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ABSTRACT

Recent theoretical work tends to characterize multinational enterprises as arising through either horizontal or vertical foreign direct investment (FDI). Empirical research tends to find stronger support for the former than for the latter. In this paper, we use recent, detailed data on U.S. multinational firms to revisit the question of why multinationals go abroad. We examine three types of foreign activities of U.S. multinationals: global outsourcing, the use of export platforms, and wholesale trading. Our results suggest that vertical FDI is more common than previous research suggests, and more generally that the foreign affiliates of multinationals span a diverse set of activities that each respond to policies and characteristics of host countries in quite different ways.

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1. Introduction

In the current process of globalization, multinational enterprises play a starring role. The share of cross-border capital flows accounted for by the foreign direct investment (FDI) of multinationals has been rising in recent years, particularly for many developing countries for which FDI is now the largest type of capital inflow. FDI links financial and product markets across countries via transfers of physical capital, technology, and management techniques. Integration of goods and capital markets, in turn, helps integrate national labor markets.

Although the general role of multinationals in globalization is well recognized, what seems less noted is that these firms display a wide range of expansion strategies (see Hanson, 2001). Dow Chemical serves many local markets by replicating in each of these countries its U.S. production facilities. In a variant of this strategy, Ford and General Motors have production facilities in Brazil and Thailand, building vehicles not just for those local markets but for the broader regional markets of South America and Southeast Asia, respectively. Intel, in contrast, fragments its global semiconductor production: it has R&D facilities in the United States, wafer-fabrication plants in Ireland and Israel, and microchip-assembly plants in Costa Rica and the Philippines. Finally, in many countries IBM operates wholesale-trade outlets, which do no meaningful manufacturing but instead import and distribute goods produced elsewhere.

In this paper we revisit the question of why multinationals go abroad. To date, most research has focused on two answers: to gain access to host-country markets, or to exploit international factor-cost differences. Most empirical research has concluded that market-seeking FDI matters more than FDI motivated by wage differentials. In contrast, we will document multinational expansion strategies that have received little attention in the literature. We then

analyze how host-country policies and market conditions shape these various strategies. Finally, we examine whether existing theories of multinationals help explain the patterns we uncover.

The starting point for our analysis is the large academic literature on why multinationals exist and how they affect host markets. A firm becomes multinational when through FDI it establishes in two or more countries business enterprises in which it exercises some minimum level of ownership control. Over the last two decades, there has been rapid progress in modeling multinational firms in general equilibrium. This theoretical literature contains mostly uni-dimensional theories of multinationals, which focus on either *horizontal* or *vertical FDI*.¹

The vertical-FDI view is that multinationals arise to take advantage of international factor-price differences.² Firms engage in two activities: headquarter services, e.g., R&D and advertising, and production. Headquarter services are intensive in physical or human capital, while production is intensive in manual labor. When factor prices differ across countries, firms become multinational by locating production in countries where manual-labor costs are low and headquarters in countries where skilled-labor costs are low.

The horizontal-FDI view is that multinationals arise because trade barriers make exporting costly.³ The formal setup is one in which firms have a high-fixed-cost headquarters and one or more production plants. When trade costs are low, a firm produces all output in domestic plants and serve foreign consumers through exports. When trade costs are high, a firm becomes multinational by building production plants at both home and abroad, each serving just

¹ We restrict our attention to general equilibrium models of multinational firms. For a discussion of partial equilibrium treatments, see Caves (1996) and Markusen (1995, 2001).

² See Helpman (1984) and Helpman and Krugman (1985). This view is related to models of foreign outsourcing, in which the vertical separation of production occurs *without* multinationals. See Feenstra and Hanson (1996, 2001).

³ See Markusen (1984), Horstmann and Markusen (1987, 1992), and Markusen and Venables (1998, 2000). Trade models of this variety are similar to older theories of tariff-jumping FDI. See Caves (1996) for a discussion. There have been some attempts to integrate models of horizontal and vertical FDI into a single framework. See Markusen et al. (1996) and Markusen (1997).

that country's consumers. This type of FDI is called horizontal because the multinational does the same activities (here, production) in all countries.

These two views of multinationals have much in common. In each case, multinationals arise to avoid duplicating headquarter activities. They also raise world welfare by making global production more efficient. The two views differ, however, in how FDI affects factor incomes within and across countries. If FDI is vertical, then multinationals may reduce absolute wage differences across countries and alter relative wages within countries. If FDI is horizontal, multinationals may raise income in each country without necessarily changing its distribution.

Recent academic empirical work tends to conclude that most real-world FDI is horizontal, not vertical. Consider these three findings. First, for decades most FDI flowed from large, rich countries to other large, rich countries (e.g., Markusen, 1995; Lipsey, 1999, 2001).⁴ That multinationals locate most production in similar, high-wage economies is consistent with FDI being driven more by market access than by wage differences. Second, sales by foreign affiliates of U.S. multinationals are higher in countries with higher tariffs and transport costs on U.S. goods (Brainard, 1997; Eckholm, 1997; Carr, Markusen, and Maskus, 2001). This is consistent with FDI motivated by market access. Third, U.S. firms serve foreign markets more through FDI and less through exports the larger is the scale of corporate operations relative to the scale of production (Brainard, 1997; Yeaple, 2000). This supports the idea that multinationals arise when scale economies in headquarter activities are strong relative to scale economies in production.⁵

⁴ In a regression setting, Carr, Markusen, and Maskus (2001) find that sales by affiliates of foreign multinationals in the United States or by foreign affiliates of U.S. multinationals are higher for countries whose GDP is more similar to U.S. GDP.

⁵ Some representative statements on the predominance of horizontal FDI are Brainard (1997)--"The finding that rising per-worker income differentials reduce affiliate sales is inconsistent with explanations of multinational activity that depend on factor-proportion differences [i.e., vertical FDI]"—and Markusen and Maskus (1999)—"Econometric tests give strong support to the horizontal model and overwhelmingly reject the vertical model ... The vertical model should clearly not be taken seriously as a description of the world." But this conclusion is not universal. For example, Carr, Markusen, and Maskus (2001) find evidence

In this paper we challenge prevailing academic views about the relative importance of horizontal and vertical FDI. We do this by analyzing data that offer, relative to the recent literature, both more current and more detailed information on the foreign operations of U.S.-headquartered multinationals. The first novelty is timing. As we will show, FDI patterns in the 1990s were much richer than just the three findings discussed above. Previous research overlooked this richness partly because most of it excluded data from most of the 1990s, a period in which factors other than market access may have played a larger role in the strategies of U.S. multinationals. The second novelty is detail. We document and analyze foreign-affiliate roles that the literature often ignores: as export platforms that produce in but then sell outside host countries, as producers adding value to inputs outsourced from their U.S. parents, and as wholesalers distributing goods into foreign countries.

We have three main findings. First, there is strong evidence of vertical FDI. Overall, U.S. parents outsource a small but growing share of production to their foreign affiliates, in terms of exporting intermediate goods to affiliates for further processing. This share is substantial in specific regions and industries. Most of this activity is concentrated in North America and in various emerging economies: e.g., imported inputs for further processing account for over 30% of affiliate sales for affiliates in Canada and Mexico. This activity is also concentrated in industries involving separable high-skill and low-skill tasks: e.g., over 20% of total sales for affiliates in electronics and transportation equipment, which were two of the three fastest-growing manufacturing industries in the 1990s.

Second, even where FDI looks to be horizontal, U.S. multinationals tailor their entry strategies—specifically, their destination of sales—to reflect host-country conditions. In larger,

consistent with the “knowledge-capital” model of multinationals, which encompasses both horizontal and vertical FDI: “Results of our estimations are closely consistent with the [knowledge-capital] theory ... Both vertical and horizontal investments are

more-protected, and higher-tax economies, affiliates target most of their sales to the domestic market. But in smaller, less-protected, and lower-tax economies, U.S. multinationals set up export platforms that devote more of their sales to export markets in nearby regions and beyond.

Third, U.S. parents in manufacturing serve each foreign market either through affiliates that produce goods locally or through wholesale trade affiliates that resell goods produced elsewhere, but rarely through both means. Multinationals appear to face a decision between *production-oriented* and *distribution-oriented* FDI. This choice does not reflect the export-versus-FDI decision common to standard models in the literature, as that decision is only about alternative production modes. We offer some evidence that this production-distribution choice turns partly on aspects of U.S. tax policy that give U.S. multinationals a strong incentive to keep these activities separate in each host country.

Our findings suggest that viewing FDI as either horizontal or vertical partly misses the point. The data seem to show evidence of *both* types of FDI. The relative importance of motivations for FDI should, in theory, depend on cross-industry variation in production technology and factor intensity. It should also depend on cross-country variation in commercial policies, market size, and factor costs. Thus, for example, as relatively low-wage economies become both more open to FDI and larger in terms of their productive capacity, we expect more vertical FDI motivated by international differences in factor costs.

More broadly, our findings suggest that the literature's benchmark distinction between horizontal and vertical FDI does not capture the range of strategies that multinationals use. Conditional on choosing to become a multinational, a firm appears to face three overlapping choices about its global operations. First, should the foreign affiliate produce goods itself or should it distribute goods produced elsewhere? Second, for cases where the multinational

important and related to country characteristics as the model predicts.”

chooses production-oriented FDI, should the affiliate be vertically integrated or vertically specialized? Vertically integrated affiliates can be stand-alone operations, but vertically specialized affiliates are presumably linked into the multinational's outsourcing network.⁶ Third, should an affiliate sell goods locally or export goods to other markets? This third choice is faced by all affiliates, be they production-oriented of either variety or distribution-oriented.

A key motivation for distinguishing different modes of FDI is to identify how specific multinational expansion strategies respond to government policy. Previous research has focused on how trade and tax policies affect aggregate FDI.⁷ Our research finds that trade and tax policies are very important not just in terms of aggregate affiliate activity but also in terms of the mix of affiliate expansion strategies.

The remainder of the paper has five sections. In section two, we briefly describe the foreign operations of U.S. multinationals. In section three, we examine the use of foreign affiliates as export platforms. In section four, we address outsourcing by U.S. parents to their foreign affiliates. In section five, we consider the choice between production-oriented and distribution-oriented FDI. In section six, we offer concluding remarks.

