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Working Paper 9115
http://www.nber.org/papers/w9115

NATIONAL BUREAU OF ECONOMIC RESEARCH
1050 Massachusetts Avenue
Cambridge, MA 02138
August 2002

The statistical analysis of firm-level data on U.S. multinational companies was conducted at the International Investment Division, Bureau of Economic Analysis, U.S. Department of Commerce under arrangements that maintain legal confidentiality requirements. The views expressed are those of the authors and do not reflect official positions of the U.S. Department of Commerce. Helpful comments on earlier drafts were provided by Ray Fisman, Bernard Yeung, and seminar participants at Columbia University, Harvard Business School, New York University, and the NBER Strategic Alliances Conference. Financial support from the Lois and Bruce Zenkel Research Fund at the University of Michigan and the Division of Research at Harvard Business School is gratefully acknowledged. The views expressed herein are those of the authors and not necessarily those of the National Bureau of Economic Research.

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NBER Working Paper No. 9115
August 2002
JEL No. F23, L23, G32, H87

ABSTRACT

This paper analyzes the determinants of partial ownership of the foreign affiliates of U.S. multinational firms and, in particular, why partial ownership has declined markedly over the last 20 years. The evidence indicates that whole ownership is most common when firms coordinate integrated production activities across different locations, transfer technology, and benefit from worldwide tax planning. Since operations and ownership levels are jointly determined, it is necessary to use the liberalization of ownership restrictions by host countries and the imposition of joint venture tax penalties in the U.S. Tax Reform Act of 1986 as instruments for ownership levels in order to identify these effects. Firms responded to these regulatory and tax changes by expanding the volume of their intrafirm trade as well as the extent of whole ownership; four percent greater subsequent sole ownership of affiliates is associated with three percent higher intrafirm trade volumes. The implied complementarity of whole ownership and intrafirm trade suggests that reduced costs of coordinating global operations, together with regulatory and tax changes, gave rise to the sharply declining propensity of American firms to organize their foreign operations as joint ventures over the last two decades. The forces of globalization appear to have increased the desire of multinationals to structure many transactions inside firms rather than through exchanges involving other parties.

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1. Introduction

The appropriate ownership of productive enterprise is a central issue in economic theory and a very practical question for multinational firms establishing new foreign affiliates. Multinational firms frequently have the option to own 100 percent, majority, or minority shares of newly created foreign entities; additionally, they might participate in foreign markets by exporting from home countries or by permitting foreign companies to produce under licensing agreements. These alternatives imply varying levels of control and commitment and allow multinational firms to tailor the organization of foreign operations to the circumstances of individual product and geographic markets. A variety of ownership forms entailing less than 100 percent parent ownership, and the accompanying coordination of interests between more than one firm, are loosely grouped in the academic and popular literature and known as "alliances."

The rapid pace of globalization suggests to many observers that international alliances are essential to the success and survival of multinational enterprises.[1] This viewpoint has not, however, been subjected to sharp statistical tests based on actual practice, in part due to the difficulty of identifying the determinants of such a heterogeneous group of activities as those encompassed by alliances. The purpose of this paper is to identify the factors associated with one class of such activity, situations in which American multinational firms share ownership of foreign affiliates. The comprehensive U.S. data described in section 4, and analyzed in section 5, offer clues to the magnitudes of the costs and benefits associated with partial ownership, as revealed by the behavior of American companies in creating new foreign affiliates. The data also answer the question of whether the joint venture form of international alliance is an increasingly important feature of international business, and indicate the way in which ownership decisions have responded to the changing nature of globalization over the last two decades.

The behavior of American multinational firms suggests that partial ownership is most valuable to firms with extensive contact with local markets. Affiliates purchasing large fractions of their inputs locally and those selling large fractions of their output locally are more likely than others to be organized as joint ventures. Parent companies with extensive foreign operations and those establishing affiliates in the same industry are more likely to own minority stakes in newly

[1] Ohmae (1989, p. 143), for example, suggests that "Globalization mandates alliances, makes them absolutely essential to strategy."

created affiliates, suggesting that effective management of shared ownership requires significant experience. While it is possible that firms choose to share the ownership of their foreign affiliates in settings in which doing so mitigates expropriation risks, the data indicate that parent companies have as much at risk in typical joint venture affiliates as they do in their wholly owned affiliates and that there is no distinctive relationship between investment and risk levels by ownership form.

Parent firms are more likely to own majority or 100 percent stakes of affiliates that sell high fractions of their output to related parties or buy high fractions of their inputs from related parties. Majority and wholly owned affiliates are also more likely to make royalty payments to their U.S. parents for the use of intangible assets, and majority and wholly owned affiliates are the most useful to firms seeking to avoid taxes. Indeed, partial ownership by local firms appears to deter aggressive transfer pricing by multinational parents. These patterns suggest that settings in which there are strong benefits to coordinating parent and affiliate operations in order to conduct intrafirm trade, use technology abroad, or avoid taxes, are those in which parents are the most likely to establish their operations as majority or 100 percent owned affiliates. This cross sectional evidence does not, however, prove that ownership is a function of these considerations, since it is possible that both ownership and operational decisions represent joint responses to other unmeasured factors.

