in Foreign Countries (1)	Foreign Investment in the U.S. Incl. Petrol. (2)	Foreign Investment in the U.S. Excl. Petrol. (3)
1966	19.9		
1974	(28.4)[b]	(32.9)[c]	32.0
1977	31.9		
1980		42.0	40.9
1982	35.7	44.8	
1985	36.1	45.6	

[a]Trade, finance (incl. banking), and other services, excl. finance affiliates in the Netherlands Antilles, holding companies, public utilities, and transportation.

[b]Interpolated between 1966 and 1977 by the share of trade, finance, and "other industries" in estimates based on the 1966 survey reported in U.S. Department of Commerce (1982) and Whichard (1979).

[c]Extrapolated from 1980 by Column 3.

Source: Lipsey (1988), Tables 8.A.1 and 8.A.9.

Our rough estimates suggest that the share of the narrowly defined service sector grew between 1974 and 1985 by 27 per cent in U.S. investment abroad and 39 per cent in foreign investment in the U.S. Both are considerably above the growth in the share of the service sector in U.S. nonagricultural private employment by 17 per cent, from 54 per cent in 1974 to 63 per cent in 1984 (U.S. Dept. of Commerce, 1985b, pp. 46-48 and later issues of the Survey of Current Business). Similarly, the 80 per cent growth of the service share in U.S. direct investment between 1966 and 1985 was far above the growth in the domestic employment share of almost 30 per cent. Thus, while the service shares in both inward and outward investment were lower than in U.S. domestic employment, they were growing much more rapidly.

The Importance of Trade and Overseas Activity for U.S. Service Industry Multinationals

The impact on the U.S. of the activities of service industry parent companies and affiliates is related to the degree to which they engage in trade in services[1] or affect trade in goods. The extent to which service output is tradable and the extent to which the competitive advantages of service firms can be exploited outside their home countries determine many of the other impacts of service industry direct investment.

Parents in service industries are, on the average, less export-oriented than those in manufacturing (Table 2). There are exceptions, however. Companies in wholesale trade, equipment rental, engineering and architectural services, and construction, all make close to 10 per cent or more of their sales to foreigners. These service industries, at least, do not appear to be confined to their local markets, but most service industry parents do very little exporting.

Service industry parents not only trade less than parents in goods industries but also do far less of their trade with their affiliates (Table 3). Only about 20 per cent of their exports are to affiliates, as compared with about 45 per cent for goods industries. Thus, direct investment seems to be much less important as a conduit for the exports of service industry parents than for the exports of parents in goods industries.

The lack of connection between investment and trade is evident on the import side as well; imports from affiliates are less than 1 per cent of service industry parent sales, as compared with 4 per cent in goods industries. One reason for the unimportance of trade with affiliates in the service

[1]We define exports here as sales by a parent or affiliate to a buyer in another country. For goods industries outside of the petroleum sector, this is close to the amount of goods physically shipped from the exporting firm. The meaning is much more uncertain for service industries because "shipment"

Table 2

Exports as Per Cent of Sales
U.S. Parent Companies of Majority-Owned Foreign Affiliates, 1982

ALL INDUSTRIES[d]	11.00
GOODS INDUSTRIES	
Primary production[a]	6.16
Petroleum and coal products[b]	20.99
Manufacturing	11.10
TOTAL GOODS INDUSTRIES	13.93
Construction	9.73
Transp., commun., and public utilities	2.35
Wholesale trade, excl. petroleum	20.78
Petroleum wholesale trade	12.55
Retail trade	.39
Financial services, excl. banking	2.01
Finance, except banking	2.89
Insurance	1.93
Real estate	0
Services, excl. finance and petroleum	6.00
Hotels etc.	2.56
Business services	5.71
Advertising	2.24
Managem., consult., & P.R.	5.43
Equipment rental	16.90
Computer services	6.86
Other business services	5.39
Motion pictures	3.13
Engineering, archit., etc.	23.39
Health services	1.73
Other services	2.94
Oil and gas field services	14.08
Other petroleum services[c]	.76
TOTAL SERVICE INDUSTRIES, BROADLY DEFINED[d]	6.11

[a]Agriculture, mining, and petroleum extraction

[b]Including integrated petroleum refining and extraction

[c]Tankers, pipelines, storage, gasoline service stations

[d]Excluding banking

Source: U.S. Department of Commerce (1985a), Table III.E6.

Table 3

Trade with Affiliates as Per Cent of Sales
U.S. Parent Companies of Majority-Owned Foreign Affiliates, 1982

	Exports to Affiliates	Imports from Affiliates
ALL INDUSTRIES[e]	4.54	2.83
Primary production[a]	1.34	1.75[d]
Petroleum and coal products[b]	11.00	6.81
Manufacturing	4.32	2.88
TOTAL GOODS INDUSTRIES	6.23	4.01[d]
Construction	NA	.18
Transp., commun., and pub. util.	.22	1.14
Wholesale trade, excl. petroleum	4.59	1.57
Petroleum wholesale trade	NA	1.39
Retail trade	NA	NA
Financial services, excl. banking	.67	.41
Finance, except banking	NA	NA
Insurance	NA	.28
Real estate	0	0
Services, excl. finance and petroleum	.82	.35
Hotels etc.	NA	.06
Business services	.99	.38
Advertising	NA	NA
Managem., consult., & P.R.	NA	.20
Equipment rental	NA	NA
Computer services	NA	.53
Other business services	NA	NA
Motion pictures	.08	NA
Engineering, archit., etc.	2.47	.58
Health services	NA	NA
Other services	NA	NA
Oil and gas field services	NA	.68
Other petroleum services[c]	NA	.19
TOTAL SERVICE INDUSTRIES, BROADLY DEFINED[e]	1.29	.92

[a]Agriculture, mining, and petroleum extraction
[b]Including integrated petroleum refining and extraction
[c]Tankers, pipelines, storage, gasoline service stations
[d]Excluding agriculture
[e]Excluding banking

Source: U.S. Department of Commerce (1985a), Tables III.E6, III.M1, and III.N1

industries must be the fact that the service parents have fewer affiliates, and have affiliates in fewer countries than parents in goods industries. Thus, the positive relationships between investment in production abroad and exports from the home country or by the investing firms, usually found for manufacturing industries, are likely to be of little importance for service industries.

Unlike their parents, affiliates owned by service industry parents are quite export-oriented. More than 40 per cent of the sales of affiliates of service industry parents were exported, while the proportion for affiliates of parents in goods producing industries was about one third (Table 4). The highest export propensities are in affiliates of parent firms in wholesale trade, including petroleum trade, and in equipment rental.

While in most cases the export propensities of affiliates reflect their parents' industries as well as their own--that is, the propensities are similar for affiliates classified by their parents' industries and by their own industries--there are exceptions. For example, affiliates in financial services are much more export-oriented than affiliates of financial service parents. Affiliates of parents in the equipment rental and public utilities industries are very export-oriented, but affiliates in those industries are not. On the other hand, affiliates whose parents are in management, consulting, and public relations do relatively little exporting, while affiliates that are themselves in that industry export more than two thirds of their

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cannot be observed and it is not always clear, as has been mentioned above, where production has taken place. Thus, it is conceivable, for example, that a service "exported" by a finance affiliate to a parent in the U.S. was actually "produced" largely in the U.S. by assets owned by the foreign affiliate.