2. Regional and Industrial Patterns of FDI: An Initial Look

The data we use on multinationals are for majority-owned, non-bank affiliates of U.S.-headquartered corporations, as tracked by the U.S. Bureau of Economic Analysis (BEA). An appendix describes these data in detail.⁸

⁶ We broadly define outsourcing as the process by which firms move certain production activities either geographically and/or outside the firm to an arm's-length supplier. For a detailed discussion see Feenstra and Hanson (2001).

⁷ For a survey of research on the sensitivity of FDI to host-country tax policy, see Hines (1997). Most studies find that inward and outward U.S. FDI is increasing in the after-tax rate of return, with an estimated elasticity of approximately unity. For recent treatment of the issue, see Hines (2001).

⁸ Through the paper, we use the term affiliate or foreign affiliate to refer to this class of enterprises. Note that in the BEA data each affiliate is measured as a business enterprise, not an establishment (as in other micro-level research, e.g., work using the

To start our analysis, Tables 1 and 2 show the distribution of affiliates, sales, value added, employment, and capital stock for majority-owned affiliates of U.S. parent companies across countries and industries, respectively, for three years, 1982, 1989, and 1998. Dollar-denominated data are in real 1998 dollars (see data appendix for details). A number of clear patterns are evident in the data.

In Table 1, looking at the location of U.S.-owned foreign affiliates in the cross-section shows that U.S. multinationals concentrate their operations in other high-income countries. In 1998, 76.6% of sales and 78.7% of value added by U.S. foreign-owned affiliates occurred in other OECD countries. As discussed in Section 1, this pattern is broadly consistent with U.S. multinationals engaging primarily in horizontal FDI. So, too, is the pattern of change over the full 1982-1998 period, during which affiliate production and sales grew even more concentrated in the OECD.

The difference in affiliate behavior between the 1980s and 1990s, however, suggests a much different story. The rising concentration of affiliate activities in high-income countries occurred entirely in the 1980s. And it resulted less from growth in the OECD than from contraction elsewhere. From 1982 to 1989, worldwide affiliate employment was stagnant, rising by only 100,000 workers as employment growth in the OECD slightly offset declines in all other regions, except non-OECD Asia.

It helps to recall that in the 1980s, many non-OECD countries faced severe economic obstacles. Latin America's debt crisis and macroeconomic instability largely halted growth in the region. This turmoil may help explain why U.S. foreign-owned affiliates were not expanding

Longitudinal Research Database). Enterprises may operate any number of establishments, information which the BEA does not track.

operations there.⁹ Central and Eastern Europe were only just starting their sweeping economic reforms, while China and India had not yet removed many obstacles to FDI.¹⁰ Africa had minimal economic growth and uneven opening to trade and FDI.

The 1990s look altogether different. Over this decade the OECD share of worldwide affiliate employment fell by six percentage points as there was sizable employment growth in all non-OECD regions (except the Middle East). By 1998 the OECD employment share had fallen below its 1982 level, with the non-OECD share up to 35.7%. Between 1989 and 1998, U.S. affiliates had rapid average annual employment growth in China (53.9%), Eastern and Central Europe (39.7%), Mexico (8.3%), and East Asia (5.4%), but much slower growth in the OECD (2.4%). This 1990s reversal of concentration of affiliate activity in high-income countries appears in Table 1 not just in employment but in the other four other activity measures as well. That U.S. multinationals were shifting activities towards low-income countries could be consistent with vertical FDI where factor-cost differences drive location decisions. But it could also be consistent with horizontal FDI, since many of these countries were enjoying rapid growth in market size.¹¹

We next examine affiliate operations along industry lines. Table 2 shows the share of total affiliate activities by major industry and year.¹² In all years manufacturing is the largest single industry, accounting in 1998 for 57.6% of total employment and 47.0% of total sales. Within manufacturing there are traditional industries, such as food products (mainly beverage

⁹ The one exception is Mexico, which during the 1980s dramatically opened its economy to foreign trade and investment. U.S. multinationals did expand Mexican operations during this decade.

¹⁰ Throughout the 1980s, China maintained severe restrictions on the activities of multinational firms (Naughton, 1996). In 1992 the government began to allow multinationals to sell goods on the domestic market more freely, lift non-tariff barriers and price controls on imports, and free exporters from having to sell their goods abroad through state-controlled foreign trade corporations.

¹¹ Shatz and Venables (2000) document a similar shift in the 1990s worldwide, not just from the United States.

¹² Here, “major industry” refers to the major headings in Table 2 (i.e., petroleum, manufacturing, wholesale trade, FIRE, services, and other industries), which are loosely based on the divisions of the 1987 U.S. Standard Industrial Classification.

and mill products), chemicals, and transportation equipment. There are also high-tech industries, such as industrial machinery (mainly computers and office equipment) and electronics.

Outside of manufacturing there has been a substantial shift away from petroleum, whose share of total affiliate sales declined from 36.5% in 1982 to 11.5% in 1998. There has been a commensurate expansion in the FIRE industries and services, whose share of sales increased over the 1982-1998 period from 3.2% to 7.2% and from 2.5% to 6.7%, respectively. It is also noteworthy that by 1998, 20.7% of foreign sales by U.S. affiliates are in wholesale trade. That wholesale affiliates are responsible for a sizable fraction of affiliate sales by U.S. multinationals suggests that distribution activities, such as marketing or after-sales service, may be an important part of multinationals' global operations.

Reading Tables 1 and 2 together, one can also see how the expansion of affiliate activities varies across both industries and regions. For the full sample period of 1982-1998, the most dynamic sectors are FIRE and services, which have high sales and employment growth in all regions except Africa and the Middle East. High growth somewhat overstates the absolute importance of these sectors, however, as by 1998 they still accounted for less than one-fifth of total affiliate operations. In manufacturing, worldwide affiliate sales grew 5.0% annually, with the most rapid growth occurring in non-OECD Asian countries. Petroleum shows (in numbers not reported) declining activity across all regions, but for slight capital-stock growth.

Combining an industry and region perspective, it is interesting to compare the input sources of output growth in manufacturing for OECD and non-OECD countries. In the OECD, the growth rate of capital stock is comparable to that of sales, but employment growth is much less. U.S. manufacturing affiliates in high-income countries seem to have expanded more through accumulating capital and enhancing production efficiency than through increasing

employment (as has also occurred in the United States). In contrast, manufacturing affiliates in low-income regions like Latin America and non-OECD Asia have much higher employment growth relative to capital-stock growth. This OECD/non-OECD difference in input mix is consistent with multinationals using more labor-intensive production techniques in lower-wage countries, a pattern suggesting these firms do respond to international factor-price differences.

Looking at all industry-region combinations (not reported, for brevity), the single most dynamic combination is industrial machinery in non-OECD Asia. A large fraction of industrial machinery is computers and office equipment (both parts/components and finished goods).¹³ Rapid growth both in this sector in Asia and also--as we will show in Section 3--for exports beyond the local market suggest that much recent FDI here has been vertical in nature.

In sum, Tables 1 and 2 paint a richer picture of multinational activity than the literature commonly presumes. The continued high share of overall activity in OECD countries masks a noticeable move away from this concentration in the 1980s; wholesale trade affiliates are a sizable share of overall activity; and certain industries and/or regions display input and output growth suggestive of vertical as well as horizontal FDI. We now turn to analyzing elements of this picture in more detail.

3. Foreign Affiliates as Export Platforms

As outlined in Section 1, the dominant view in the trade literature is that FDI is primarily horizontal in nature: i.e., that FDI by U.S. multinationals largely serves host-country markets by replicating abroad what these firms do at home. Here, FDI is not motivated by international

¹³ In 1998, computers and office equipment accounted for 64% of total sales in industrial machinery worldwide and 92% in non-OECD Asia.

factor-cost differences between countries; but rather by the combination of fixed costs in headquarter services and trade costs in shipping goods internationally.

In standard models of horizontal FDI, affiliate sales stay exclusively in the host countries. But is this true in reality? In this section we present empirical evidence that challenges the presumption that foreign affiliates in all industries and countries are oriented mainly towards selling into their host markets. We first document that many foreign affiliates act as export platforms, serving regional and/or international markets. We then use econometric techniques to uncover what forces drive the choice for foreign affiliates between local sales and exports.

3.1 Affiliate Exports and Local Sales

Table 3 shows the fraction of exports in total sales for foreign affiliates by region for three years (1982, 1989, 1998).¹⁴ Across all countries, exports account for about one-third of total affiliate sales, with this fraction being quite stable over time. This aggregate stability, however, hides considerable variation across regions and over time.

The geographic orientation of sales appears to be sensitive to trade policies. The export-to-sales ratio rose dramatically in Mexico after its trade and investment reforms in the mid-1980s; in China, after its trade and investment reforms in the early 1990s; and in Canada, after its investment reforms of the mid-1980s and the U.S.-Canada free trade agreement in 1989. In contrast, the export fraction of sales is much lower in regions with relatively high trade barriers, e.g., Other Asia and Pacific (mainly India).

¹⁴ The complement of exports in total sales is same-country or local sales. These local sales are defined by whether or not the entity to which an affiliate sells a good resides in the same country as the affiliate. These entities can, of course, turn around and export their purchased goods to foreign markets. Given that such second-party exports are not captured in the data, the measured ratio of affiliate exports to total sales is a lower bound for the true value.

Simple geography seems to matter, too. Exports are a lower fraction of total sales in some relatively isolated regions, e.g., OECD Asia and the Pacific (Japan, Australia, and New Zealand). Yet the export-to-sales ratio in East Asia is higher than that in all other regions. Its fall over time reflects divergent trends between the relatively large and rich Asian tigers (Hong Kong, Singapore, Taiwan), which have falling ratios, and newly emerging Asian economies (Malaysia, Philippines, Thailand), which have rising ratios.¹⁵

Table 4 shows export-to-sales ratios by industry. One noticeable difference here is between manufacturing and non-manufacturing sectors. In all four major non-manufacturing sectors shown—petroleum, wholesale trade, FIRE, and services—exports as a share of total sales are actually falling over the sample period. By 1998, in all these sectors this share is at or below the all-industry share. In contrast, in manufacturing a rising share of affiliate sales are for export, over 44% by 1998. Within manufacturing, the export-to-sales ratios are highest and have risen the most sharply over time in the industries commonly associated with outsourcing: computers and office equipment, electronic equipment, and transportation equipment. These three industries account for about 25% of total manufacturing sales and employment (Table 2), and, as discussed in Section 2, these are also some of the industries in which U.S. multinationals have most aggressively expanded operations in emerging economies.