Fortunately, it is possible to exploit two types of changes in government policy that affect the relative costs of sharing ownership – the liberalization of ownership restrictions by certain host countries and the U.S. Tax Reform Act of 1986 – in order to identify the extent of linkage between ownership and coordinated activity between parents and affiliates. American firms operating in countries that liberalize their restrictions on foreign ownership of local affiliates trade more with their affiliates after liberalization. American firms in tax situations that reward the ability to coordinate closely with foreign affiliates, and those whose joint ventures are subject to tax penalties after 1986, likewise trade extensively with affiliates. These results are precisely what should appear if intrafirm transactions and majority and 100 percent ownership are complementary. It follows, therefore, that greater desire to coordinate parent and affiliate trade, technology transfer, and tax planning makes firms more likely to establish their foreign operations with majority or 100 percent ownership.

A comprehensive review of all U.S. overseas affiliate activity from 1982 to 1997 indicates that American multinational firms are decreasingly likely to establish their foreign affiliates as joint ventures. Aggregate activity by joint ventures has fallen considerably over time, and the cross sectional evidence is consistent with an increased appetite for control by multinational parents. Moreover, disappearing government-imposed ownership restrictions explain only a portion of the declining use of shared ownership by U.S. firms.

The forces of globalization appear to have diminished rather than accelerated the use of shared ownership. This is at first surprising, since globalization typically improves the return to international business activity, including joint ventures – but it is understandable if the opportunities created by globalization are best exploited by the use of wholly owned (or majority owned) foreign affiliates. In particular, ease of communication, reduced transportation costs, and integration of worldwide financial and commodity markets make it possible to coordinate integrated production activities in disparate locations, transfer technology between countries, and arrange international operations to reduce associated tax burdens. All of these activities are most profitably undertaken by foreign affiliates under the exclusive control of multinational parents.

Section 2 of the paper reviews the theoretical and empirical literature on international joint ventures. Section 3 presents a model that outlines the tradeoffs implicit in choosing ownership levels when operating abroad, thereby serving as the basis of the empirical work to follow. Section 4 provides an overview of the data on international joint ventures and describes recent patterns of joint venture activity. Section 5 analyzes the determinants of the ownership fractions of the foreign affiliates of American multinational corporations. Section 6 is the conclusion.

2. International Joint Venture Activity[2]

There is extensive discussion of the factors that influence a multinational parent's preferences for full or shared ownership of affiliates. The considerations that have received the most theoretical and empirical attention stem from work on transactions costs and contract theory. The transactions cost approach to the organization of firms, developed by Williamson (1975), Klein, Crawford, and Alchian (1978), and others, stresses that agents who develop a specific asset confront the possibility of opportunistic behavior by their trading partners. The

transaction cost literature, notably the work of Oxley (1997) and Anand and Khanna (2000), also identifies the hazard of technological appropriability in arm's-length relationships and various forms of alliances. These inefficiencies are thought to be mitigated when activities are organized under common ownership. Based on similar premises, the property rights approach, developed by Grossman and Hart (1986), Hart and Moore (1990), and others, formalizes the notion of asset specificity and focuses on the way in which ex ante investment incentives differ across ownership structures.[3] In this framework, joint ownership is generally suboptimal due to the sharing of residual control rights.

The moral hazard problems that arise in cooperative efforts have attracted considerable attention since Holmstrom's (1982) finding that efficient sharing rules do not exist for certain types of partnerships. Subsequent work identifies circumstances in which efficient sharing rules *may* exist, including those with repeated play, unlimited liability, and those in which risk-averse agents use stochastic sharing rules.[4] In the important case in which assets are jointly used, joint ownership may be an efficient arrangement. Aghion and Tirole (1994) find that "split" property rights can encourage innovation in settings with incomplete information. Similarly, the existence of potential spillovers means that parent firms may benefit from coordinated R&D activity in spite of the associated moral hazard problems.[5] The moral hazard created by partnership arrangements can facilitate certain types of market transactions. Crampton et al. (1987) note that, in environments with incomplete information, joint ownership of an asset may be consistent with efficient resource allocation.[6] Similarly, Rey and Tirole (1999) demonstrate that joint ventures can alleviate biased decision-making but can also be associated with complexities arising from divergent objectives.