Table 4

Export Propensities of Majority-Owned U.S. Affiliates, by Industry of Affiliates and Industry of Parents, 1982

	Exports as Per Cent of Sales, Affiliates Classified by Industry of	
	Affiliate	Parent
ALL INDUSTRIES[d]	34.6	34.6
Primary production[a]	63.5	41.6
Petroleum and coal products[b]	16.6	31.3
Manufacturing	33.9	33.8
TOTAL GOODS INDUSTRIES	33.5	32.9
Construction	9.5	3.4
Transp., commun., and pub. util.	9.2	37.9
Wholesale trade, excl. petroleum	41.7	56.3
Petroleum wholesale trade	46.2	62.7
Retail trade	2.2	5.6
Financial services, excl. banking	37.8	19.1
Finance, except banking	53.9	28.2
Insurance	26.3	18.5
Real estate	NA	NA
Services, excl. finance & petroleum	19.8	20.1
Hotels etc.	.5	5.6
Business services	21.2	13.7
Advertising	.8	.8
Management, consulting, & P.R.	69.2	16.8
Equipment rental	5.8	79.6
Computer services	15.5	22.2
Other business services	16.3	13.2
Motion pictures	46.4	34.3
Engineering, archit., etc.	27.8	32.9
Health services	NA	9.7
Other services	NA	7.2
Oil and gas field services	5.6	12.8
Other petroleum services[c]	2.6	6.2
TOTAL SERVICE INDUSTRIES, BROADLY DEFINED[d]	36.0	40.3

[a]Agriculture, mining, and petroleum extraction
[b]Including integrated petroleum refining and extraction
[c]Tankers, pipelines, storage, gasoline service stations
[d]Excluding banking
Source: U.S. Department of Commerce (1985a), Tables III.E2 and III.E6

sales. The inference is that the consulting and management affiliates that are so export-oriented are owned by parent firms in other industries.

The relatively high reported export ratios for some finance sectors are subject to some of the doubts referred to above in the discussion of assets as a size measure. Since much of the assets of a finance affiliate may be located outside the host country, exports to the U.S. by a Caribbean financial affiliate of a U.S. firm may in fact originate in the U.S. and never involve any factors of production located in the host country.

Aside from financial services, some of the other service industries appear in the data to be particularly host-country oriented: hotels, advertising, health services, and other services all export less than 10 per cent of their output. Particularly in the case of hotels, there is good reason to be suspicious of the reported ratios. The affiliate questionnaire asks for "sales to persons in affiliate's country of location," a question that would most likely put sales to many U.S. tourists in the category of domestic sales even though, since the tourists are U.S. residents, the balance of payments criterion would treat the sales as exports (see Whichard, 1987).

Almost all of the exports of U.S. affiliates in goods-producing industries are goods rather than services, and almost all the exports of affiliates in public utilities, finance, and other service industries are services (Table 5). However, there are some substantial exceptions. Wholesale trade affiliates, including those in petroleum trade, export goods almost entirely, as does the construction industry. The wholesale trade affiliates account for such a large share of service industry exports that the share of goods in total exports of service industry affiliates is almost 90 per cent.

Another characteristic of the trade of affiliates of service industry

Table 5

Share of Service Exports in Total Sales and in Total Goods and Service Exports of U.S. Majority-Owned Affiliates, by Industry of Affiliate, 1982

	Per Cent of	
	Total Sales	Total Exports
ALL INDUSTRIES[a]	2.03	5.89
Primary production	<.07	<.11
Petroleum and coal products[b]	.20	1.23
Manufacturing	.34	1.02
TOTAL GOODS INDUSTRIES	.27 - .28	.81 - .83
Construction	.97	10.22
Transp., commun., and pub. utililities	9.10	99.23
Wholesale trade, excl. petroleum	.30	.72
Petroleum wholesale trade	.06	.13
Retail trade	<.24	NA
Financial services, excl. banking	37.74	99.81
Finance, except banking	53.84	99.92
Insurance	26.26	100.00
Real estate[d]	19.79	81.43
Services, excl. finance and petroleum	19.08	96.58
Hotels etc.	.52	100.00
Business services	19.92	94.12
Computer services	14.85	95.52
Other business services	20.45	94.01
Motion pictures	46.43	100.00
Engineering, architecture, etc.	27.71	99.55
Health services		
Other services	2.77	92.77
Oil and gas field services	5.03	90.05
Other petroleum services[c]	1.02	38.66
TOTAL SERVICE INDUSTRIES, BROADLY DEFINED[a]	4.40 - 4.41	12.21 - 12.24

[a]Excluding banking
[b]Including integrated petroleum refining and extraction
[c]Tankers, pipelines, storage, gasoline service stations
[d]Including holding companies

Source: U.S. Department of Commerce (1985a), Table III.E11

parents is that it is less oriented to the United States, and particularly to the parent companies, than is the trade of affiliates of goods producing companies. Their exports to parents are less than half as large, relative to their total sales, as those of affiliates of goods producing firms, and their imports from their parents are only a third as large (Table 6). Thus, while affiliates of manufacturing firms often appear to be part of an integrated structure of supply for the parent companies' worldwide demand, the affiliates of service firms seem to be much more free-standing, neither supplying their parents nor being supplied by them to any great degree.

The relatively weak trade connections between affiliates of service parents and the U.S. and between the affiliates and their own parents are visible also for affiliates that are themselves in service industries. Their exports to their parents, in particular, were only a little more than half as large relative to affiliate sales as those of affiliates in goods industries (Table 7). However, affiliates in some service industries were very much oriented to exports to the U.S. and to their parents, particularly those in non-banking finance and in management, consulting, and P.R. The strongest trade ties with parents and with the U.S., it is clear, are between affiliates in these two industries and parents in other industries, possibly goods industries. Thus, the cases in which service affiliates are tied into worldwide intracompany trade networks probably involve parent firms outside the service industries.

For broad industry groups, it is possible to observe differences between affiliates in industrial countries and those in LDCs in the extent of their trade ties with the U.S. Those in LDC's were more closely tied to the U.S. as a market than those in developed countries.

Table 6

Extent of Trade Linkages with Parents and with the U.S., Majority-Owned U.S. Affiliates, by Industry of Parent, 1982

	Per Cent of Total Sales			Exports to Parents as % of Exports
	Exports to		Imports from Parents	
	U.S.	Parents		
ALL INDUSTRIES[e]	10.5	8.7	6.1	25.2
Primary production[a]	6.7	1.8	4.8	2.2
Petroleum and coal products[b]	14.6	13.0	0.9	41.5
Manufacturing	9.4	8.1	10.9	24.1
TOTAL GOODS INDUSTRIES	11.4	10.0	7.1	30.3
Construction	1.1	0.5	0.4	15.0
Transp., commun., and pub. util.	28.4	24.6	3.0	64.9
Wholesale trade, excl. petroleum	11.4	4.0	6.0	7.2
Petroleum wholesale trade	4.3	2.9	0.7	4.7
Financial services, excl. banking	6.7	3.0	0.7	15.8
Finance, except banking	16.3	NA	0.0	NA
Insurance	5.2	2.5	0.9	13.6
Real estate	NA	NA	0.0	NA
Services, excl. finance and petrol.	2.8	2.0	1.4	9.9
Hotels etc.	NA	1.0	0.3	17.7
Business services	2.6	1.8	2.6	13.4
Managem., consult., & P.R.	1.1	1.1	0.4	6.5
Computer services	4.2	3.8	2.8	17.1
Other business services	2.5	1.5		13.2
Motion pictures	NA	NA	0.3	NA
Engineering, archit., etc.	2.4	1.2	NA	3.6
Health services	8.8	NA	0.3	NA
Other services	NA	NA	0.6	NA
Oil and gas field services	NA	1.5	5.6	11.6
Other petroleum services[c]	5.7	4.8	0.4	78.6
TOTAL SERVICE INDUSTRIES, BROADLY DEFINED[d]	8.0	4.3	2.4	9.9

[a]Mining only
[b]Including integrated petroleum refining and extraction
[c]Tankers, pipelines, storage, gasoline service stations
[d]Excluding retail trade and banking
[e]Excluding banking

Source: U.S. Department of Commerce (1985a), Tables III.E6 and III.G8

Table 7

Extent of Trade Linkages with Parents and with the U.S., Majority-Owned U.S. Affiliates, by Industry of Affiliate, 1982