The evidence in Tables 3 and 4 on the destination of sales shows considerable diversity in the operations of foreign affiliates of U.S. multinationals. Most sales are for the local market in services and in countries that are large, rich, or have high trade costs. But most sales are for export in equipment industries commonly associated with outsourcing, with the strongest shift towards exports in countries in North America and Asia that have opened their markets to trade

¹⁵ An additional factor that may have lowered the export to sales ratio for foreign affiliates in the Asian Tigers is that in 1988 the U.S. government removed these countries' eligibility for duty-free trade status under the Generalized System of Preferences.

and investment. These patterns suggest multinationals systematically orient affiliate sales based on various industry and country characteristics. We now turn to a more formal examination of what forces shape the export versus local-sales decision of U.S. multinationals.

3.2 The Export Versus Local-Sales Decision

In the empirical literature on multinationals, many studies treat all output by foreign affiliates in a country as destined for the local market and then examine which country and industry characteristics are correlated with affiliate total sales (e.g., Brainard, 1997; Markusen and Maskus, 1999; Yeaple, 2000; Carr, Markusen, and Maskus, 2001). The typical set of regressors include host-country income-tax rates; host-country distance from the United States; industry average scale and skill intensity; and country-industry tariffs and transport costs. Regressions are estimated on data aggregated over affiliates by industry and/or country.¹⁶

The main findings in this literature are that affiliate sales are increasing in country GDP, per capita GDP (or average education), tariffs, and industry skill intensity, and decreasing in average plant size. Brainard (1997) interprets these results to mean that FDI is higher where markets are larger, trade costs are higher, and scale economies at the plant are weaker, all of which are consistent with theories of horizontal FDI. The positive correlation between affiliate sales and per capita GDP is sometimes seen as evidence against vertical FDI.¹⁷

We use the standard estimating equations from the literature to ask a different set of questions. Rather than examining how country and industry characteristics influence total

¹⁶ Carr, Markusen, and Maskus (2001) and Markusen and Maskus (1999) use data aggregated to the country level, but their approach is similar in spirit to the country/industry analysis of Brainard (1997).

¹⁷ Other results contradict this view. Yeaple (2000) finds that the impact of country average education on affiliate sales is weaker for less-skill-intensive industries, which suggests that multinationals in less-skill-intensive industries prefer less-skill-abundant countries. Relatedly, Carr, Markusen, and Maskus (2001) find that for data at the country level, affiliate sales are higher the larger is the difference in the relative supply of skilled labor between the source and host country for FDI. This suggests that, all else equal, FDI tends to flow from more-skill-abundant to less-skill-abundant countries.

affiliate sales, we examine how these factors influence affiliate exports relative to affiliate local sales. We estimate the following specification using data over time (t) at the country (j) and industry (i) level for foreign affiliates of U.S. multinationals.

$$\begin{aligned} \ln(\text{AEX}_{ijt}) - \ln(\text{ALS}_{ijt}) = & \beta_0 + \beta_1 * \ln(\text{GDP}_{jt}) + \beta_2 * \ln(\text{GDP}_{jt} / \text{POP}_{jt}) + \beta_3 * (\text{ENG}_j) \\ & + \beta_4 * \ln(\text{DST}_j) + \beta_5 * \ln(1 - \text{TAX}_{jt}) + \beta_6 * \ln(\text{SKL}_{it}) + \beta_7 * \ln(\text{SCL}_{it}) \\ & + \beta_8 * \ln(1 + \text{TC}_{ijt}) + \beta_9 * \ln(1 + \text{TAR}_{ijt}) + \beta_{10} * (\text{NTB}_{ijt}) + \mu_{ijt} \end{aligned} \quad (1)$$

In (1) AEX_{ijt} is exports by affiliates; ALS_{ijt} is local sales by affiliates; the next two regressors are country GDP and per capita GDP; ENG_j is dummy variable for whether the country is English speaking; DST_j is country distance to the United States; TAX_{jt} is the country effective corporate income-tax rate, defined such that higher values mean *lower* tax rates; SKL_{it} is the ratio of college educated workers to high-school educated workers for the industry in the United States; SCL_{it} is average employment for affiliates in the industry; TC_{ijt} is average freight cost for the country and industry; TAR_{ijt} is the average tariff rate for the country and industry; and NTB_{ijt} is a dummy variable indicating the presence of non-tariff barriers in the country and industry. The last three regressors are available for manufacturing industries only. See the appendix for details on these and other variables.

The specification in (1) captures the differential impact of country and industry characteristics on affiliate exports relative to affiliate local sales. Since the dependent variable is the log difference between affiliate exports and affiliate local sales, we implicitly control for any unobserved variables which affect affiliate exports and local sales in the same manner.¹⁸ This allows us to examine which factors induce affiliates to shift away from local sales and towards exports. In using an off-the-shelf empirical methodology, we refrain from commenting on

¹⁸ This is similar in spirit to Brainard (1997) and Yeaple (2000), who report results in which the dependent variable is the ratio of U.S. exports to U.S. exports plus sales by foreign affiliates of U.S. multinationals.

whether the reduced-form specifications used in the literature are the best way to test general-equilibrium trade models. We focus, instead, on whether interpretations of results in the literature miss anything by not distinguishing between affiliate exports and affiliate local-market sales.¹⁹

We estimate equation (1) on a sample spanning 12 two-digit industries, which include manufacturing and non-manufacturing sectors; 58 countries; and two years, 1989 and 1994.²⁰ All regressions include time and sectoral dummy variables. Table 5 reports the results. The first two columns include all sectors, and so exclude tariffs, NTBs, and transport costs as regressors. The last two columns cover affiliates in manufacturing only, and so include these variables.

To start with specifications more similar to that of earlier studies, in column (1) we report results using as the dependent variable log affiliate exports (rather than the dependent variable shown in equation (1)). We see that affiliate exports are higher in countries that have larger markets, higher average incomes, lower tax rates, an English-speaking population, and closer proximity to the United States. Column (2) uses as the dependent variable log affiliate local sales. The same qualitative correlations hold here as well. None of these results are surprising, and they are mostly consistent with previous research on affiliate total sales.

What *is* interesting is to compare the results in columns (1) and (2) to those in column (3), in which the dependent variable is the log difference between affiliate exports and affiliate local sales, as given in equation (1). The regression coefficients, then, show the correlation

¹⁹ Other work on exports by affiliates includes Rangan and Lawrence (1999), who address multinational responses to exchange-rate movements. Our approach is more similar to Blomstrom, et al (1988), which relates U.S. exports to U.S. foreign-affiliate activity broken out between local sales and exports. Our work also follows the lead of Markusen and Maskus (2001), albeit at the country and industry level rather than the country level only. For other work on exports by foreign affiliates of multinationals, see Shatz (2000) and Shatz and Venables (2000).

²⁰ Note that our estimation sample does not have to exclude observations which would require BEA data suppression. That said, there are many country-industry combinations in which U.S. multinationals are not present. We could enhance the efficiency and perhaps the consistency of the estimation by including data on these observations, for which affiliate sales are zero. The “first-difference” approach we take in constructing our regressand for equation (1) complicates including data on these zero observations in the estimation.

between affiliate exports and country/industry characteristics holding constant affiliate local sales.

In column (3), the coefficient on GDP is significantly negative, whereas it is positive in columns (1) and (2). This indicates that local sales are more attractive in larger markets, but in smaller markets affiliates are oriented towards exports more than local sales. The coefficient on per capita GDP remains significantly positive, indicating that sales are directed more towards exports in high-productivity countries. The coefficient on corporate taxes remains positive and statistically significant. That affiliates export more of their output the lower are taxes suggests that low taxes induce affiliates to become export platforms.²¹ This may reflect a desire of U.S. multinationals to concentrate their production for a given region in low-tax countries. Wheeler and Mody (1992), Brainard (1997), and others fail to find a significant correlation between affiliate total activity and tax rates.²² This may be due, in part, to the fact that these studies do not differentiate between where affiliate goods are sold. Interestingly, in column (3) the coefficients on distance and the English dummy variable are not statistically different from zero. Proximity to or linguistic similarity with the United States do not seem conducive to foreign affiliates being export platforms.

Moving on to industry characteristics, Table 5 shows that while there is a weakly positive correlation between industry skill intensity and total affiliate exports in column (1), there is a negative correlation between skill intensity and the ratio of affiliate exports to affiliate local sales in column (3). This suggests that overall affiliate activity may be higher in skill-intensive

²¹ Our sample of countries includes tax havens, which are mostly small economies with very low tax rates that attract large numbers of multinationals (Hines, 1994). One might be concerned that exports by foreign affiliates in tax havens may be fictitious. A multinational might transfer ownership of goods to a foreign affiliate in a tax haven, which then transfers ownership on to the final destination, with or without the goods physically passing through the country. Shipping exports through tax havens could allow firms to avoid taxes through transfer pricing or other activities. To control for this possibility, we estimated the regressions in Table 6 with tax havens excluded from the sample and found no impact on the results.

industries, but that export platforms concentrate in less skill-intensive industries. We find no strong correlations for industry scale, as proxied by average affiliate employment.²³

In columns (4) and (5) we limit the sample to manufacturing industries. Of particular interest here are data on trade costs. Higher tariffs, non-tariff barriers, and transport costs are all associated with lower affiliate exports both in absolute terms and relative to local affiliate sales. Brainard (1997) and Yeaple (2000) find that higher tariffs are associated with higher affiliate sales, suggesting that tariff-jumping is an important motivation for FDI. Our results indicate that these results do not apply to export platforms. Instead, higher trade barriers seem to dissuade affiliates from exporting.²⁴ This may be because higher barriers provide affiliates with a captive local market, making local sales relatively attractive, or because higher barriers raise the cost of importing intermediate inputs, making goods produced by affiliates less competitive on the world market.²⁵

Beyond these results for trade barriers, our other results in columns (4) and (5) broadly match those in columns (1) through (3). One change of note is that in column (5) the coefficient on industry scale is positive, which suggests that within manufacturing export platforms are more prevalent in high-scale-economy industries. This is plausible, as stronger scale economies would raise the incentive to concentrate global production in fewer locations.