Empirical work on the use of joint ventures by multinational companies suggests that firms select ownership levels that economize on transaction costs.[7] As outlined by Stopford and Wells (1972), Beamish and Banks (1987), Contractor and Lorange (1988) Gomes-Casseres

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[2] This section draws on Desai and Hines (1999).
[3] For a careful treatment of the differences between the transactions cost approach and the property rights approach, see Whinston (2002).
[4] See, for example, Legros and Matthews (1993).
[5] See Bhattacharya et al. (1992), Kaimen et al. (1992), and Gandal and Scotchmer (1993) for examples.
[6] Hart and Moore (1998) and other recent work on non-profit cooperative ownership structures considers joint ownership through cooperatives but typically in a not-for-profit setting.
[7] These theories are reviewed in Caves (1996).

(1989) and Asiedu and Esfahani (2001), joint ventures balance the benefits of combining complementary assets with costs that include managerial conflicts and shirking. Gatignon and Anderson (1988) present evidence that parents seek higher levels of ownership in affiliates that make greater use of proprietary assets. In a study of technology transfers to Indian firms, Ramachandran (1993) finds that subsidiaries that are 100 percent owned by foreign multinationals receive greater technology transfers than do Indian-owned firms, or subsidiaries that are partially owned by foreign multinationals. In contrast, Hennart (1991) argues that the cost of using market transactions to purchase other firms' intermediate inputs makes joint ventures particularly attractive.

Multinational parents also select ownership levels with eyes to facilitating the coordination of pricing and production decisions. Unlike other types of firms, multinational firms have units that are simultaneously active in multiple countries. As a result, these firms have the ability to adjust prices used for intrafirm transfers in order to allocate taxable income among jurisdictions in order to reduce the associated tax liabilities. Horst (1971) and Kant (1990) model the optimal transfer prices that multinational firms should charge in cross border transactions. Kant (1990) points out a limitation of joint ventures by indicating that significant conflicts of interest can arise in setting transfer prices between whole and partially owned affiliates – since multinational parents have incentives to shift profits away from affiliates owned jointly with other investors. Sole ownership also provides multinational firms the control needed to integrate worldwide operations. Franko (1971) reports limited use of joint ventures by multinational firms with the ability to shift production between locations, presumably due to excessive compensation demanded by potential joint venture partners fearing that multinational parents would shift production away from them first.

Recent empirical work on international trade suggests that there are significant benefits from coordinating production and pricing within multinationals. Feenstra and Hanson (1996a, 1996b) and Feenstra (1998) point out that the integration of world markets has been accompanied by a disintegration of the production process in which different stages of making a finished good take place in different places. Hanson, Mataloni, and Slaughter (2001) find evidence that parents export a small but growing volume of intermediate goods to affiliates for further processing, and that affiliates play growing roles as distributors and regional exporters. Zeile (1997) indicates that a growing percentage of U.S. multinational parent company trade

takes place with affiliated parties. Given that multinationals are transferring more goods inside the firm, there may be growing benefits to 100 percent ownership of affiliates in thereby avoiding hold-up problems with foreign partners, limiting transfer pricing conflicts, and simplifying integration of worldwide production.

Resource-constrained firms have the potential to learn from their local partners without incurring prohibitive expenses. Stopford and Haberich (1978) present data suggesting that smaller British MNEs made greater use of joint ventures when entering markets outside of the Commonwealth. Blomstrom and Zejan (1991) find evidence that parents were more likely to choose partial as opposed to 100 percent ownership when diversifying, although Ghemawat, Porter and Rawlinson (1985) suggest the opposite in their study of international coalitions. Kogut (1991) characterizes joint ventures as "real options" that provide firms with information they can use in forming subsequent plans – that may include acquiring their partners or dissolving their joint ventures. Similarly, Balakrishnan and Koza (1993) view joint ventures as intermediate forms between markets and hierarchies that permit firms to overcome informational asymmetries at low cost.

An additional common motivation for finding a local partner is the need to curry favor with host governments. As recently as two decades ago, many host country governments attempted to restrict foreign ownership of domestic firms. Franko (1989), Gomes-Casseres (1990), and Contractor (1990) argue that sole ownership is generally preferred by multinational parents but occasionally conceded in bargains with host governments. Henisz (2000) and Gatignon and Anderson (1988) present evidence that multinational parents entering countries with higher political risk are more likely to use joint ownership since local firms are well positioned to interact with local government.

Older surveys commonly report a rising use of joint ventures by multinational firms. Anderson (1990) and Geringer and Hebert (1991) claim that American firms rely to an ever-greater extent on international joint ventures, and will continue to do so. Curhan, Davidson, and Suri (1977) document a dramatic rise in the use of international joint ventures by American firms between 1951 and 1975 using survey data collected through the Harvard Multinational Project. Hladik (1985) extends Curhan et al.'s data through 1984 and projects continued growth of international ventures by U.S. firms. In contrast, Desai and Hines (1999) draw attention to the

reduced usage of minority ownership after passage of the U.S. Tax Reform Act of 1986, and identify patterns in the data suggesting that the tax penalties introduced in 1986 may be at least partly responsible for the decline.