	Per Cent of Total Sales: Exports to U.S.	Per Cent of Total Sales: Exports to Parents	Exp. to Parents as % of Exports	Per Cent of Affiliate Sales: Imports From U.S.	Per Cent of Affiliate Sales: Imports From Parents
ALL INDUSTRIES	10.5	8.7	25.2	7.2	6.1
Primary production[a]	39.1	35.2	55.4	2.1	0.8
Petroleum and coal products[b]	7.1-7.4	5.6-5.8	33.7-35.2	0.6	0.5
Manufacturing	9.7	8.3	24.6	12.8	10.7
TOTAL GOODS INDUSTRIES	12.7	10.9-11.0	32.5-32.9	8.7	7.1
Construction	0.3	.3	2.7	1.2	0.8
Transp., commun., and pub. util.	6.4	5.5	60.1	1.3	0.9
Wholesale trade, excl. petroleum	4.8	2.8	6.8	12.4	11.3
Petroleum wholesale trade	10.4	8.2	17.8	0.7	0.6
Retail trade	0.2	.1	6.7	2.8	2.5
Financial services, excl. banking	23.0	17.6	46.5	0.1	0.0
Finance, except banking	35.9	33.4	61.9	0.0	0.0
Insurance	13.8	6.3	24.0	0.0	0.0
Real estate	1.0	1.0	NA	1.5	0.0
Services, excl. finance and petroleum	5.4	5.2	26.3	1.5	0.8
Hotels etc.	d	NA	NA	0.9	0.2
Business services	9.8	9.5	44.9	1.3	1.0
Advertising	0.3	.1	9.1	0.0	0.0
Managem., consult., & P.R.	32.4	32.4	46.9	0.0	0.0
Equipment rental	1.3	.5	8.4	1.6	1.4
Computer services	4.5	4.1	26.1	6.1	4.6
Other business services	10.0	10.0	61.2	0.9	0.6
Motion pictures	d	NA	NA	0.0	0.0
Engineering, archit., etc.	1.5	NA	NA	0.3	0.2
Health services	0.0	0	NA	4.4	1.3
Other services	0.7	NA	NA		
Oil and gas field services	0.6	.3	4.9	8.2	5.3
Other petroleum services[c]	<2.6	NA	NA	0.1	0.1
TOTAL SERVICE INDUSTRIES, BROADLY DEFINED[e]	7.5	5.6-5.8	15.6-16.0	5.3	4.7

[a]Agriculture, mining, and petroleum extraction
[b]Including integrated petroleum refining and extraction
[c]Tankers, pipelines, storage, gasoline service stations
[d]Included in other services
[e]Excluding banking
Source: U.S. Department of Commerce (1985a), Tables III.E2, III.G4, and III.G6

	Exports to the U.S. as Per Cent of Sales by Affiliates in:	
	Developed Countries	LDCs
ALL INDUSTRIES	5.3	20.3
Petroleum	7.2	25.9
Manufacturing	9.1	12.1
Wholesale trade	4.5	6.9
Finance, excl. banking	5.5	48.9
Services	5.9	3.2
Other industries	4.0	9.6

Source: U.S. Department of Commerce (1985a), Tables II.D3 and III.E4.

However, the outstanding cases of export orientation were finance affiliates in Bermuda and the Netherlands Antilles. The former exported to both the U.S. and other countries, while the latter dealt mainly with the U.S. These two countries overwhelmingly dominated the data for the finance sector in LDCs; most of the LDCs had no U.S. finance affiliates at all.

Service industry multinationals in the U.S. are not only less export-oriented than U.S. goods producing firms and less tied to their overseas operations by trade, but also conduct less of their business overseas than goods industry firms. There are many criteria that can be used to measure the degree of internationalization of these firms, and several of them are set out here. It should be stressed that these ratios of foreign to domestic activity are not measures of the degree to which each industry operates overseas; firms with no overseas operations are excluded. The ratios refer to firms that do operate overseas to some degree and are therefore upper bounds to the degree of internationalization of their industries. The degree to which they are higher than ratios for their industries as a whole must vary from one industry to another, but it is pretty certain that the bias is larger for services than for goods industries, where foreign operations are more common.

Even with this feature, the data show that service multinationals outside of banking have much smaller shares of their capital and labor inputs producing overseas than do multinationals in goods industries: physical capital input in affiliates of service parents is only 8 per cent of parent capital, while in goods industries it is more than a third. Labor input in affiliates of service parents is a little under 20 per cent of that of the parents while in goods industries it is close to half (Table 8). Banks, in sharp contrast to most other service industries, hold a third of their assets through their foreign affiliates, although their share of labor input in affiliates is close to that of other service industries.

The capital and labor input measures of Table 8 give partial views of the extent to which these firms operate outside the United States. More comprehensive measures, comparing sales and production inside and outside the U.S., are given in Table 9. The difference between the sales and production columns is in the treatment of parent shipments to affiliates. The sales column includes affiliates' imports from their parents in affiliate sales but not in parents' sales, while the production estimate treats all parents' sales as parents' production and subtracts parents' shipments to affiliates from affiliate sales to estimate affiliate production.

By both of these measures, parents in goods industries are more international than those in service industries. There are a few exceptionally international service industries, however, that are close to or even above the level of the goods industries, and particularly that of manufacturing. The most international of the service companies are those in banking and oil and gas field services, but in advertising, engineering and architectural services, construction, and wholesale trade, foreign affiliates' sales are at

Table 8

Foreign Affiliate Activity as Per Cent of Parent Activity in the U.S., by Industry of Parent, 1982

	Assets	Net Property, Plant, & Equipment	Employ-ment	Employee Compen-sation
ALL INDUSTRIES	35.9	NA	35.1	21.3
ALL INDUSTRIES, EXCL. BANKING	28.5	24.4	35.6	21.5
Primary production[a]	31.1	23.0	98.5	36.3
Petroleum and coal products[b]	56.8	43.2	34.6	29.2
Manufacturing	37.5	33.3	45.7	25.5
TOTAL GOODS INDUSTRIES	42.2	36.5	45.8	25.9
Construction	32.6	22.4	21.9	17.3
Transp., commun., and pub. util.	5.1	2.2	6.3	27.4
Wholesale trade, excl. petroleum	33.8	33.8	35.0	22.5
Petroleum wholesale trade	29.9	20.5	36.8	23.0
Retail trade	13.0	14.8	18.9	11.7
Banking	56.0	NA	22.0	15.0
Financial services, excl. banking	14.8	31.0	39.1	31.4
Finance, except banking	7.0	24.4	13.3	7.2
Insurance	11.0	23.3	31.1	23.6
Real estate	869.8	62.1	50.0	35.7
Services, excl. finance and petrol.	18.2	10.3	14.7	14.2
Hotels etc.	8.6	5.7	7.0	5.8
Business services	23.2	10.9	23.4	21.4
Advertising	42.0	27.6	52.1	40.4
Managem., consult., & P.R.	17.9	8.0	20.1	19.1
Equipment rental	17.2	7.2	14.8	11.9
Computer services	14.8	8.5	11.9	13.3
Other business services	21.8	16.8	20.4	16.3
Motion pictures	15.8	4.4	5.5	6.7
Engineering, archit., etc.	27.7	33.0	30.8	30.3
Health services	11.8	5.0	5.2	3.6
Other services	14.3	9.0	14.6	9.1
Oil and gas field services	43.3	38.5	33.1	24.2
Other petroleum services[c]	15.6	15.8	17.2	8.3
TOTAL SERVICE INDUSTRIES, BROADLY DEFINED	32.3	NA	19.6	13.0
SAME, EXCLUDING BANKING	14.6	8.1	19.4	12.8

[a]Agriculture, mining, and petroleum extraction
[b]Including integrated petroleum refining and extraction
[c]Tankers, pipelines, storage, gasoline service stations
Source: U.S. Department of Commerce (1985a), Tables I.J1, I.R1, II.A13, II.K1

Table 9

Foreign Affiliate Sales, Production, and Exports, as Per Cent of those of Parents, by Industry of Parent, 1982