²² It is important to note, however, that there is a large public-finance literature on the impact of host-country taxes on FDI. See Hines (1997) for a survey.

²³ The (unreported) industry dummies indicate that export platforms are more prevalent in equipment industries, which include industrial machinery, electrical equipment, and transportation equipment. These sectors are commonly associated with outsourcing, a process which could entail use of export platforms.

²⁴ Contrary to results in the literature, we find a negative correlation between trade barriers and affiliate activity. We discuss reasons for the difference in results in Section 4, in particular in note 31.

²⁵ One concern might be that these results on trade barriers might be driven by particular countries. For example, affiliates in Canada and Mexico might be special thanks to factors such as the NAFTA and the shared U.S. border; empirically, export sales are exceptionally large for, and account for an exceptionally large share of the total sales by, those affiliates. Our results were qualitatively unchanged to various sampling exclusions, however. For example, when we excluded Canadian and Mexican affiliates from our sample, the only change in sign or significance to the results in Table 5 was for the coefficient on tariffs in column (4) to become insignificant.

One other result of note is the important role being played by policy variables. In unreported results, to explain the ratio of exports to local sales for our manufacturing sub-sample we first included as regressors sector dummies, distance, and country variables; we then added to this specification the policy variables tax rates, tariffs, and non-tariff barriers. Across these two specifications the adjusted R-squared rose from 0.37 to 0.52. This indicates that although the country and industry characteristics help explain some amount of the overall variation in the decision of exports vs. local sales, this aspect of multinational behavior also depends importantly on country policy variables as well.

3.3 The Export Versus Local-Sales Decision: Summary

Much of the previous research on multinational expansion estimates correlations between affiliate total sales and host-country characteristics, and then evaluates whether these estimates are consistent with horizontal or vertical FDI. Again, the common finding is that total affiliate sales are greater in countries that are larger, richer per capita, and more protected.

In this section we have analyzed whether the sensitivity of affiliate sales to host-country characteristics depends on the destination market for these sales. We find that it does. Foreign affiliates tend to be more oriented towards export markets when located in countries that are smaller, less protected, and less taxed. Our results counter the idea that FDI is primarily oriented toward jumping trade barriers, and suggest that tax and trade policies influence both the scale and type of operations that multinationals establish in a country. This impact of host-country policies on the structure of multinational activities has been missed in previous work, which tends to assume that multinationals perform the same functions in all countries.

4. Outsourcing and Vertical Specialization

Some of our findings in Section 3 suggest that vertical FDI matters more than previous literature has presumed: e.g., that the share of affiliate sales going for export is higher in industries like machinery, electronics, and transportation. But we can gain additional insight on the production patterns of FDI by switching focus from affiliate outputs to affiliate inputs. The BEA data report total affiliate imports from their parents, and then disaggregate these imports into goods for resale, goods for further processing, capital goods, and other imports. Affiliate imports of goods for further processing are direct evidence of one kind of outsourcing, in which U.S. parents provide inputs for their foreign affiliates for additional processing.²⁶ Previous research has not made use of the BEA's outsourcing data.²⁷ In this section we examine these data to learn more about multinational expansion strategies.

4.1 Outsourcing From Parents To Affiliates

Table 6 reports the ratio of affiliate imports of goods for further processing to affiliate total sales by industry and by various regions. We limit the sample to manufacturing, since non-manufacturing industries, by definition, do very little processing of physical inputs (imported or otherwise). In overall manufacturing, affiliate imports of goods for further processing have increased over time, from 9.8% of affiliate sales in 1982 to 12.2% of affiliate sales in 1994. But the aggregate shares mask considerable variation across industries and regions.

Looking across industries, we see that outsourcing is most prevalent in industries that manufacture equipment. In 1994, the share of processing imports in sales is 23.2% in

²⁶ Approximately 90-95% of imports from the United States by foreign affiliates of U.S. multinationals are from parent firms. Even where the affiliate imports goods from an entity other than the parent, the parent may still have arranged the transaction. With this in mind, the measure of affiliate imports we use is all imports from the United States, including imports from parent and non-parent entities.

transportation equipment, 22.2% in electronics and electrical equipment, and 10.9% in industrial machinery (mainly computers and office equipment), compared to 0.1% in petroleum, 2.5% in food products, and 7.0% in chemicals. At least two features of equipment manufacturing make it amenable to outsourcing. One is that it tends to involve production stages—design, component production, final assembly—that are physically separable. Firms need not perform these tasks in the same location, and so can locate different stages in different countries. Another feature is that production stages exhibit different factor intensities, with design activities being more skill-intensive and assembly activities being more labor-intensive. To the extent that factor costs vary across countries, firms may want to locate labor-intensive activities in labor-abundant countries.

It is also evident in Table 6 that the propensity of U.S. parents to outsource production to their affiliates varies greatly across regions. The share of processing imports in total sales is 33.5% in Canada, 36.7% in Mexico, and 14.3% in non-OECD Asia (with equipment industries having the highest incidence of outsourcing in all three regions). The magnitude of outsourcing to Canada and Mexico may reflect the importance of low trade costs in vertical FDI. As part of global outsourcing networks, multinationals may need to send large volumes of inputs back and forth between parent operations and affiliate plants. For U.S. firms, Canada and Mexico have both low transport costs and, as of the late 1980s, low tariffs and non-tariff barriers. The magnitude of outsourcing to Asia may reflect the concentration of relatively low-wage, low-trade barrier countries in the region.²⁸

²⁷ There is abundant empirical work on outsourcing from more-developed to less-developed countries, which may or may not involve FDI. See Feenstra and Hanson (2001) for a survey of this literature.

²⁸ Some companies report to the BEA that affiliate imports of goods for further processing accounts for more than 100% of total affiliate sales. This anomaly occurs because some affiliates, particularly those engaged in in-bond processing of goods (e.g., maquiladoras in Mexico), do not include imports for further processing in their sales or expenses. Such cases are extremely rare, however: in 1994 there were only 67 cases like this out of a universe of 18,929 non-bank foreign affiliates. To correct for this problem in Table 6, for these cases in 1994 we replaced reported total sales with our best estimate of the true sales figure—i.e., the sum of reported sales and imported goods for further processing.

Table 7 offers additional evidence suggesting the vertical specialization by foreign affiliates of U.S. multinationals. For various industry aggregates in both 1982 and 1994, this table shows the ratio of value added to total sales both for foreign affiliates of U.S. multinationals and, for comparison, for all establishments operating in the United States (as calculated by the Bureau of Economic Analysis). A higher ratio of value added to sales indicates that a business enterprise produces in-house a larger fraction of the inputs and outputs that comprise its total sales. Value-added-to-sales ratios are generally lower for foreign affiliates than for U.S. establishments. This suggests that foreign affiliates specialize more in particular production stages than do comparable U.S. establishments, as would be consistent with vertical FDI.²⁹ Comparing 1982 with 1994, notice that while the value-added-to-sales ratios have been slightly rising for U.S. establishments, they have generally been falling for foreign affiliates. This suggests that foreign operations have become even more vertically specialized over time.

4.2 The Outsourcing Decision

Tables 6 and 7 show clear evidence of global outsourcing by U.S. multinationals, consistent with vertical FDI. This evidence raises an important question. Could estimation results on the relationship between affiliate total sales and country/industry characteristics, which have been interpreted as evidence in support of horizontal FDI and against vertical FDI, actually be summarizing country or industry characteristics associated with vertical FDI? Since these results are from reduced-form specifications, they are open to interpretation.

To shed light on this issue we estimate a regression similar to equation (1), but in which we replace the dependent variable with either log affiliate imports for further processing or this

²⁹ It could be, of course, that foreign affiliates resell goods purchased from their parent firms and that this accounts for the low value added to sales ratios. In unreported results, we find that foreign manufacturing affiliates of U.S. multinationals import very

variable minus log affiliate total sales. The regressors and the sample of observations are the same as in Table 6, except that we restrict the set of industries to be from manufacturing. Table 8 reports our estimation results.

Columns (1) and (2) of Table 8 shows regression results using as the dependent variable log affiliate imports for further processing and log total sales, respectively. Since affiliate imports are positively correlated with aggregate affiliate activity, it is not surprising that the coefficient estimates in columns (1) and (2)—both here in Table 8 and back in Table 5, too—are quite similar. Affiliate imports for further processing are higher in economies that are larger, have higher average incomes, are closer to the United States, have an English speaking population, and have lower tax rates. They are also higher in industries that have lower transport costs to the United States, are more skill-intensive (in the United States), and have a larger average scale of production. The same patterns hold for affiliate total sales (but for scale). This suggests that vertical and overall FDI respond in a qualitatively similar manner to country and industry characteristics.

To gauge the differential sensitivity of vertical and overall FDI to these characteristics, we turn to the estimation results in column (3), in which we control for aggregate affiliate activity. The dependent variable is the log difference between affiliate imports for further processing and affiliate total sales. The regression coefficients show the correlation between affiliate processing imports and country/industry characteristics, holding constant total affiliate activities. The coefficients on total GDP and per capita GDP are now negative and statistically significant, while the coefficient on distance remains negative and the coefficient on industry scale remains positive. No other variables are statistically significant.

few goods for resale as a fraction of their total sales.