3. A Model of Multinational Ownership

The agency costs intrinsic to joint ventures discourage their formation except in circumstances in which there are important offsetting considerations. The literature on alliances offers several candidates for such considerations, which fall into a few broad categories, thereby permitting them to be expressed in a manner that makes them possible to test. There are two purposes of this section, the first of which is to identify the restrictions needed to analyze the determinants of whether new affiliates are established as joint ventures, conditional on prior decisions to create new affiliates. The second purpose is to identify an indirect method of measuring the extent to which higher payoffs to intrafirm transactions contribute to the demand for majority or 100 percent ownership of affiliates.

Joint venture theories start from the assumption that firms are guided by profitability considerations in deciding whether or not to establish a foreign affiliate, what fraction of the affiliate the parent company should own, and operational issues such as the deployment of proprietary technology and the volume of intrafirm trade. Since firms make these choices on the basis of specific information, much of which is unavailable to researchers, it can be very difficult to identify causal effects. For example, the evidence (examined in detail in section 5) indicates that firms with extensive trade with their affiliates have higher than average propensities to be majority or 100 percent owners of them. In order to identify an effect of trade on ownership, however, it is necessary to use instruments that affect only one of either ownership or trade. As it happens, instruments (in the form of changing government regulations and tax policies) are available for levels of parental ownership of foreign affiliates. The theory of the firm, elucidated in what follows, implies that such instruments can be properly used to identify other factors that contribute to the demand for whole and partial ownership of affiliates.

The maximum net profit (π) that a foreign affiliate is capable of earning can be expressed as $\pi(X, c, \omega, \varepsilon)$, in which X is a vector of attributes of the parent company and the market in which the affiliate is located, and ε is a vector of residuals. The vector c captures exogenous determinants of the costs of undertaking transactions between the parent and its

affiliate, so that an element of *c* might be the distance between the parent and affiliate (to the extent that greater distances are associated with higher trade costs), and another element of *c* might be the extent of the parent company's ownership of intangible assets. Finally, ω represents any ownership restriction imposed by the host country, such as a requirement that foreign investor ownership not exceed 49 percent of any local affiliate. The profit function is understood to capture profits associated with establishing a foreign affiliate net of relevant opportunity costs, so it subtracts, for example, the profits that could otherwise be earned by exploiting opportunities via arm's length contracts with unrelated parties.

It is extremely useful to restrict attention to situations in which the profit function takes the following form:

$$\pi(X,c,\omega,\varepsilon) = f_1(X,c,\varepsilon_1)\cdot f_2(X,c,\omega,\varepsilon_2), \tag{1}$$

in which ε_1 and ε_2 are independently distributed elements of ε, and the function f_2 is defined so that $f_2(\cdot) > 0, \forall(X,c,\omega,\varepsilon_2)$. Profit functions that satisfy the decomposition in equation (1) have several attractive analytic properties, of which the most important is that the decision of whether or not to establish an affiliate is independent of the profit-maximizing choice of parent ownership level.[8] This property follows from the combination of the simple profit maximization rule that parent firms establish foreign affiliates whenever $\pi(X,c,\omega,\varepsilon) \geq 0$, and the fact that $f_1(X,c,\varepsilon_1) \geq 0$ is a necessary and sufficient condition for $\pi(X,c,\omega,\varepsilon) \geq 0$. Intuitively, a multinational firm whose profits can be expressed by $\pi(X,c,\omega,\varepsilon)$ as given in (1), and that would maximize profits by owning 100 percent of its affiliate, would also find it profitable (though less so) to establish an affiliate with 30 percent parent ownership, since doing so produces profits given by a value of $[f_1(\cdot)f_2(\cdot)]$ in which $f_2(\cdot)$ incorporates an ownership restriction of 30 percent. Since the ownership level restriction embedded in ω can be selected for any (positive) value without changing the fact that $\pi(X,c,\omega,\varepsilon)$ and $f_1(X,c,\varepsilon_1)$ have the

[8] An example of a function satisfying these properties is one based on the specification: $\pi = \left(\beta_1 X + \beta_{21} Xy - \beta_{22} Xy^2 + \varepsilon_1\right)\exp\left\{\phi\left[\beta_3 X + \beta_{41} Xy - \beta_{42} Xy^2\right] + \beta_5 X\phi^2 + \varepsilon_2\right\}$, in which *y* is the level of intrafirm trade, and ϕ is the fraction of an affiliate that the parent owns. In this specification, the costs that are elements of the vector *c* are embedded in the β terms. It is then possible to construct the $\pi(X,c,\omega,\varepsilon)$ function by solving for profit-maximizing levels of *y* and ϕ, subject to the ω constraint, and substituting those values into the expression for π.

same sign, it follows that the existence of positive profitability is not a function of the fraction of parental ownership.