	Sales[d]	Production[e]	Exports[f]
ALL INDUSTRIES	42.0	39.3	NA
ALL INDUSTRIES, EXCL. BANKING	40.7	37.8	101.9
Primary production[a]	36.2	34.4	173.4
Petroleum and coal products[b]	70.1	69.2	78.2
Manufacturing	45.2	39.4	107.8
TOTAL GOODS INDUSTRIES	52.4	47.8	95.1
Construction	38.0	37.4	12.3
Transp., commun., and pub. util.	5.9	5.7	74.5
Wholesale trade, excl. petroleum	34.7	32.3	105.2
Petroleum wholesale trade	47.3	46.9	237.3
Retail trade	15.8	15.4	132.5
Banking	69.4	69.4	NA
Financial services, excl. banking	18.2	18.0	128.1
Finance, except banking	22.5	22.5	103.7
Insurance	13.8	13.6	107.9
Real estate	NA	NA	NA
Services, excl. finance and petroleum	19.2	19.0	59.3
Hotels etc.	7.5	7.4	14.3
Business services	23.6	22.9	49.5
Advertising	34.7	34.7	11.8
Managem., consult., & P.R.	18.4	18.3	56.8
Equipment rental	21.7	21.7	72.4
Computer services	20.8	19.8	44.7
Other business services			46.2
Motion pictures	25.2	25.1	271.6
Engineering, archit., etc.	49.0	48.6	68.1
Health services	4.9	4.9	23.9
Other services	11.3	11.3	24.9
Oil and gas field services	54.6	50.2	41.7
Other petroleum services[c]	4.5	4.5	32.6
TOTAL SERVICE INDUSTRIES, BROADLY DEFINED	22.6	22.1	NA
SAME, INCLUDING BANKING	28.0	27.5	128.0

[a]Agriculture, mining, and petroleum extraction
[b]Including integrated petroleum refining and extraction
[c]Tankers, pipelines, storage, gasoline service stations
[d]Affiliate sales as per cent of parent sales other than shipments to affiliates
[e]Affiliate sales minus shipment from parents as per cent of parent sales
[f]Majority-owned affiliates and their parents only
Source: U.S. Department of Commerce (1985a), Tables II.D9, II.N1, II.P1, III.E6, and III.N1

least a third of parents' sales. The largest differences between the sales and production measures are in primary production and manufacturing, because imports from parents are relatively important as a part of affiliate sales.

The one respect in which service industry multinationals are relatively international is their exporting. As could be inferred from the fact that export propensities are higher for service industry affiliates than for parents in service industries, a large part of service exports is accounted for by the affiliates. For firms in the service industries, more exports were made from affiliates than from their parents. That was true also for manufacturing, but the margin was larger for services, mainly as the result of the large exports of finance industry affiliates. Thus, financial service industries seem to have chosen their affiliates to serve not only host-country markets, but other markets as well, including the U.S. As noted earlier, however, these finance affiliates are heavily concentrated in a few Caribbean and West Indies countries.

While wholesale trade and financial service firms did more exporting from abroad than from the U.S., the same was not true for firms in most non-financial service industries. They did most of their exporting (not very large in any case) from the U.S. However, the proportion of exporting done from abroad was generally much greater than the share of the foreign affiliates in inputs of labor and capital, a fact that is implicit in the higher export propensities of affiliates relative to parents mentioned above.

Characteristics of Multinationals in Service Industries

Service industries are often described as offering mainly low paid jobs to workers of little skill, and it is usually assumed that service industries are more labor intensive than goods producing industries. In this section we exa-

mine the factor intensities of U.S. multinational firms (MEs) in the service industries to see whether they conform to the stereotype. If they did, and were characterized by low physical capital and particularly by human capital intensity, it would not be likely that these industries would be ones in which U.S. firms would have any comparative advantage.

Definitions and Concepts

The measure of labor input we use in forming ratios of capital or other inputs to labor is the number of employees. Annual hours of work would be better, but work hours are available in the benchmark surveys only for production workers in manufacturing; these workers account for not much over half of the manufacturing employment of majority-owned foreign affiliates (U.S. Dept. of Commerce, 1985a, Table III.F 13) and less than 40 percent of all employment in majority-owned affiliates (MOFAs) (Table III.F 11). Some inkling of the difference the use of hours could make is given by the fact that among 32 detailed manufacturing industries for which hours data are provided, the highest number of annual hours per worker (averages across host countries) was 27 per cent above the lowest (Table III.F 14).

For the measures of nonhuman capital input, the published reports of the benchmark surveys offer several variants of assets, including total assets and gross and net property, plant and equipment. All three measures are based on historical cost and are converted from local currencies to U.S. dollars via exchange rates, whereas purchasing power parities for capital goods would be preferable converters, at least for fixed capital. "Net property, plant and equipment" (hereafter "net property"), in addition to the assets named, includes land, mineral rights, construction in progress, and capitalized tangible and intangible natural resource exploration and development costs. Total assets

include current assets, net property, and other non-current assets including equity in other enterprises. In 1982, parents' net property was 34% of total assets (Table III.K 1) and non-current investments were 22%; the corresponding MOFA percentages were 28% and 12% (Table III.A 3). Both total assets and net property are after deduction of depreciation, depletion, and like charges. The published reports give gross figures only for majority-owned affiliated, while the net property measure is available for all affiliates, except banks, and the total assets for all, including banks. For MOFAs in 1982, the value of gross property was 63 percent higher than that of net property (Table III.C2). This leaves room for large differences between the capital intensities of the various industries as measured by the gross and net concepts. The net concept, for which data are more available, is theoretically the appropriate one, although the dubious matching of declines in physical usefulness of capital goods and the bookkeeping entries for depreciation is a drawback to its use. As between total assets and net property, the latter, representing mainly physical things, comes closer to the Heckscher-Ohlin concept of capital than does total assets with its inclusion of cash, receivables, and investments. The case for excluding investments is clear; investments in other firms or entities do not represent capital employed in the production carried on within the enterprise. However, bank accounts and other receivables may also represent capital used outside the affiliate's country and do not necessarily contribute to output in the affiliate's host country. The difference between the total asset and net property concepts is particularly great for financial institutions, for which fixed assets play a small role in input.

Our measure of human capital or skill intensity is average compensation per worker, including fringe benefits as well as wages and salaries. This suffers

from the previously mentioned defects of employment as a measure of labor input, and average compensation per hour would be preferable if it were available. A further problem is that, where employees of affiliates are concerned, the compensation, paid mainly in non-dollar currencies, is converted to dollars via exchange rates. The appropriate converter is the purchasing power of each currency over labor of different qualities. The exchange rate method understates the purchasing power of the currencies of low income countries, particularly over unskilled labor (Kravis and Lipsey, 1982; Bhagwati, 1984) and thus understates these labor inputs. Also, the premium for education and skill in different countries is inversely correlated with the per capita income level, and employee compensation for different industries may, on this account also, be influenced by the industry to industry variations in the distribution of affiliate employment over countries with different per capita incomes.

An alternative approach to human capital would be to measure labor quality directly by characteristics of the labor force. A difficulty with this procedure is that such quality indexes have to be based on proxies, such as years of education completed or school enrollment, the relation of which to productivity is not well established. Furthermore, the indexes would apply to a nation's labor force as a whole rather than to the workers employed by individual parents and affiliates or even the aggregate of affiliates in individual countries.[2]

The last type of capital input we examine is the input of technology in the form of research and development. The measure should ideally be in the form of the return on technological capital plus the depreciation on it or, as in the case of physical capital, at least the stock of technological capital. Unfortunately, we must settle for the current investment in such capital in the

[2]For a discussion of such corrections and examples, see Denison (1967), Harbison and Myers (1964), Kravis and Lipsey (1982), pp. 213-214, Krueger (1968), Lary (1968), pp. 35-40.

form of research and development expenditures, with the factor input ratio proxied by R & D expenditures per worker. A mitigating factor is that because R & D investment is much more stable than physical capital investment, a single year's expenditure gives a better estimate of the long-run rate of expenditure and of the accumulated stock than would be the case for a single year's data on physical capital investment.

Factor Intensities of Service Sector Multinationals

Contrary to the common impression, parents in the combination of sectors we refer to as services operate with higher physical capital intensity than those in goods production and particularly those in the manufacturing sector. About half of the service industries are relatively labor intensive, but there are a few that are extremely capital intensive, such as petroleum trade and services, real estate, equipment rental, and transportation and public utilities (see Table 10).