These results suggest that vertical FDI, as measured here by the fraction of total sales related to outsourcing, is greater in economies that are smaller, have lower labor productivity, and are closer to the United States. Smaller countries offer smaller markets and thus may make horizontal production for the local market less attractive, and so outsourcing more attractive. That multinationals appear to outsource more to low-labor-productivity countries suggests that affiliate production related to outsourcing is more sensitive to labor costs than other types of affiliate production. The importance of distance from the United States to processing by affiliates is consistent with outsourcing requiring substantial back-and-forth movements of inputs (or managers) between parents their foreign affiliates. Finally, the imprecisely estimated coefficient on tax rates in column (3) – as compared to the positive and precisely estimated coefficients in columns (1) and (2) – suggests that outsourcing is not more sensitive to taxes than are other multinational activities. In other words, vertical and horizontal FDI appear to have similar tax sensitivities.³⁰

In columns (4) and (5), we introduce controls for tariffs and non-tariff barriers. Since we are missing observations on these variables for many industry-country combinations, their inclusion reduces the sample size.³¹ In column (4), higher tariffs and NTBs are significantly correlated with lower levels of processing imports. This is to be expected. In column (5), however, the estimated coefficients on tariffs and NTBs are not significantly different from zero. This suggests that our measure of vertical FDI is not more sensitive to trade barriers (other than distance) than are other multinational activities. Since outsourcing may require back-and-forth shipments between parents and affiliates, we might expect trade barriers to have a strong

³⁰ This tax result should be interpreted with caution. Many government give generous tax breaks to foreign firms that engage in export processing within their borders (Hanson, 2001). In this case, effective tax rates may be a poor indicator of the tax rates that apply to foreign affiliates engaged in outsourcing.

negative impact on vertical FDI. One relevant fact here is that many countries give tariff breaks to foreign firms that process imported inputs for export. Such input-processing provisions allow a foreign affiliate in, say, Mexico to import inputs duty free from its parent in the United States, as long as the affiliate later exports the processed inputs in the form of a final product. So our observed trade barriers may be a poor indicator of the actual trade barriers that apply to global outsourcing by U.S. multinationals.³²

4.3 The Outsourcing Decision: Summary

In this section we have presented evidence of vertical FDI by U.S. multinationals. Both vertical and horizontal FDI appear to be higher in countries with larger markets, higher labor productivity, lower taxes, and closer proximity to the United States. However, when we hold constant the overall level of multinational sales in a country and industry, we find that outsourcing to foreign affiliates is higher in countries that have *lower* average labor productivity, smaller markets, and that are closer to the United States. The former result is important, as it contrasts with reported correlations between per capita GDP and affiliate sales in Brainard (1997) and Markusen and Maskus (1999), which have been taken as evidence against vertical FDI. Among countries in which U.S. multinationals are present, outsourcing appears to be most common where labor productivity and average incomes are relatively low.

³¹ Going from column (2) to column (4), we see that the coefficients on the dummy for an English speaking population and on industry skill increase in magnitude substantially. Unreported results indicate that this is not the result of introducing controls for trade barriers but of restricting the sample to observations for which we have data on tariffs.

³² Two additional comments on the results in Table 8. First, Brainard (1997) found a positive correlation between tariffs and affiliate total sales. This result may depend at least partly on equation specification: Brainard did not include GDP as a regressor, and when we exclude GDP from our regression with affiliate total sales as a regressand we, too, estimate a positive coefficient on tariffs. It may also depend on differences in sample selection. We limit our sample to cases of non-zero observations on total sales, to allow our “differenced” dependent variables (see note 20). Second, as with our estimates in Table 5, here again our results appear to be robust to various sampling exclusions. For example, Mexican affiliates may again be special here. Imports for further processing are exceptionally large for, and account for an exceptionally large share of total sales by, those affiliates. In addition, Mexico has relatively low labor productivity and shares a border with the United States. Despite all this, there were no changes to the sign or significance of our coefficient estimates for the sample excluding Mexico.

These findings suggest that to identify the impact of country (or industry) characteristics on multinational behavior, it is essential to distinguish between specific types of multinational operations, in this case outsourcing versus total sales. Aggregating over the activities of foreign affiliates may mask the presence of vertical FDI and give an incomplete picture of the range of operations that multinationals perform abroad.

5. Production-Oriented FDI Versus Distribution-Oriented FDI

Much of the recent empirical work on multinationals focuses on the cross-country configuration of production within manufacturing, with much effort devoted to understanding whether foreign-affiliate production in manufacturing is horizontal or vertical in nature. In the previous section, we re-examined data on manufacturing affiliates to argue that vertical FDI matters more than is commonly presumed. In this section, we broaden our focus beyond production-oriented FDI to consider distribution-oriented FDI. In Section 2 (Table 2), we documented that by 1998 foreign affiliates in wholesale trade accounted for over 20% of worldwide total sales by foreign affiliates of U.S. multinationals. We now analyze in greater detail the characteristics of these distribution-oriented affiliates.

One reason wholesale affiliates matter is they belie the common assumption that U.S. firms serve foreign markets either through exports or through FDI. In most models of multinationals, when a firm exports goods the only cost of reaching foreign buyers is international shipping costs (covering both natural and political barriers). In reality, however, there may be substantial costs to delivering goods from foreign borders to foreign buyers, including clearance through customs, internal distribution and storage, marketing, repair, etc. Sizable host-country distribution activities may induce exporting U.S. firms to establish foreign

wholesaling affiliates—in which case these firms serve foreign markets through both exports and FDI. Another possibility is that manufacturing and wholesale-trade affiliates belong to different sets of parents involved in different sets of activities. All this suggests there are merits to examining foreign distribution decisions and their links to foreign (and domestic) production decisions.

5.1 Facts About Wholesale-Trade Affiliates

We begin with the question, do individual U.S. multinationals engage in both production-oriented FDI and distribution-oriented FDI? Table 9 shows, for U.S. parents in different primary industries, the share of total sales in foreign affiliates by primary industry of affiliates. All data are for 1998. To illustrate, of total sales by foreign affiliates of U.S. parents whose primary industry was electronic and electric equipment, 59.1% were by affiliates whose primary industry was also electronics, 28.1% were by affiliates whose primary industry was wholesale trade, etc.

There are two key messages in Table 9. First, most sales by foreign affiliates are in the same primary industry as that of their parents. While this might not seem surprising, these primary-industry sales shares are not as high as one might expect. For manufacturing, they range from a high of 70.4% in food products to a low of 41.7% in industrial machinery. Second, for manufacturing parents the other major industry for sales by foreign affiliates is wholesale trade. The share of sales in wholesale-trade affiliates ranges from 9.7% for parents in transportation equipment to 37.7% for parents in industrial machinery. Thus, Table 9 suggests that many U.S. multinationals engage in both production-oriented and distribution-oriented FDI.

We now ask whether U.S. multinationals *in a given country* tend to choose either one form of FDI or the other. In unreported calculations on 1998 data, we found that to be

overwhelmingly the case. There are few U.S. multinationals that operate both manufacturing and wholesale-trade affiliates in the same country. For example, in 1998 533 U.S. parents had manufacturing affiliates in Canada, 259 had wholesale-trade affiliates in Canada, 60 had *both* a manufacturing and a wholesale trade affiliate in Canada, and 732 had *either* a manufacturing or a wholesale trade affiliate in Canada--but not one of each in Canada. The Canadian case is typical: in most countries only about 10% of U.S. parents choose this strategy, with an even smaller share in the developing countries. So in given country, U.S. multinationals choose either production-oriented FDI or distribution-oriented FDI, but not both.³³

What might explain this either/or strategy of firms? It seems consistent with standard theories of horizontal FDI. In markets that are large and where trade costs vis-à-vis the United States are high, multinationals set up manufacturing affiliates; in contrast, in small, low-trade-cost markets, multinationals set up wholesale-trade affiliates to import and distribute goods produced elsewhere. The finding of the previous paragraph does not obviously support this hypothesis, however. Countries host affiliates in both manufacturing and wholesale trade, not just all one or all the other.³⁴ To the extent that U.S. firms face roughly the same host-country market conditions, that finding doesn't support a simple horizontal-FDI explanation. But we can't rule it out completely, since exports can still flow without mediation by wholesalers.

³³ Two additional comments on this result. First, one feature of the data which may make this result difficult to interpret is that U.S. parents vary greatly in the number of foreign affiliates they own. It may be that large multinationals, which account for a large fraction of total sales by foreign affiliates, have both manufacturing and wholesale trade affiliates, but that small multinationals, purely by virtue of their size, have either one type or the other. This could give the false impression of a separation between production-oriented and store-front FDI. To gain insight into this issue, we examined how the fraction of countries in which a U.S. parent has both manufacturing and wholesale-trade affiliates varies with the number of countries in which the parent has affiliates. It is true that parents with more affiliates are in more countries and have a higher incidence of production-oriented and store-front investments in the same country. But in a given country even the largest parents tend to specialize in one activity or the other. Parents with affiliates in 40 or more countries have both manufacturing and wholesale trade affiliates in just 16% of the countries in which they are present. A second comment is that this stark separation of activities between manufacturing and wholesaling does not result from diversified affiliates being forced into different primary industries by the data collectors. As explained in the data appendix, BEA does not allow foreign affiliates in the same country to be consolidated if they are in different primary industries unless they are integral parts of the same business operation. Moreover, the secondary activities of the affiliates that meet this exception are small. In 1998, for example, only 4% of the sales of

A second explanation of this either/or strategy of U.S. multinationals might be a life-cycle story, in which one type of FDI leads the other. Perhaps initial uncertainty about host-market conditions and policies motivate U.S. firms to establish initially just wholesale-trade affiliates. These wholesalers can resell goods produced elsewhere and help firms gauge whether host-countries merit larger-scale investments in manufacturing operations. If this life-cycle story of FDI were true, then we should see wholesale affiliates leading to manufacturing ones.³⁵

We examined this idea by tallying by industry the number of new manufacturing affiliates created by U.S. multinationals between 1990 and 1994. For each new manufacturing affiliate, we then asked whether its parent firm had a wholesale-trade affiliate in that country in 1989. We found that manufacturing births were preceded by wholesale affiliates in fewer than 10% of births in every industry, and in fewer than 6% of all manufacturing births that period. So, in very few cases in which a parent established a manufacturing affiliate did it first establish a wholesale trade affiliate in the same country. This casts doubt on the life-cycle explanation.³⁶

A third reason why U.S. multinationals might choose to locate production-oriented and distribution-oriented affiliates in different countries relates to the U.S. tax treatment of foreign-source income. U.S. firms are taxed on a residence basis. This means that income that a U.S. corporation earns through its foreign affiliates, i.e., its foreign-source income, is subject to U.S. taxation. If a U.S. corporation also pays foreign taxes on its foreign-source income, it is eligible for a foreign-income-tax credit. With the current top U.S. corporate income-tax rate of 35%, a

manufacturing affiliates were in the secondary industry of wholesale trade, and only 3% of the sales of affiliates in wholesale-trade affiliates were in manufacturing.

³⁴ Looking at all countries, we found that wholesale-trade affiliates were less prevalent in small and/or developing economies.