Profit-maximizing firms choose affiliate ownership levels, denoted $\phi(X,c,\omega,\varepsilon_2)$, that correspond to maximal values of $\pi(X,c,\omega,\varepsilon)$. A host government ownership restriction may take the form that $\phi \leq \omega$. Consequently, for any desired value of $\phi < \omega$, the constraint does not bind, so $\frac{\partial \phi}{\partial \omega} = 0$ and $\frac{\partial \pi}{\partial \omega} = 0$. From equation (1), $\frac{\partial \pi}{\partial \omega} = 0$ implies that $\frac{\partial f_2}{\partial \omega} = 0$. For values of ω for which the constraint does bind, $\frac{\partial \phi}{\partial \omega} > 0$ and $\frac{\partial \pi}{\partial \omega} > 0$, and therefore $\frac{\partial f_2}{\partial \omega} > 0$. The unconstrained profit-maximizing level of ϕ is therefore characterized locally by the value of ω at which the function $f_2(X,c,\omega,\varepsilon_2)$ transits from $\frac{\partial f_2}{\partial \omega} > 0$ to $\frac{\partial f_2}{\partial \omega} = 0$.

It follows, therefore, that in circumstances in which the profit function satisfies (1), it is feasible to estimate desired levels of affiliate ownership by comparing actual levels of affiliate ownership by firms in differing circumstances. In particular, it is not necessary to incorporate the alternative of not establishing an affiliate at all. Given the very great difficulty of including all the information necessary to determine whether firms establish affiliates, and the millions of observations of potential affiliates that are *not* established, this is a valuable separation. But it is necessary that a restriction of the type embedded in equation (1) hold.

The evidence (examined in detail in section 5) indicates a close connection between the provision of parental inputs and whole or majority ownership of foreign affiliates. The difficulty with interpreting this evidence is that input provision as well as ownership levels represent choices made by firms on the basis of possibly a large number of correlated omitted variables, thereby clouding inference. Ideally, one would want to estimate the $\phi(X,c,\omega,\varepsilon_2)$ function in order to identify $\frac{\partial \phi}{\partial c}$, recalling that *c* represents the costs associated with the provision of parental inputs. This derivative indicates directly the effect of the costs (and therefore levels) of intrafirm transfers on desired ownership, but in practice, since it is very difficult to measure *c*, it cannot be reliably estimated.

Fortunately, there is an indirect method of inferring the sign and magnitude of $\frac{\partial \phi}{\partial c}$.

Differentiating the profit function with respect to ω yields $\frac{\partial \pi}{\partial \omega}$, which is the effect of a small change in ω on profitability. Further differentiating this function with respect to *c* yields $\frac{\partial^2 \pi}{\partial \omega \partial c}$. Since $\frac{\partial \pi}{\partial \omega}$ is zero unless the ω constraint binds, it follows that, if ω is selected so that $\omega = \phi(X, c, \omega, \varepsilon)$, then the constraint binds on the positive side and not on the negative side. (Appropriately redefining the ω constraint to be a minimum ownership constraint rather than a maximum ownership constraint would make the constraint bind on the negative side.) Then a positive value of $\frac{\partial^2 \pi}{\partial \omega \partial c}$ corresponds to a case in which increasing *c* raises the value of additional ownership of an affiliate, while a negative value of $\frac{\partial^2 \pi}{\partial \omega \partial c}$ implies that higher levels of *c* reduce the value of additional ownership shares. Since *c* is the cost of exchanges between the parent firm and its affiliates, higher values of *c* correspond to fewer exchanges between parents and affiliates. Thus, a negative value of $\frac{\partial^2 \pi}{\partial \omega \partial c}$ corresponds to a situation in which greater desired exchange (such as goods or technology trade, driven by low values of *c*) between parents and affiliates leads to greater desired parental ownership of affiliates ($\frac{\partial \phi}{\partial c} < 0$).

The challenge is to estimate the function $\frac{\partial^2 \pi}{\partial \omega \partial c}$ in the absence of reliable information on the value of *c*. For this purpose, it is useful to invoke Hotelling's lemma:

$$y = -\frac{\partial \pi(X, c, \omega, \varepsilon)}{\partial c}, \tag{2}$$

in which *y* is the magnitude of exchange between the parent company and its affiliate. Equation (2) is simply the envelope property that, for small price changes, induced factor substitution can be ignored in calculating the extent to which profitability falls as costs rise. It follows from (2) that:

(3) $$\frac{\partial^2 \pi(X,c,\omega,\varepsilon)}{\partial \omega \partial c} = \frac{\partial^2 \pi(X,c,\omega,\varepsilon)}{\partial c \partial \omega} = -\frac{\partial y(X,c,\omega,\varepsilon)}{\partial \omega}.$$

Equation (3) implies that the effect of ownership restrictions on intrafirm trade $\left(-\frac{\partial y}{\partial \omega}\right)$ equals the effect of intrafirm trade desirability on the profitability of additional ownership $\left(\frac{\partial^2 \pi}{\partial \omega \partial c}\right)$. Neary and Roberts (1980) analyze this symmetry property in some detail in a related context. Since the value of $\frac{\partial y}{\partial \omega}$ is amenable to measurement even in the absence of reliable measures of *c*, this is a potentially useful method of drawing inferences, and is adopted in section 5.