	Parent Physical Capital Intensity[a], 1982 ($000)
Service industries, broadly defined, excluding banking	55
Goods industries	47
Manufacturing	30

[a]Net property, plant, and equipment per worker

Source: Table 10.

In general, affiliates outside petroleum-related industries are less physical-capital intensive than their parents. However, because affiliate employment is heavily concentrated in labor intensive industries (Table 12 and Appendix Table A), the difference was much larger for the service industries

Table 10

Measures of Physical and Human Capital Intensity
U.S. Parent Companies of Foreign Affiliates, 1982

	Net Property, Plant, and Equipment per Employee	Assets per Employee ($ thousands)	Compensation per Employee
ALL INDUSTRIES	NA	193.1	27.6
ALL INDUSTRIES, EXCL. BANKING	49.9	146.6	27.8
Primary production[a]	276.0	463.9	30.8
Petroleum and coal products[b]	210.6	380.0	36.3
Manufacturing	31.8	96.6	29.7
TOTAL GOODS INDUSTRIES	46.8	120.3	30.2
Construction	16.6	54.1	33.7
Transp., commun., and pub. util.	133.4	167.8	34.1
Wholesale trade, excl. petroleum	22.8	109.4	21.7
Petroleum wholesale trade	179.9	627.9	33.4
Retail trade	11.9	45.4	14.1
Banking	NA	1,379.6	23.3
Financial services, excl. banking	17.9	673.5	26.3
Finance, except banking	12.0	1,091.0	47.7
Insurance	17.3	628.7	24.0
Real estate	523.2	830.5	19.1
Services, excl. finance and petroleum	23.6	53.0	18.2
Hotels etc.	20.7	29.2	11.6
Business services	18.2	54.3	21.0
Advertising	9.3	73.3	32.0
Managem., consult., & P.R.	23.7	129.5	35.5
Equipment rental	487.6	783.5	28.0
Computer services	17.7	45.2	22.6
Other business services	6.0	23.6	16.0
Motion pictures	7.8	91.0	14.3
Engineering, archit., etc.	32.3	102.1	24.4
Health services	26.3	41.4	15.8
Other services	32.8	58.2	20.7
Oil and gas field services	66.5	150.8	35.1
Other petroleum services[c]	238.3	413.6	36.6
TOTAL SERVICE INDUSTRIES, BROADLY DEFINED	NA	298.0	23.9
SAME, EXCL. BANKING	54.9	188.3	24.0

[a]Agriculture, mining, and petroleum extraction
[b]Including integrated petroleum refining and extraction
[c]Tankers, pipelines, storage, gasoline service stations
Source: U.S. Department of Commerce (1985a), Tables I.R1, II.K1, and II.01

as a group than for the individual service industries (Table 11). Within industries, service firms' affiliates are more capital intensive than their parents in four cases and the unweighted average of ratios of affiliate to parent capital intensities is 82 per cent, considerably above the average ratio for manufacturing.

The fact that affiliate physical-capital intensities are closer to those of parents in most service industries than they are in manufacturing suggests that in these industries, there is less room than in manufacturing, either for adjusting factor proportions to take advantage of lower wages outside the U.S. or of splitting up the production process into labor-intensive and capital-intensive segments and moving the labor-intensive segments to the developing countries.

Despite their low overall physical capital per worker relative to service parents, affiliates of service industry parents are, on the average, as capital intensive as those of manufacturing parents. The affiliates of petroleum-related parents are particularly capital intensive, but those of parents in equipment rental, engineering, architectural services, transportation, communication, and public utilities are also well above the manufacturing average.

	Affiliate Physical Capital Intensity[a], by Industry of Parent ($000)
Service industries, broadly defined, excluding banking	23
Goods industries	37
Manufacturing	23

[a]Net property, plant, and equipment per worker

Source: Table 12

Table 11

Physical Capital Intensity[a] of Affiliates as Per Cent of that of Parents, by Industry of Parent, 1982

ALL INDUSTRIES, EXCL. BANKING	68.5
Primary production[a]	23.3
Petroleum and coal products[b]	99.6
Manufacturing	72.6
TOTAL GOODS INDUSTRIES	79.7
Construction	101.8
Transp., commun., and pub. util.	34.4
Wholesale trade, excl. petroleum	96.5
Petroleum wholesale trade	55.8
Retail trade	78.2
Financial services, excl. banking	79.3
Finance, except banking	183.3
Insurance	75.1
Services, excl. finance and petroleum	69.9
Hotels etc.	81.2
Business services	46.7
Advertising	52.7
Managem., consult., & P.R.	39.7
Equipment rental	48.4
Computer services	71.2
Other business services	81.7
Motion pictures	79.5
Engineering, archit., etc.	106.8
Health services	97.7
Other services	61.9
Oil and gas field services	116.5
Other petroleum services[c]	91.7
TOTAL SERVICE INDUSTRIES, BROADLY DEFINED, EXCL. BANKING	41.5

[a]Net property, plant, and equipment per worker

Source: Tables 10 and 12

Table 12

Total Assets and Net Property, Plant and Equipment per Worker
U.S. Affiliates, By Industry of Parent, 1982
($ thousands)

	Total Assets per Worker			Net PP & E per Worker
	All Countries	Developed Countries[g]	Developing Countries[g]	All Countries
ALL INDUSTRIES	192.0	179.8	222.0[f]	NA
ALL INDUSTRIES, EXCL. BANKING	117.4	114.9	103.9[f]	34.2
Primary production[a]	146.4	256.5	92.0[f]	64.3
Petroleum and coal products[b]	497.8	496.0	484.1	209.8
Manufacturing	79.3	84.9	66.1	23.1
TOTAL GOODS INDUSTRIES	110.8	114.9	101.8[f]	37.3
Construction	80.4	66.3	89.7	16.9
Transp., commun., and pub. util.	134.1	97.1	182.3	45.9
Wholesale trade, excl. petroleum	105.6	135.7	67.2	22.0
Petroleum wholesale trade	509.8	476.1[d]	725.2[f]	100.4
Retail trade	31.2	28.3	47.7[f]	9.3
Banking	3,517.6	3,739.7	3,292.6[f]	NA
Financial services, excl. banking	247.0	198.2	151.1	14.2
Finance, except banking	967.7	650.4	707.0[f]	22.0
Insurance	219.7	178.6	254.1	13.0
Real estate	NA	228.6	NA	NA
Services, excl. finance and petroleum	65.5	60.9	77.1[f]	16.5
Hotels etc.	35.8	NA	NA	16.8
Business services	53.7	56.1	45.7	8.5
Advertising	59.2	62.3	44.0	4.9
Managem., consult., & P.R.	115.0	114.3	125.0	9.4
Equipment rental	907.5	615.0	1,845.0	236.2
Computer services	56.0	54.3	68.0	12.6
Other business services	25.2	31.7	10.3	4.9
Motion pictures	262.9	NA	NA	6.2
Engineering, archit., etc.	91.7	73.0	144.6[f]	34.5
Health services	94.7	81.4	110.6	25.7
Other services	56.8	42.3	91.3	20.3
Oil and gas field services	197.3	104.3	259.3[f]	77.5
Other petroleum services[c]	375.0	e	576.4	218.5
TOTAL SERVICE INDUSTRIES, BROADLY DEFINED	490.3	397.1	814.3	NA
SAME, EXCL. BANKING	142.1	114.6	142.5	22.8

Notes to Table 12

[a]Agriculture, mining, and petroleum extraction

[b]Including integrated petroleum refining and extraction

[c]Tankers, pipelines, storage, gasoline service stations

[d]Includes other petroleum services

[e]Included with petroleum wholesale trade

[f]Including "International" with developing countries

[g]Excluding nonbank affiliates of bank parents

Source: U.S. Department of Commerce (1985a), Tables I.A6, I.F4, I.J1, II.A13, II.A15, and II.F11

Thus, it would be a mistake to view direct investment in services as being confined to labor-intensive activities.