³⁵ For a detailed discussion of life-cycle motives for FDI, see Moran (2001).

³⁶ An issue we did not address is whether there is a difference between the case where a manufacturing affiliate is created through a merger or acquisition and one in which it is created by greenfield investment. In the latter case, we might expect uncertainty about host-country conditions to be greater and so the incentive to test the market through establishing a wholesale trade affiliate to be higher. This is an interesting issue, but one we leave for future work.

U.S. corporation that earns foreign income in a country and pays foreign taxes equal to 20% of this income would owe the U.S. government a tax payment equal to 15% of its foreign earnings.

Under U.S. tax law, foreign-source earnings from manufacturing and wholesale-trade affiliates are subject to different tax treatment. “Active” foreign income by foreign subsidiaries of U.S. corporations, which includes most income earned by U.S. foreign manufacturing affiliates, is subject to U.S. taxation when firms repatriate the income to the United States. A U.S. firm may delay repatriation and so defer taxes by re-investing its foreign earnings in activities abroad that generate active income.³⁷ “Passive” foreign income, which includes some income from sales by wholesale-trade affiliates, is subject to immediate U.S. taxation.³⁸

To avoid having income from manufacturing activities lumped together with income from wholesale-trade activities, and so subject this active income to immediate U.S. taxation, a U.S. corporation must keep these activities confined to separate subsidiaries. In practice, as we have seen, U.S. multinationals tend to avoid having manufacturing affiliates and wholesale-trade affiliates in the same country. The incentive to separate wholesale and manufacturing activities would be stronger in lower-tax countries, since in these countries the U.S. tax liability (and so the potential tax deferral) on any amount of foreign income would be higher.

5.2 The Choice Between Production-Oriented and Distribution-Oriented FDI

To gauge the importance of factors that influence the choice between production-oriented and distribution-oriented FDI, we now examine whether the scale of activity in wholesale-trade affiliates relative to manufacturing affiliates is systematically related to host-country

³⁷ To be eligible for tax deferral, the requirements include that the U.S. corporation own 10% of the affiliate in which it is investing and that the affiliate generates active income. For details, see Joint Committee on Taxation (1984), Hufbauer (1992), Altshuler and Newlon (1993), and Altshuler and Hubbard (2000).

³⁸ This tax treatment is due in part to changes in U.S. tax law resulting from the Tax Reform Act of 1986, which tightened up Subpart F rules first created in 1962 meant to prevent abuse of tax-deferral provisions.

characteristics and policies. In the previous sub-section we discussed three hypotheses for firm-level factors driving this choice. Theories of horizontal FDI suggest that this choice mirrors the export-versus-FDI decision, in which case production-oriented FDI should be more common in economies that are larger and have higher trade costs. The second hypothesis, the life-cycle story, has no obvious support in the data and we do not pursue it further. The third hypothesis, tax planning, is that the preference of U.S. multinationals for wholesale-trade activities over manufacturing activities will be stronger in higher-tax countries (again, since the benefits of deferring U.S. income taxes would be smaller on income earned in these countries).

We examine these hypotheses by regressing the ratio of sales by wholesale-trade affiliates to total sales by wholesale-trade and manufacturing affiliates on country GDP, per capita GDP, effective corporate tax rates, distance from the United States, and average transport costs. Our dependent variable, which captures the share of wholesale-trade affiliates in total “manufacturing-related” sales in a country, is one measure of distribution-oriented FDI relative to production-oriented FDI.

Before turning to the estimation results, we note that our sample of countries includes tax havens.³⁹ These are countries with very low tax rates, in which multinationals sometimes locate corporate offices for the purposes of reporting income but not necessarily for the purposes of producing or selling goods locally (Hines, 1994). The presence of tax havens may introduce noise into data on wholesale-trade activity. Multinationals may ship goods through affiliates in tax havens en route to a final destination, or may simply report goods as having been bought and sold by affiliates in tax havens to benefit from lower tax rates. Wholesale-trade activity by U.S.

³⁹ The tax havens in our sample are the Bahamas, Barbados, Bermuda, Hong Kong, Ireland, Luxembourg, the Netherlands Antilles, Panama, Singapore, and Switzerland. See also note 21.

multinationals in tax havens may, then, be quite different from that in other countries. To control for this possibility, we report results both with and without affiliates in tax havens in the sample.

Table 10 reports our results. Column (1) includes tax havens in the sample of countries. The share of wholesale-trade affiliates in total manufacturing-related sales is lower in larger markets, higher in markets with higher average income, and lower in English-speaking countries. Coefficients on the other variables are imprecisely estimated. That relative sales by wholesale-trade affiliates is decreasing in country GDP is inconsistent with horizontal theories of FDI. The small and imprecisely-estimated coefficient on tax rates suggests that tax policy does not matter. This coefficient estimate, however, may be influenced by tax-haven countries in the sample.

Column (2) excludes tax havens from the sample. Now relative sales by wholesale-trade affiliates are higher in countries with higher taxes, although this correlation is imprecisely estimated. This is consistent with tax considerations mattering as outlined above. U.S. multinationals seem to be (weakly) more oriented towards distribution-oriented FDI in higher-tax countries, in which the cost of exposing foreign-source income to immediate U.S. taxation is relatively low. Column (2) also shows that wholesale relative sales are increasing in distance to the United States. This is inconsistent with theories of horizontal FDI, which predict that multinationals favor serving remote countries via local production rather than exports (and export-related wholesale trade).

5.3 Distribution-Oriented FDI: Summary

In this section we have examined the wholesale-trade activities of U.S. multinationals. Previous research has focused on their manufacturing activities, both at home and abroad, which makes sense given the prominence of manufactured goods in international trade. But wholesale-

trade affiliates constitute a sizable share of overall affiliate activity, and little is known about how their operations may interact with manufacturing operations. Our analysis suggests that distribution-oriented FDI displays features that seem inconsistent with standard theories of horizontal FDI. Instead, we found suggestive evidence that host-country tax policies influence the choice between distribution-oriented and production-oriented FDI.

6. Concluding Remarks

Over the last two decades, there has been a boom in academic research on FDI. Two important strands of this literature develop and test general-equilibrium models of multinational firms. Theoretical work tends to characterize multinationals as arising through either horizontal or vertical FDI. Empirical work tends to find strong support for horizontal FDI but not vertical FDI. These first-generation studies have been enormously helpful.

In this paper, we use recent, detailed data on U.S. multinationals to revisit why multinationals go abroad. We examine three types of multinational activities: global outsourcing, the use of export platforms, and wholesale trading. Our results suggest that vertical FDI is more common than previous work suggests, and more generally that affiliates span a diverse set of activities that each respond to host-country policies and characteristics in quite different ways.

We find clear evidence of vertical FDI. Earlier research tends to overlook data on trade within U.S. multinationals. U.S. parents actually outsource a substantial amount of production to their foreign affiliates. Though this vertical FDI is concentrated in particular regions and industries, it is clearly an important part of the overall picture. Previous work may have missed detecting vertical FDI due to the fact that outsourcing—and of other activities by foreign affiliates—have similar patterns of correlation with host-country characteristics.

Consistent with previous literature, we also find evidence that FDI is horizontal. But these activities are more varied than has been recognized. The standard view is that horizontal FDI is oriented towards producing goods exclusively for the host-country market. We find that foreign affiliates in certain industries and regions export the majority of goods that they sell. What is striking about these export platforms is that they predominate in smaller and less-protected economies, where theory predicts that horizontal FDI should be least common. We also document the relatively high sensitivity of export platforms to taxes and trade barriers.

Finally, we find evidence of distribution-related FDI, which the trade literature has largely ignored. In standard models, the decision of a firm to become a multinational is typically cast as a production choice: between exporting to or producing in a foreign market. This distinction obscures FDI related to wholesale trade. Wholesale-trade affiliates account for 24% of sales by foreign affiliates of U.S. multinationals in manufacturing. We find distribution-oriented FDI to be relatively concentrated in markets that are smaller and more distant from parent firms—markets in which standard theory suggests affiliates should be less oriented towards selling goods imported from abroad. We also document that firms tend to enter a given foreign market either through either distribution-oriented FDI or production-oriented FDI, and we find preliminary evidence that tax policy, among other factors, helps shape this choice.

Recent research on horizontal FDI has been extremely useful in describing broad patterns of multinational behavior. However, this research misses important variation in the range of activities that multinationals perform and in the sensitivity of these activities to host-country policies and characteristics. We have tried to provide some initial evidence on this range of activities and on the role of policy. Future work should examine these issues in greater detail.

Data Appendix

BEA Data

The data on the operations of foreign affiliates are from the tabulated results of Bureau of Economic Analysis (BEA) surveys of U.S. direct investment abroad.⁴⁰ They are based on mandatory surveys conducted by BEA. Data are available annually from 1982-98, but the data for some years are more comprehensive than others, depending on the type of survey on which the data are based. Benchmark surveys (or censuses), which are currently conducted every five years, are the most comprehensive in two respects: (1) they cover virtually the entire population of foreign affiliates in terms of dollar value, and (2) they obtain more data items than are collected in the non-benchmark surveys. The BEA maintains an annual time series for most data items by conducting sample surveys in the non-benchmark years. Reports are not required for small affiliates in the sample surveys, in order to reduce the reporting burden on the U.S. companies that must file. Instead, BEA estimates the data for these affiliates by extrapolating forward their data from the most recent benchmark survey on the basis of the movement of the sample data. Thus, coverage of the affiliate universe is comparable in benchmark and non-benchmark periods. The data in this paper are from the 1982, 1989, and 1994 benchmark surveys and the 1998 sample survey.

A foreign affiliate is a foreign business enterprise in which there is U.S. direct investment; that is, it is a foreign business enterprise in which a U.S. legal entity (e.g. business or individual) has a 10-percent equity stake. A majority-owned affiliate is a foreign business enterprise in which the U.S. entity has at least a 51% equity stake. Foreign affiliates are classified by 2-digit and 3-digit BEA International Surveys Industry codes that are closely related to 2-digit and 3-digit U.S. Standard Industrial Classification codes. A foreign affiliate generally represents the consolidation of the U.S. direct investor's business operations in a host country in a single three-digit industry.⁴¹ In 1994, majority-owned affiliates accounted for 78% of total affiliate sales.