A similar method of estimating $\frac{\partial \phi}{\partial c}$ is available if it is possible to identify features, such as special tax provisions, that affect only the cost of holding joint ventures and not the cost of intrafirm exchanges. The U.S. Tax Reform Act of 1986 provides just such an example.[9] Then letting c_1 denote the cost of intrafirm exchanges such as trade and technology transfers, and c_2 denote the cost of maintaining a foreign affiliate as a joint venture, it follows that:

(4) $$-\frac{\partial \phi}{\partial c_1} = \frac{\partial^2 \pi}{\partial c_2 \partial c_1} = \frac{\partial^2 \pi}{\partial c_1 \partial c_2} = -\frac{\partial y}{\partial c_2}.$$

Equation (4) implies that the effect of ownership costs on intrafirm transfers $\left(\frac{\partial y}{\partial c_2}\right)$ is identical – in sign and magnitude – to the effect of intrafirm transfer costs on ownership $\left(\frac{\partial \phi}{\partial c_1}\right)$. The main virtue of the former effect is that it can be estimated with available data. The empirical work reported in section 5 uses both types of specifications, those presented in equations (3) and (4), to estimate the extent to which ownership and transfers are related.

4. Data and Descriptive Statistics

The empirical work presented in section 5 is based on the most comprehensive available data on the activities of American multinational firms. The Bureau of Economic Analysis (BEA)

[9] See Desai and Hines (1999) for an analysis.

annual survey of U.S. Direct Investment Abroad from 1982 through 1997 provides a panel of data on the financial and operating characteristics of U.S. firms operating abroad. These surveys ask reporters to file detailed financial and operating items for each affiliate and information on the value of transactions between U.S. parents and their foreign affiliates. The International Investment and Trade in Services Survey Act governs the collection of the data and the Act ensures that "use of an individual company's data for tax, investigative, or regulatory purposes is prohibited." Willful noncompliance with the Act can result in penalties of up to $10,000 or a prison term of one year. As a result of these assurances and penalties, BEA believes that coverage is close to complete and levels of accuracy are high.

U.S. direct investment abroad is defined as the direct or indirect ownership or control by a single U.S. legal entity of at least ten percent of the voting securities of an incorporated foreign business enterprise or the equivalent interest in an unincorporated foreign business enterprise. A U.S. multinational entity is the combination of a single U.S. legal entity that has made the direct investment, called the U.S. parent, and at least one foreign business enterprise, called the foreign affiliate. In order to be considered as a legitimate foreign affiliate, the foreign business enterprise should be paying foreign income taxes, have a substantial physical presence abroad, have separate financial records, and should take title to the goods it sells and receive revenue from the sale. In order to determine ownership stakes in the presence of indirect ownership, BEA determines the percentage of parent ownership at each link and then multiplies these percentages to compute the parent's total effective ownership.

The foreign affiliate survey forms that U.S. multinational firms are required to complete vary depending on the year, the size of the affiliate, and the U.S. parent's percentage of ownership of the affiliate. The most extensive data are available for 1982, 1989, and 1994, when BEA conducted Benchmark Surveys. In these years, all affiliates with sales, assets, or net income in excess of $3 million in absolute value and their parents were required to file extensive reports. In non-benchmark years between 1982 and 1997, exemption levels were higher and less information is collected.[10] Although wholly owned and majority owned affiliates report many

[10] From 1983-1988, all affiliates with an absolute value of sales, assets, or net income less than $10 million were exempt, and this cutoff increased to $15 million from 1990-1993 and $20 million from 1995-1997. BEA uses reported data to estimate universe totals when surveys cover only larger affiliates or when only certain affiliates provide information on particular survey forms. Estimated data is unlikely to have a significant impact on the BEA's published data at the industry or country level as data based on actual reports exceeds 90 percent of the

accounting items and information concerning operations each year, minority owned affiliates need only file information about sales, net income, assets, employment, employment compensation, and trade with the United States in non-benchmark years. "Majority owned" affiliates are foreign affiliates in which the largest ownership claim by a U.S. parent exceeds 50 percent and is less than 100 percent; "minority owned" affiliates are those in which the largest ownership claim by a U.S. parent is at least 10 percent but not more than 50 percent.[11] "Wholly owned" affiliates are those that are 100 percent owned by an American parent.

BEA collects identifiers linking affiliates through time, thereby permitting the creation of a panel. By checking the status of all affiliates that filed forms in the previous year and are expected to fall within reporting requirements, BEA identifies which enterprises leave the sample. By monitoring news services for information on mergers, acquisitions, and other activities of U.S. companies, BEA identifies which new enterprises should be included in the sample. As a result, it is possible to examine the entry and exit of affiliates. Measures of entry and exit are most reliable when looking from one benchmark to the next since there are more extensive efforts to update data in these years. In addition, since all reporting affiliates report the parent's level of ownership in an affiliate annually, it is also possible to examine the consequences of changes in levels of ownership.