A somewhat different picture of capital intensity, involving financial, in addition to physical, capital, is given by total assets per employee. With only one exception, the service industries in which parents have higher physical capital intensity than manufacturing also have higher parent total assets per worker, but this version of capital intensity produces several additional capital intensive service sectors in finance and wholesale trade. In fact, by this standard, more than half of the service industries were more capital intensive at home than was manufacturing, and as a group they were three times as capital intensive.

	Parent Assets per Employee ($000)
Service industries, broadly defined	298
Same, excluding banking	188
Goods industries	120
Manufacturing	97

Source: Table 10

Service industry affiliates were also more capital intensive than manufacturing affiliates by this measure--more than twice as capital intensive as manufacturing affiliates. The capital-intensive service affiliates were mostly in the same industries as capital intensive service parents, petroleum related services, finance, professional services, and utilities.

A surprising feature of these capital intensities is the high values for affiliates in developing countries. In manufacturing, parents are more capital-

	Affiliate Assets per Employee	
	Developed Countries	Developing Countries
	($000)	
Service industries, broadly defined,	397	814
Same, excluding banking	115	142
Goods industries	115	102
Manufacturing	85	66

Source: Table 12

intensive than affiliates in developed countries and they, in turn, are more capital intensive than affiliates in developing countries.[3] That is the ordering one would expect if firms responded to labor costs by adjusting the capital intensity of production in each location, or allocated their production processes among locations according to the capital intensities of the processes and the prices of labor in different locations. No such allocation can be observed for service industries. In many of them, it is the affiliates in developing countries that have the highest assets per worker, even larger than those of their parents.

A drawback of this measure of capital intensity, mentioned above (page 9), is that financial assets attributed to an affiliate, unlike plant and equipment, are fairly likely to be located outside the host country, and to contribute little or nothing to host-country production or employment. Some evidence for this phenomenon is provided by a comparison between value added in affiliates and value added in the whole host-country industry, as reported in national accounts. Sometimes, as is the case in the Bahamas and Panama, the estimated value added in U.S. affiliates, particularly for financial sec-

[3]For a detailed analysis of these relationships for manufacturing firms see Lipsey, Kravis, and Roldan (1982).

tors, far exceeds the entire value added of the host country industry. The implication is that almost all the assets of these affiliates are outside the host country. They probably have little or no impact on the host country's economy. In other words, some of the large direct investment capital movements in the financial sector are purely paper transactions, shifting the nominal ownership of assets to developing countries, but not increasing the availability of capital to their businesses, households, or governments. The cost to the U.S. economy, if there is any, may be limited to whatever fees the host governments can extract for providing the service of registration or incorporation. Since the service is almost costless to produce, the competition to provide it is probably keen enough to keep the price charged quite low.

The average skill level of employees of parent firms in service industries is, if we judge by average compensation levels, well below that of employees of parent firms in manufacturing.

Industry	Parent Compensation per Employee ($000)
Service industries, broadly defined	24
Goods industries	30
Manufacturing	30

Source: Table 10

There are, however, a fair number of high-skill service sectors, including those associated with the petroleum industry, public utilities, and construction. Within the groups more usually identified as services, finance other than banking, real estate, advertising, management, consulting and public relations, what might be thought of as white-collar service industries, all have relatively high skill levels among parents.

Service industry affiliates, in contrast to their parents, are relatively high-skill operations. Manufacturing multinationals and all goods producers in the aggregate apparently go further in allocating their low-skill operations to developing countries. This is suggested by a comparison between manufacturing and service industries with respect to average compensation in different groups of countries. In manufacturing, average compensation in developing countries is less than half that in developed countries, and less than a third of that in parent operations, while in service industries, average compensation in developing countries is only 15 per cent below that in developed countries, and a little more than 40 per cent below that in the United States. In fact, in a number of service industries, such as management consulting and engineering and architectural services, average compensation in developing countries is even above that of the parents in the United States, and above that of affiliates in the developed countries (Tables 10 and 13). Thus, there is little evidence that these industries allocate their activity to take advantage of low wages in developing countries.

	Affiliate Compensation per Employee	
	Developed Countries	Developing Countries
	($000)	
Industry of Parent		
Service industries, broadly defined	16	14
Goods industries	21	9
Manufacturing	20	9

Source: Table 13

As a consequence of this allocation of activities, in developed countries service industry affiliates as a group appear to use workers of almost as high a skill level as manufacturing affiliates, while in developing countries they

Table 13

Compensation per Worker
U.S. Affiliates, by Industry of Parent, 1982
($ thousand)

	By Industry of Parent		
	All Countries	Developed Countries[i]	Developing Countries[i]
ALL INDUSTRIES	16.8	19.9	10.1
ALL INDUSTRIES EXCL. BANKING	16.8	19.9	10.2
Primary production[a]	11.4	21.6	6.2
Petroleum and coal products[b]	24.4	27.9	17.4
Manufacturing	16.6	20.4	8.6
TOTAL GOODS INDUSTRIES	17.1	21.0	9.0
Construction	26.6	37.4	20.3
Transp., commun., and pub. util.	14.7	18.4	9.3
Wholesale trade, excl. petroleum	13.9	19.0	7.9
Petroleum wholesale trade	20.9	23.5[d]	12.5
Retail trade	8.8	9.5	4.9
Banking	15.9	18.9[h]	13.5[h]
Financial services, excl. banking	20.5	19.6	22.7
Finance, except banking	23.4	29.6	15.6
Insurance	18.0	19.4	9.9
Real estate	13.6	17.1	7.5
Services, excl. finance and petroleum	17.5	19.2	12.5
Hotels etc.	9.6	11.5	8.0[f]
Business services	19.3	21.8	10.7
Advertising	24.8	26.3	17.4
Managem., consult., & P.R.	33.8	33.0	50.0
Equipment rental	22.5	25.0	15.0[g]
Computer services	25.4	26.5	18.0
Other business services	12.8	15.4	6.6
Motion pictures	17.5	17.1	10.0[g]
Engineering, archit., etc.	23.9	23.1	26.4[f]
Health services	11.1	10.2	12.0
Other services	12.8	13.1	12.3
Oil and gas field services	25.7	23.4	23.1[f]
Other petroleum services[c]	17.6	e	13.2
TOTAL SERVICE INDUSTRIES, BROADLY DEFINED	15.9	16.5	13.9
SAME, EXCL. BANKING	15.9	16.3	13.8

Notes to Table 13

[a]Agriculture, mining, and petroleum extraction

[b]Including integrated petroleum refining and extraction

[c]Tankers, pipelines, storage, gasoline service stations

[d]Including other petroleum services

[e]Included with petroleum wholesale trade

[f]Estimated

[g]Figure is unreliable because denominator is small relative to rounding error

[h]All banking affiliates regardless of parent industry

[i]Excluding nonbank affiliates of bank parents

Source: U.S. Department of Commerce (1985a), Tables I.JI, I.F4, I.F7, II.F11, and II.F12.

use a far higher level of skill than manufacturing affiliates. This was true not only for the average, but for service industries in general. Of those service industries shown separately in Table 13, 16 out of 22 pay higher compensation per employee in developing countries than do manufacturing affiliates. This suggests that U.S. service industry multinationals are either sending highly skilled employees to work in developing countries, or are using or training highly skilled indigenous workers.

U.S. multinationals in service industries do, in fact, use a higher proportion of U.S. citizens in their labor forces abroad than do manufacturing firms, but the numbers are so small relative to total employment that they could not account for the difference in measured skill levels.

U.S. Citizens as Per Cent of Total Employment in Majority-Owned U.S. Affiliates, 1982

Service industries, broadly defined	2.2
Goods industries	.5
Manufacturing	.4

U.S. Dept. of Commerce (1985a), Table III.F10.

The highest proportions of U.S. citizens are in equipment and rental (about half), holding companies (12 per cent), oil and gas field services (10 per cent), and construction (7 per cent).