The data used in this paper are from BEA's country-by-industry tabulations of selected data items for foreign affiliates. These tabulations provide data on a single aspect of affiliate operations for 58 major host countries (grouped into 5 major regions), by twelve 2-digit industries. To avoid the loss of data observations, the statistical analysis was performed on unsuppressed versions of the tabulated BEA data.⁴²

Comparison of the dollar-denominated measures of affiliate operations across countries and across time is subject to some measurement error related to valuation. The dollar-denominated measures are, for the most part, valued in the prices and exchange rates of the year covered by the data. Accordingly, changes in foreign-affiliate data over time may reflect

⁴⁰ For a description of these data, see Mataloni (1995).

⁴¹ The only exception to this rule is that foreign affiliate in the same host country, but in different three-digit industries, may be consolidated if they are integral parts of the same business operation.

⁴² In its published results, BEA suppresses some data cells in order to avoid disclosure of data of individual companies. In this study, we were able to use the data in these cells under arrangements that maintained BEA's legal confidentiality requirements.

changes in prices and exchange rates rather than real changes in affiliate operations. In addition, the accuracy of cross-country comparisons of foreign affiliate data may be affected if the market exchange rates used to translate foreign-affiliate data to U.S. dollars do not reflect the relative purchasing power of different currencies. Finally, data on the affiliate capital stock is valued at historical cost rather than current replacement cost. To improve the comparability of the dollar-denominated measures of affiliate operations across time in Tables 1-3, rough estimates of their value in 1998 dollars were obtained by applying the U.S. GDP deflator to BEA's published current dollar estimates.⁴³ Because of potential limitations of our dollar-denominated measures, affiliate-activity measures in terms of employment may be more informative (e.g., section 2 of the paper).

Other Data

Our analysis combines the BEA data with a number of industry and/or country-varying characteristics. The trade-barrier variables include tariffs, nontariff barriers, distance, and transportation costs. Tariffs are from the United Nations' TRAINS (Trade Analysis and Information System) CD-ROM. The original source data are classified by country and by 6-digit Harmonized System product codes. These data, plus a translation of them to a 1987 4-digit U.S. SIC (Standard Industrial Classification) basis, were obtained from Jon Haveman. Aggregation of the data from a 4-digit SIC basis to a 2-digit BEA ISI (International Surveys Industry) basis was derived by weighting the disaggregated data by the value of U.S. exports of goods to the country. Data on non-tariff barriers are also from TRAINS. The original source data for these were at the 4-digit SIC level, which we then concurred to BEA industries as just described. The nontariff information is categorical, indicating presence or absence of a set of nontariff barriers. The transportation-cost data were generated from data files in Feenstra (1996), which report for each industry in each year imports (in millions of dollars) in terms of both c.i.f. (cost, insurance, and freight) values and customs value.⁴⁴ For each observation we constructed transportation costs as (imports c.i.f. value - imports customs value) as a share of the customs value of imports. The original source data are classified by on a 1987 4-digit U.S. SIC (Standard Industrial Classification) basis; they were aggregated to a 2-digit BEA ISI (International Surveys Industry) basis by weighting the disaggregated data by the value of total imports by the host country. All trade-barrier data are bilateral for the host country vis a vis the United States; all but distance also vary by industry as described.

Host-country data include information on market size, average productivity, and tax rates. Total market size and average productivity are measured by total and per capita GDP (at PPP exchange rates); these data come from the World Bank. The tax-rate data are from the Internal Revenue Service Statistics of Income Division; they measure average effective tax rates faced by controlled foreign corporations of U.S. corporations. We obtained these data from Harry Grubert (see Grubert, 2001). Industry-varying data include average skill intensity in the United States; this is measured by the ratio of college educated workers to high-school educated workers, as calculated from U.S. Census Bureau data.

⁴³ BEA has developed a more accurate method for deflating dollar-denominated measures of affiliate operations, but it could not be employed in this paper because of source data limitations. See Mataloni (1997).

⁴⁴The c.i.f. value is the price of the goods plus packing costs, insurance, and freight charges to the port of entry. The customs value is the value of the goods at the port of export.

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Table 1: Levels of U.S. Majority-Owned Foreign-Affiliate Activity, by Region

	World		All OECD		Latin America		Non OCED Asia		Africa		Middle East		Non OECD Europe	
	Level	Share	Level	Share	Level	Share	Level	Share	Level	Share	Level	Share	Level	Share
Affiliates														
1982	14,475	65.3	9445	19.9	2,886	984	6.8	659	4.6	267	1.8	30	0.5	
1989	15,381	71.1	10937	15.7	2,409	1,282	8.3	397	2.6	187	1.2	34	0.4	
1998	21,335	67.9	14480	15.7	3,345	2,449	11.5	511	2.4	233	1.1	222	2.1	
Sales														
1982	1,183.2	72.5	857.4	14.2	168.3	78.3	6.6	38.2	3.2	27.1	2.3	0.8	0.1	
1989	1,160.7	83.1	964.3	8.5	99.0	68.1	5.9	13.2	1.1	9.1	0.8	1.0	0.1	
1998	2,027.8	76.6	1553.4	11.4	230.7	201.4	9.9	20.8	1.0	9.3	0.5	7.7	0.7	
Value Added														
1982	362.5	72.4	262.5	12.5	45.3	21.0	5.8	16.3	4.5	13.1	3.6	0.1	0.1	
1989	364.0	82.0	298.4	9.3	33.7	18.6	5.1	6.0	1.7	5.6	1.5	0.2	0.1	
1998	510.7	78.7	402.1	12.0	61.3	34.3	6.7	6.8	1.3	3.8	0.7	1.0	0.3	
Capital Stock														
1982	163.4	70.1	185.6	13.5	35.6	16.9	6.4	10.1	3.8	3.0	1.1	0.1	0.1	
1989	282.3	79.6	224.8	9.0	25.5	17.8	6.3	4.7	1.7	2.2	0.8	0.1	0.1	
1998	519.4	68.5	356.0	15.1	78.2	55.0	10.6	14.7	2.8	3.9	0.8	6.8	2.8	
Employees														
1982	5,022	66.5	3,338	19.8	994	383	7.6	159	3.2	111	2.2	2	0.1	
1989	5,114	70.0	3,582	18.8	962	393	7.7	81	1.6	69	1.4	3	0.1	
1998	6,900	64.3	4,433	20.5	1,416	827	12.0	111	1.6	50	0.7	53	1.7	

Notes: Columns headed “Level” indicate entries reporting absolute numbers. Units for these entries are number for affiliates; billions of 1998 dollars for sales, value added, and capital stock; and thousands for employees. Columns headed “Share” indicate entries reporting the share of the worldwide total, listed in column 1.

Table 2: Levels of U.S. Majority-Owned Foreign-Affiliate Activity, by Industry

	Petro- leum	Manufacturing								Wholesale Trade	FIRE	Services	Other Industries
		Total	Food	Chemicals	Metals	Industrial Machinery	Electronic Equipmnt	Transport Equipmnt	Other Manuf.				
Affiliates													
1982	10.7	38.9	3.9	9.5	4.4	5.2	4.3	1.9	9.6	23.7	12.4	7.8	6.5
1998	6.5	36.7	3.1	8.4	3.1	5.0	4.1	2.5	10.5	23.1	15.1	12.3	6.2
Sales													
1982	36.5	37.1	4.5	7.5	2.1	5.5	3.5	7.8	6.3	15.6	3.2	2.5	5.2
1998	11.5	47.0	5.4	8.9	1.7	8.1	5.1	10.1	7.8	20.7	7.2	6.7	6.8
Va Added													
1982	38.3	44.6	4.0	7.3	2.4	7.9	4.4	8.1	10.5	8.7	0.5	3.6	4.4
1998	17.5	49.2	5.2	10.8	2.1	6.8	4.5	8.1	11.7	11.6	4.5	10.3	6.9
Cap Stock													
1982	43.2	40.6	3.4	9.4	2.6	6.8	2.6	8.4	7.4	4.4	1.3	2.9	7.6
1998	25.5	42.2	4.8	10.5	2.4	3.6	4.5	7.7	8.7	3.8	4.4	5.7	18.3
Employees													
1982	7.1	66.9	7.1	9.7	4.4	8.8	11.2	11.5	14.1	8.5	1.8	5.5	10.3
1998	2.6	57.6	6.3	7.9	2.8	8.2	10.5	9.3	12.8	8.3	3.2	14.0	14.4

Notes: Entries in this table are the share of total world activity; these shares are calculated using the world totals in Table 1. “FIRE” stands for finance, insurance, and real estate (excluding depository institutions).

Table 3: Affiliate Exports as a Share of Affiliate Total Sales, by Region

	1982	1989	1998
All Countries	34.5	32.3	34.5
Canada	23.3	26.5	31.4
OECD Europe	37.3	34.1	36.8
Other Europe	60.1	66.5	19.8
Mexico	10.3	31.9	40.2
Other Latin America	44.0	36.4	29.8
Africa	44.0	43.5	33.1
Middle East	25.0	38.3	46.2
OECD Asia / Pacific	11.0	14.8	11.4
East Asia	60.5	52.9	48.9
China	22.7	5.8	36.0
Other Asia / Pacific	5.9	7.5	7.5

Table 4: Affiliate Exports as a Share of Affiliate Total Sales, by Industry

	1982	1989	1998
All Industries	34.5	32.3	34.5
Petroleum	35.4	25.6	22.4
Manufacturing	33.9	37.8	44.4
Food and kindred products	15.6	19.6	26.1
Chemicals and allied products	31.7	33.4	36.2
Primary and fabricated metals	25.7	35.4	33.8
Industrial machinery and equipment	40.6	44.9	60.4
Computer and office equipment	38.9	44.5	65.9
Electronic and other electric equipment	40.7	45.0	57.1
Transportation equipment	43.3	46.8	52.3
Other manufacturing	30.7	30.7	33.8
Wholesale trade	41.7	29.9	34.5
Durable goods	35.3	24.0	29.9
Nondurable goods	51.3	41.6	43.1
FIRE	37.8	29.6	29.3
Services	19.8	20.0	17.3

Notes: Affiliate refers to majority-owned foreign affiliates of U.S. multinationals.