Table I displays basic information on the incidence and size of affiliates by level of parent ownership in the three benchmark years – 1982, 1989, and 1994 – and in the most recent year in the panel, 1997. In the most recent benchmark year and in 1997, approximately 80 percent of all affiliates are organized as wholly owned affiliates, with minority and majority ownership each comprising approximately 10 percent of the sample. The dynamics of multinational ownership over the sample period appear quite clearly as the prevalence of minority owned affiliates declines from 17.9 percent of affiliates in 1982 to 10.6 percent, while the prevalence of wholly owned affiliates increases from 72.3 percent of affiliates to 80.4 percent. There is little evidence that minority owned affiliates are smaller than majority owned

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estimated totals of assets and sales in each of the years between 1982 and 1997. To avoid working with estimated data, only affiliates required to provide all the information associated with a particular analysis are considered.

[11] In contrast to the categorization employed in this paper, the BEA classifies affiliates as majority owned if the combined ownership stakes of all U.S. parents is greater than 50 percent even if no single U.S. person owns a majority stake. In practice, the distinction between these two categorizations of majority ownership is minor. There are no more than 79 joint ventures between U.S. parents in any given year and this activity is concentrated in the petroleum industry.

affiliates. In fact, the median sales, assets, and employment of minority owned affiliates are almost always larger than the median sales, assets, and employment of wholly owned affiliates. In 1997, median sales for minority owned affiliates was $46.7 million while the median sales for majority owned affiliates was $44.9 million and the median sales for wholly owned affiliates was $41.1 million.

The bottom of Table I displays entry and exit rates of affiliates over the 1982-1989 and 1989-1994 periods. The entry rate is calculated as the ratio of the number of affiliates appearing for the first time during the period that did not appear in the beginning year to the number of affiliates appearing in the beginning year. The exit rate is computed by taking the ratio of the number of affiliates leaving the sample during the period to the number of affiliates appearing in the beginning year. The entry and exit rates are large, suggesting that there is a large amount of turnover among affiliates in the sample. These entry and exit rates also indicate that turnover is associated with a shift towards higher levels of ownership. For minority owned affiliates, the entry rate is significantly less than the exit rate in the 1982-1989 period. For wholly owned affiliates, the entry rate exceeds the exit rate in both periods.

These declines in the propensity to share ownership may represent the changing geographic concentration of multinational activity or purely a response to the reduction in ownership restrictions during the sample period. Figures 1a and 1b consider the dynamics of ownership decisions over the sample period for countries sorted by host country per-capita income quartiles, and by a measure of the barriers to acquiring majority stakes.[12] Figure 1a demonstrates that the declining use of minority ownership positions is uniform across all quartiles of ownership restrictions as measured by Shatz (2000). In countries in the two highest quartiles of receptivity to controlling acquisition by foreigners, partial ownership is only employed by 14 percent of affiliates in 1997. While affiliates in the most liberal countries are increasingly wholly owned, affiliates in less liberal quartiles are increasingly majority owned. Given that the majority of U.S. multinational activity is in the two most liberal quartiles and that these two quartiles were characterized by minimal restrictions during the entire sample period,

[12] Income quartiles are constructed by taking the average value of GNP per capita in 1995 dollars over the 1982 to 1997 period. The quartiles measuring barriers to acquisition are constructed using the rating system developed and documented in Shatz (2000).

the declining overall incidence of shared ownership cannot be exclusively attributed to ownership restriction liberalizations.

Figure 1b indicates that affiliates in developing countries are the most likely to be only partially owned by their American parents. In the richest countries, partially owned affiliates only comprise 15.5 percent of all affiliates in 1997 and declined significantly over the sample from 24.4 percent in 1982. Within the poorest countries, whole ownership characterizes less than half of all affiliates throughout the sample period. Nonetheless, the mode of partial ownership has shifted considerably over the sample period, with majority ownership becoming more popular than minority ownership in the poorest countries.

As indicated in Figure 2, the use of alternative organizational forms varies considerably across industries. In 1994, minority owned affiliates account for more than 15 percent of affiliates in the petroleum, food manufacturing, chemical manufacturing, and transportation equipment manufacturing industries, while they make up less than 10 percent of affiliates in the industrial machinery manufacturing, electronic manufacturing, wholesale trade, and financial services industry groups. In fact, nearly 88 percent of wholesale trade affiliates are wholly owned, suggesting that the activities of such affiliates are incompatible with partial ownership. The dynamics of organizational form decisions across time also yield insight into those industries where propensities toward ownership modes are most fixed. While ownership fractions are relatively unchanging in wholesale trade, services, and other industries, a variety of subgroups within manufacturing – particularly transportation equipment and electronics – have undergone significant shifts toward whole ownership.