The high skill level in service affiliates, particularly those in developing countries, points up the major difference between direct investment in services and direct investment in manufacturing mentioned earlier. The manufacturing operations seem to be more able to take advantage of low labor costs in developing countries, perhaps for serving worldwide markets. The service operations show little evidence of that incentive.

A speculation about the implication for labor demand of this contrast between goods industries and service industries might be that direct investment abroad by U.S. firms in goods industries is more likely to reduce the demand for low-skill labor at home than investment by service industries. The reason is that investment in goods industries more frequently represents an allocation of the firm's worldwide production to take advantage of differences in labor cost. Foreign affiliates in most service industries, on the other hand, are apparently more free-standing, independent operations, much less tied to their parent companies by trade links. Aside from finance affiliates in a few countries, affiliates of a service industry parent are a way for the parent to exploit its skills in competing in the host country market, and do not compete with their parents for these markets. If this is the case, the likelihood of any substitution of host country input for home-country input would seem very small, and the likelihood of a complementary relationship also slight, except perhaps for some managerial service, R & D, and similar central activities.

Factor Intensities and the Provision of Services to Foreign Buyers

We inferred earlier that the comparison between parent and affiliate characteristics suggested that firms in goods industries were able to allocate different parts of their production to different areas of the world, placing labor-intensive and low-skill operations in LDCs, but that firms in service industries were less able to do that, probably because the stages of production could not be separated.

In this section we explore the extent to which factors that explain the exports of American multinationals from the U.S., and their production (sales) abroad through foreign affiliates, differ between goods and service industries. There is a substantial literature on the factors explaining exports by U.S.

goods industries, and particularly manufacturing industries, and some on the relation of foreign production to exports among and within manufacturing industries (Baldwin, 1971 and 1979, and Branson and Monoyios, 1977, for the former issues, and Lipsey and Weiss, 1981 and 1984, and Blomström, Lipsey, and Kulchycky, 1988, for the latter), but little on the service industry sector.

Some possible determinants of the extent to which production by multinational firms in an industry is carried on outside the United States are examined in Table 14. The unit of observation here is an industry, not a firm. In the first four equations, variables representing the usual factor intensities, physical capital per worker and average compensation per worker, in parent production do not manage to explain any of the differences in the propensity to produce abroad among goods industries or among service industries, although R & D per worker does seem to be positively related to the extent of overseas production in goods industries. When the ratio of affiliate to parent average compensation per worker is added to the equations, some of the other variables become significant, and this variable is related to differences among goods industries but not to those among service industries. Among the goods industries, the lower the average compensation in affiliates relative to that in parents, the larger was affiliate employment relative to parent employment.

The meaning of that relationship is somewhat ambiguous because the relative compensation variable combines the effects of any differences in relative wages for labor of identical quality with the effects of differences in the mix of low and high income countries in which the affiliates operate and with differences in the extent to which skill levels differ between parents and affiliates in particular countries. Since firms in all industries presumably face the same prices for labor in any given country, the variable is not likely to represent

Table 14

Equations Relating Ratios of Affiliate to Parent Employment in an Industry to Factor Intensities and Relative Compensation per Employee, Goods Industries, Manufacturing Industries, and Service Industries, 1982

	Parent							
	Assets per Employee	Property, Plant & Equipment per Employee	Compensation per Employee	R&D per Employee	Compensation per Employee Affil./Parent	Constant Term	$\bar{R}^2$ (Prob. F)	No. Obs.
Goods	.14		-6.2	50.3		.42	.05	36
	(.40)		(.7)	(2.2)		(1.88)	(.22)	
Manuf.	1.85		-6.9	46.3		.25	.28	33
	(2.19)		(1.2)	(3.3)		(1.84)	(.01)	
Services	-.06		3.1	34.2		.10	-.10	18
	(.52)		(.8)	(.8)		(1.06)	(.69)	
Goods		-.19	-3.6	45.5		.38	.04	36
		(.34)	(.4)	(1.9)		(1.73)	(.22)	
Manuf.		.28	.22	41.7		.23	.16	33
		(.19)	(.0)	(2.6)		(1.59)	(.05)	
Services		.34	10.1	-85.9		.05	-.13	19
		(.37)	(.8)	(.5)		(.12)	(.80)	
Goods	.80		-18.4	59.5	-.98	1.23	.35	36
	(2.42)		(2.4)	(3.1)	(4.0)	(4.52)	(.00)	
Manuf.	2.02		-12.0	50.2	-.37	.58	.33	33
	(2.46)		(1.9)	(3.6)	(1.8)	(2.55)	(.00)	
Services	-.06		3.1	35.0	.01	.09	-.18	18
	(.48)		(.7)	(.7)	(.06)	(.44)	(.84)	
Goods		.98	-15.0	58.1	-.94	1.17	.29	36
		(1.66)	(1.9)	(2.8)	(3.5)	(3.96)	(.00)	
Manuf.		.92	-4.8	47.2	-.35	.54	.19	33
		(.59)	(.7)	(2.9)	(1.5)	(2.13)	(.04)	
Services		.21	5.0	-113.2	-.71	.74	-.13	19
		(.22)	(.3)	(.6)	(.97)	(.91)	(.75)	

Source: U.S. Department of Commerce (1985a).

Note: Figures in parentheses are t-statistics

the relative price of labor encountered by different industries. A possible interpretation is the one alluded to earlier: goods industries, in which firms can divide up their production into parts requiring different levels of skill and different capital intensities tend to produce more abroad and thus to hire more of their labor input abroad, and to produce more in low-income countries abroad. Given their ability to divide up their production, and to produce in one country for consumption in another country, some goods producers will hire the lower-skilled workers among those available in any particular foreign country and concentrate production in low-wage countries. Among service industries, however, this separation of parts of the production process is not feasible; firms cannot produce in very different ways in different areas of the world, and there is, therefore, no correlation between average compensation differences between parents and affiliates and the extent of overseas production.

A test of our hypothesis that the firms in goods producing industries are more able to allocate employment to low-wage countries than are firms in service industries is to ask how much of the interindustry differences in affiliate wage levels and affiliate compensation levels relative to parent compensation levels is accounted for by interindustry differences in the country distribution of affiliate employment. We estimated what the average affiliate compensation in each industry would have been if the only differences among industries had been in the geographical distribution of employment; that is, if each industry had paid the identical average compensation in each area. We then correlated this estimated compensation level with the actual one and with the actual ratios of affiliate to parent average compensation, with the following results:

Percent of interindustry variance (R^2 x 100) accounted for by geographical distribution of affiliate employment

Variance in average compensation per employee	
Goods industries	45.4
Service industries	5.1
Variance in ratio of affiliate/parent average compensation per employee	
Goods industries	46.9
Service industries	22.3

Interindustry differences in average affiliate compensation and relative affiliate/parent compensation levels reflected the geographical distribution of employment to a much greater degree than did those of service industries. It appears that among goods industries, the greater the opportunity to reduce production costs by allocating labor-intensive elements of production to low-wage countries, the greater the extent of foreign relative to domestic employment.[4]

When the factor proportions and R & D variables of Table 14 are used to explain differences in export propensities among goods industries and among service industries in Table 15, they do so to a much greater degree than for foreign employment propensities. Again, large differences between goods industries and service industries emerge. Factor intensities of parent firms do explain a substantial part of differences in export propensities among goods industries, but not among service industries. The R & D intensity of an industry is the only statistically significant variable at conventional levels of the t-ratio, but there is also some suggestion among goods industries of a negative relationship with physical capital intensity and a positive one with the average skill levels of employees.

If we add to these equations a variable for the ratio of parent to affiliate average compensation levels, the results suggest that large gaps in com-

[4]Since foreign production is labor intensive relative to domestic production, the allocation of production is not identical to the allocation of employment.