Table 5: Regression Results, Affiliate Exports Versus Local Sales

	(1)	(2)	(3)	(4)	(5)
Dependent Variable	Exports	Local Sales	Exports/ Local Sales	Exports	Exports/ Local Sales
GDP	0.571 (0.051)	0.856 (0.041)	-0.285 (0.048)	0.887 (0.091)	-0.112 (0.081)
Per Capita GDP	1.315 (0.079)	0.996 (0.063)	0.319 (0.074)	1.078 (0.177)	0.341 (0.158)
(1-Tax Rate)	2.934 (0.445)	0.806 (0.356)	2.127 (0.418)	3.819 (0.703)	2.736 (0.628)
Distance From USA	-0.629 (0.109)	-0.592 (0.087)	-0.037 (0.102)	-0.329 (0.151)	0.240 (0.135)
English Speaking	1.111 (0.196)	1.082 (0.157)	0.029 (0.184)	0.812 (0.281)	-0.243 (0.251)
U.S. Skill Intensity	0.143 (0.160)	0.731 (0.128)	-0.589 (0.151)	0.764 (0.260)	-0.311 (0.232)
Average Aff. Employ.	-0.380 (0.121)	-0.260 (0.097)	-0.120 (0.113)	-0.346 (0.271)	0.458 (0.242)
Transport Costs				-4.744 (2.449)	-6.396 (2.188)
Tariffs				-4.171 (1.899)	-1.150 (1.696)
NTBs				-0.802 (0.233)	-0.493 (0.209)
No. Observations	1054	1054	1054	455	455
Adjusted R-Squared	0.40	0.53	0.18	0.42	0.50

Notes: Cell entries are OLS parameter estimates (and standard errors) for equation (1). Each column reports a different specification, using as the regressand the variable reported at the top of each column. Columns (1) and (2) cover all industries; columns (3) and (4) cover just manufacturing industries. Specifications include an unreported set of industry and year fixed effects. All variables are in logarithms except the dichotomous variables English Speaking and NTBs. See text for equation (1) and variable definitions.

Table 6: Affiliate Imports of Goods for Further Processing
as a Share of Affiliate Total Sales,
by Industry and Region

	World	OECD Europe	OECD Asia	Canada	Mexico	Other LatinAm.	Other Asia	Africa	Middle East
1982									
Manufacturing	9.8	5.0	6.9	21.6	19.8	9.4	25.7	6.5	8.6
Food and kindred products	5.2	6.1	1.2	5.7	1.1	3.1	8.0	--	--
Chemicals and allied products	6.0	5.1	7.1	7.8	5.4	5.5	13.9	5.8	5.5
Primary and fabricated metals	4.6	4.0	2.8	7.0	4.6	1.7	7.8	--	--
Industrial machinery and equipment	8.1	6.7	9.4	12.8	6.2	8.1	17.2	--	--
Electronic and other electric equipment	16.3	5.1	14.7	11.1	--	33.1	39.7	--	--
Transportation equipment	17.7	1.0	3.6	43.8	33.9	17.4	8.9	--	--
Other manufacturing	7.6	7.0	9.1	10.2	--	6.2	5.9	--	--
1994									
Manufacturing	12.2	4.9	9.2	33.5	36.7	6.7	14.3	5.8	3.3
Food and kindred products	2.5	1.4	5.1	7.0	2.4	2.6	3.3	0.8	0.4
Chemicals and allied products	7.0	4.4	8.8	19.8	8.5	8.2	9.6	6.8	3.3
Primary and fabricated metals	8.2	3.8	8.0	17.0	26.3	6.8	13.0	--	--
Industrial machinery and equipment	10.9	8.2	7.8	36.7	44.3	10.3	8.7	--	--
Electronic and other electric equipment	22.2	10.0	18.0	21.2	66.5	21.1	25.9	--	--
Transportation equipment	23.2	2.5	5.3	49.6	50.4	5.9	7.0	4.5	--
Other manufacturing	7.7	5.2	10.6	14.3	17.1	6.8	11.4	--	--

Notes: "--" indicates data are not available due to BEA suppression requirements.

Table 7: Ratio of Value Added to Total Sales,
for Foreign Affiliates and U.S. Establishments

	Foreign Affiliates	U.S. Establishments
1982		
Manufacturing	36.8	33.7
Food and kindred products	27.3	23.4
Chemicals and allied products	30.0	34.5
Primary and fabricated metals	36.0	38.3
Industrial machinery and equipment	43.5	45.9
Electronic and other electric equipment	39.1	43.4
Transportation equipment	31.6	36.0
Other manufacturing	51.3	30.6
1994		
Manufacturing	29.4	37.0
Food and kindred products	28.2	26.2
Chemicals and allied products	31.5	42.6
Primary and fabricated metals	32.4	37.6
Industrial machinery and equipment	23.2	39.6
Electronic and other electric equipment	30.8	53.1
Transportation equipment	23.8	32.5
Other manufacturing	39.9	36.7

Table 8: Regression Results, Affiliate Imports for Further Processing

	(1)	(2)	(3)	(4)	(5)
Dependent Variable	Imports for Processing	Total Sales	Imports/ Total Sales	Imports for Processing	Imports/ Total Sales
GDP	0.647 (0.052)	0.764 (0.054)	-0.119 (0.044)	0.711 (0.075)	-0.127 (0.063)
Per Capita GDP	0.531 (0.084)	0.995 (0.088)	-0.462 (0.071)	0.433 (0.146)	-0.539 (0.123)
(1-Tax Rate)	1.837 (0.449)	1.756 (0.471)	0.083 (0.384)	1.299 (0.583)	-0.299 (0.488)
Distance From USA	-0.882 (0.110)	-0.566 (0.116)	-0.309 (0.094)	-0.717 (0.125)	-0.273 (0.105)
English Speaking	1.187 (0.195)	1.023 (0.205)	0.166 (0.167)	1.115 (0.236)	0.287 (0.198)
U.S. Skill Intensity	0.965 (0.182)	0.921 (0.191)	0.040 (0.155)	1.121 (0.219)	0.104 (0.184)
Average Aff. Employ.	0.279 (0.190)	-0.428 (0.199)	0.705 (0.162)	0.159 (0.231)	0.812 (0.194)
Transport Costs	-4.098 (1.571)	-2.121 (1.649)	-1.936 (1.344)	-3.626 (2.028)	-2.454 (1.700)
Tariffs				-2.833 (1.569)	-1.359 (1.315)
NTBs				-0.367 (0.195)	0.102 (0.163)
No. Observations	604	604	604	436	436
Adjusted R-Squared	0.49	0.48	0.49	0.47	0.44

Notes: Cell entries are OLS parameter estimates (and standard errors) for equation (1). Each column reports a different specification, using as the regressand the variable reported at the top of each column. Specifications include an unreported set of industry and year fixed effects. All variables are in logarithms except the dichotomous variables English Speaking and NTBs. See text for equation (1) and variable definitions.

Table 9: Distribution of Affiliate Total Sales, Industry of Parent by Industry of Affiliate, 1998

Parent Primary Industry	Affiliate Primary Industry											
	Petro- leum	Food	Chems.	Metals	Indust. Mach.	Electric. Equip.	Transp. Equip.	Other Mfg.	Whole. Trade	FIRE	Services	Other Inds.
Petroleum	84.4	0.0	4.0	0.1	0.2	0.0	0.0	0.2	1.3	0.6	0.7	8.5
Food	0.0	70.4	0.2	0.1	0.0	0.7	0.0	9.1	17.0	0.5	1.5	0.6
Chemicals	3.7	1.6	60.7	0.2	0.3	0.1	0.0	8.6	22.6	1.3	0.3	0.5
Metals	0.3	0.7	8.3	59.9	4.3	2.0	1.3	5.9	11.0	0.8	1.6	4.0
Industrial Mach.	1.3	0.0	0.1	1.3	41.7	1.0	0.4	1.0	37.7	0.6	9.9	4.9
Electrical Equip.	0.0	0.0	0.1	3.0	2.1	59.1	2.7	1.8	28.1	0.9	0.8	1.5
Transport. Equip.	0.0	0.0	1.4	0.6	4.2	4.5	68.5	1.8	9.7	7.1	1.6	0.5
Other Mfg.	0.1	0.1	3.0	0.7	4.9	1.2	2.4	64.5	19.7	0.6	1.6	1.1
Wholesale Trade	0.2	14.4	1.1	0.4	4.1	3.1	1.4	4.8	64.8	0.8	1.8	3.1
FIRE	23.1	0.4	0.7	0.6	0.1	0.0	0.2	0.5	1.7	64.9	1.9	5.8
Services	0.0	0.0	0.2	0.8	0.8	0.4	0.0	0.8	3.3	1.3	86.1	6.2
Other Industries	3.3	0.2	0.5	0.3	0.0	0.2	0.0	0.5	2.2	0.6	4.3	88.0

Notes: Each row corresponds to U.S. parents whose main line of business is that row's industry; each column corresponds to foreign affiliates whose main line of business is that column's industry. Each cell, then, reports what share of total sales for foreign affiliates controlled by parents in that row's industry were in the industry of that cell's column. (For example, across all foreign affiliates controlled by U.S. parents operating primarily in the petroleum industry, 84.4% of affiliate total sales were in petroleum, 0.0% in food, 4.0% in chemicals, etc.)

Table 10: Regression Results, Sales by Wholesale-Trade Affiliates

	(1)	(2)
GDP	-0.037 (0.013)	-0.056 (0.012)
Per Capita GDP	0.126 (0.021)	0.138 (0.018)
(1-Tax Rate)	0.058 (0.105)	-0.095 (0.092)
Distance From USA	0.035 (0.031)	0.076 (0.028)
English Speaking	-0.124 (0.052)	-0.081 (0.045)
Transport Costs	0.837 (0.810)	0.307 (0.694)
No. Observations	135	117
Adjusted R-Squared	0.23	0.36

Notes: Cell entries are OLS parameter estimates (and standard errors) for estimates of the equation presented in Section 5.2, where the dependent variable is sales by wholesale trade affiliates as a share of those sales plus the sales of manufacturing affiliates. Column (1) includes in the sample tax-haven countries; Column (2) excludes them. All variables are in logarithms except the dichotomous variable English Speaking. See text for equation and variable definitions.