Table 15

Equations Relating Export Propensities of U.S. Parent Companies in an Industry to Factor Intensities and Relative Compensation per Employee, Goods Industries and Service Industries, 1982

	Parent							
	Assets per Employee	Property, Plant & Equipment per Employee	Compensation per Employee	R & D per Employee	Compensation per Employee Affil./Parent	Constant Term	$\bar{R}^2$ (Prob. F)	No. Obs.
ods	-.129 (1.97)		2.23 (1.36)	12.2 (2.8)		.015 (.37)	.31 (.00)	36
rvices	-.017 (.28)		-0.92 (.46)	22.7 (1.0)		.046 (.97)	-.08 (.64)	18
ods		-.22 (2.02)	2.04 (1.28)	11.7 (2.6)		.016 (.39)	.32 (.00)	36
rvices		-.05 (.51)	-1.17 (.75)	24.4 (1.2)		.052 (1.15)	-.04 (.54)	19
ods	-.102 (1.34)		1.74 (.96)	12.6 (2.8)	-.040 (.71)	.049 (.77)	.30 (.00)	36
rvices	-.025 (.38)		-1.13 (.54)	19.5 (.8)	-.051 (.53)	.094 (.92)	-.14 (.75)	18
ods		-.17 (1.33)	1.65 (.93)	12.2 (2.7)	-.032 (.55)	.043 (.67)	.30 (.00)	36
rvices		-.06 (.57)	-1.49 (.86)	22.7 (1.1)	-.044 (.51)	.095 (.98)	-.10 (.67)	19

ource: U.S. Department of Commerce (1985a).

ote: Figures in parentheses are t-statistics.

pensation levels, which were important determinants of overseas production, had no visible effect on export propensities among goods industries or among service industries.

Conclusions

Although service transactions in the balance of payments have clearly been underestimated, corrections for the understatement would still leave sales by foreign affiliates as the main channel through which U.S. service sector firms serve foreign markets. Service sector firms have played a smaller role in U.S. direct investment abroad and in foreign direct investment in the U.S. than have firms in goods producing sectors, but the share of the narrowly defined service sector (excluding construction and public utilities) in investment has been growing rapidly. The service industries mainly responsible for the growth in U.S. investment have been wholesale trade and financial services, including banking.

There appear to be major differences in behavior between goods and service industries. Service sector parents other than those in wholesale trade export less of their output and, in particular, trade less with their own foreign affiliates. Service industry foreign affiliates, on the other hand, are about as export-oriented as goods-industry affiliates. However, for some service affiliates, particularly those in wholesale trade, the exports are almost entirely of goods rather than services. The share of the exports of service affiliates that goes to their parents is much smaller than for goods-industry affiliates.

Service sector affiliates are more similar to their parents in two respects than are those in goods industries. One is physical capital intensity and the other is human capital or skill intensity. It is clear that multinationals in manufacturing allocate their activities in such a way as to respond to differen-

ces in labor cost by producing labor-intensive products or by using labor-intensive methods of production in countries in which labor is cheap (Lipsey, Kravis, and Roldan, 1982). In service industries, there is little sign of such an allocation of production; affiliates are more similar to parents in each industry, and affiliates in LDCs are more similar to those in developed countries.

Our interpretation of these facts is that in the service sector, it is more difficult to break down production for a world market into parts adapted to various countries' factor prices. Partly, this is because of the limited tradability of services: the fact that most of them must be produced where they are consumed or consumed where they are produced. The result is that service sector affiliates in foreign countries, to a greater extent than goods affiliates, are like miniature versions of their parents rather than specialized elements in a worldwide production allocation.

While this hypothesis stems from the comparisons of characteristics of parents with those of affiliates, it is reinforced by efforts to explain differences in the extent of foreign operations and the export propensities of parents among goods and among service industries. With respect to the first, we found that the importance of foreign employment relative to domestic employment in a goods industry was significantly associated with the size of the difference in average compensation between parents and their foreign affiliates. Our interpretation of that result is that goods industry multinationals, but not those in service industries, can split their operations into low-skill and high-skill components and take advantage of low prices for unskilled labor in poor countries by placing their low-skill operations there. This interpretation is reinforced by the finding that the proportion of interindustry differences in affiliate compensation levels and relative affiliate/parent compensation levels

that is accounted for by differences in the geographical location of affiliate employment is much greater for goods industries than for service industries. With respect to exporting, we find that factor proportions explanations of the pattern of U.S. exports, particularly the technological intensity of an industry, works well for goods industries but not for service industries.

The implication of these results is that foreign investment in goods industries represents an allocation of production among locations that should produce an increase in the demand for high-skill labor and for R & D input in parent companies and a decrease in the demand for low-skill labor. Investment in service industries, on the other hand, while it increases the multinationals' shares in foreign markets, and may be necessary for any share, does not affect the composition of the parents' production or the parents' demand for different types of labor.

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APPENDIX TABLE A

Measures of Overseas Affiliate Activity, by Industry, 1982

	Total Assets ($mill.)	Sales ($mill.)	Employment (thous.)	Employee Compensation ($mill.)	U.S. Direct invest. ($mill.)
ALL INDUSTRIES	1,270,911	1,022,460	6,813.9	114,473	207,835
GOODS INDUSTRIES					
Primary Production					
Agriculture, forestry, fishing	1,404	1,548	102.6	418	579
Mining, exc. petroleum	16,757	7,831	140.5	2,057	5,263
Oil, & gas extraction, exc. services	59,095	50,684	59.7	1,564	20,431
Total primary production	77,256	60,063	302.8	4,039	26,273
Petroleum & coal products[a]	77,016	136,067	206.2	6,374	19,078
Manufacturing	265,887	359,354	4,432.9	71,801	83,500
TOTAL GOODS INDUSTRIES	420,339	555,484	4,942.4	82,214	128,851
SERVICE INDUSTRIES					
Construction	5,897	13,790	88.4	1,800	1,035
Transp., commun., & public util. exc petrol.	16,467	25,492	89.5	1,598	2,312
Petroleum transport, pipelines, storage	12,306	6,000	16.1	432	1,631
TRADE					
Wholesale trade, exc. petrol	57,911	123,302	477.6	10,093	21,070
Petroleum wholesale trade	32,177	115,299	49.4	1,219	10,798
Retail trade, exc. gasoline	11,437	27,261	466.0	4,172	3,640
Gasoline service stations	2,923	11,994	9.9	200	237
Total Trade	104,448	277,856	1,002.9	15,684	35,745
FINANCE					
Banking	573,721	87,220[b]	159.0	2,618	10,342
Finance exc. banking	103,494	14,396	43.7	898	-9,828
of which Netherlands Antilles[c]	(43,959)	(4,343)	D	D	(-20,172)
Other	59,535	10,053	43.7	898	10,344
Insurance	44,085	16,767	82.0	1,439	7,240
Real estate	1,609	259	2.0	23	549
Holding companies[c]	(33,624)	(88)	(2.1)	(66)	(19,657)
Total Finance	678,950	114,299	286.7	4,978	28,475
OTHER SERVICES					
Hotels & other lodging places	1,831	1,783	55.5	583	502
Business services					
Advertising	1,635	1,608	29.5	692	325
Management, cons., public rel. serv.	2,029	1,776	13.7	591	587
Equipment rental, exc. autos & comp.	5,714	3,251	32.8	704	495
Computer & data processing serv.	893	1,014	12.2	312	248
Other business services	2,008	2,766	70.2	1,022	521
Total Business Services	12,280	10,415	158.4	3,321	2,175
Motion pict., incl. telev. tape & film	1,366	1,518	6.5	75	745
Engineering, archit., & surveying serv.	1,848	3,563	31.7	959	404
Health services	1,157	949	18.1	257	9
Other services exc. oil & gas	2,510	2,349	49.0	696	728
Oil & gas field services	11,513	8,961	69.3	1,878	5,223
Total Other Services	32,504	29,538	388.5	7,769	9,785
TOTAL SERVICE INDUSTRIES, BROADLY DEFINED	850,572	446,976	1,871.5	32,259	78,984

Notes to Appendix Table A

[a]Including integrated petroleum refining and extraction

[b]Total income

[c]Excluded from total and subtotals, wherever possible

D = Suppressed by source

Source: U.S. Department of Commerce (1985a), Table 6, pp. 13-14.