Associated with the approximately 20,000 affiliates reporting in each benchmark year are about 2,500 U.S. parents. In order to consider the distribution of the use of partial ownership among parents, Figure 3 focuses on the set of parent systems with 5 or more affiliates and classifies them by the share of their affiliates that are wholly owned. The 1997 figures indicate that 38 percent of such parents own 100 percent of their affiliates, and only two percent fail to own 100 percent of at least one affiliate. The dynamics over time illustrate that the preference for whole ownership among larger multinationals is becoming much more pronounced over the sample period. In 1982, 48 percent of parents used whole ownership in at least 80 percent of their affiliates, and by 1997 that figure had risen to 65 percent.

This quest for more control by multinationals over the sample period is mirrored in the histogram of ownership levels conditional on partial ownership in the three benchmark years, as presented in Figure 4. While Figure 3 emphasizes the shift toward whole ownership, Figure 4 illustrates that majority control is becoming more and more important for those affiliates structured under partial ownership. Common sense, along with much of the scholarly literature, suggests that joint ventures are typically 50 percent owned by each of two partners, but Figure 4 shows that only 41 percent of all affiliates that are partially owned by American firms have between 40 percent and 60 percent American parent ownership in 1997.

Figures 5a and 5b present descriptive evidence that levels of parent ownership are lower for affiliates with higher fractions of their total sales in host countries, those that purchase small fractions of their inputs from the United States, and affiliates that have fewer transactions with other members of their parent system. Figure 5a displays the mean share of goods sold locally for majority owned and wholly owned affiliates.[13] In 1997, majority owned affiliates sold 7.0 percentage point higher fractions of their output to local markets than did wholly owned affiliates. This pattern is consistent with the hypothesis that parents are more interested in finding a local partner when access to local distribution is more important. The bottom part of the top panel displays the mean value of the ratio of goods purchased from the United States by an affiliate to the affiliate's overall sales. Although minority owned affiliates purchase about 2 percent of the value of their sales from the United States over the sample period, this figure is about 8 percent for majority owned affiliates and 10 percent for wholly owned affiliates. This pattern is consistent with the hypothesis that a parent is more interested in finding a local partner when its affiliate obtains fewer inputs from the United States, and is therefore more reliant on the local market for inputs. It is also notable that the tendency of majority and wholly owned affiliates to rely on imports from the United States has accelerated during the sample period, while the same is not true for minority owned affiliates.

Figure 5b illustrates the variation, by level of ownership, in the extent of exchange within parent systems. The evidence consistently suggests that parents engaging in extensive trade with their affiliates own greater fractions of affiliate equity than do parents with little trade with affiliates – and that this trend has accelerated over the sample period. The first part of this panel

[13] A breakout of local sales is not available for minority owned affiliates.

indicates that affiliates that sell higher fractions of their output to their parents, or to other affiliates in the same parent system, tend to be more closely held by parents. In 1997, wholly owned affiliates sold an average of 28.7 percent of their output to affiliated parties, while affiliates whose parents own a majority of the equity sold only 17.1 percent of their output to affiliated parties. The second and third subpanels characterize reliance on trade with the United States by depicting imports from, and exports to, the U.S. parent, as a fraction of affiliate sales. In 1994, mean ratios of imports from the U.S. parent to total sales were 1.0 percent for minority owned affiliates, 8.4 percent for majority owned affiliates, and 9.4 percent for wholly owned affiliates. Similarly, minority owned affiliates exported 2.0 percent of sales to their parents, but majority owned affiliates exported 6.9 percent, and wholly owned affiliates 7.6 percent, of sales to their parents. The consistent evidence that related-party exchanges take place more frequently under whole-ownership suggests that the degree to which affiliates are embedded within a worldwide production process influences the desirability of partial ownership. This evidence is also consistent with the theory that firms find it difficult to convince potential joint venture partners that extensive transactions with other members of the parent system are likely to take place on fair terms. In addition, the dynamics displayed in Figures 5a and 5b suggest that these tensions may well have increased over the sample period.

5. The Determinants of Ownership Decisions

The leading theories of joint ventures carry implications for the impact of observable variables on the choice of whether to form a new venture with 100 percent, majority, or minority parent ownership. Some of these implications bear on the characteristics of countries in which affiliates are located, while others bear on the characteristics of firms that undertake the ventures.

Regulatory and tax policies of host countries have clear potential to influence the desirability of forming new ventures as wholly owned and partially owned affiliates. While the role of regulatory policies that implicitly or explicitly limit ownership percentages is self-evident, the impact of local tax policy is somewhat subtler. Differences between foreign tax rates and the U.S. tax rate introduce tax planning opportunities that are most readily exploited by wholly owned affiliates. The capital structures, payout policies, and transfer pricing practices of wholly owned affiliates can be tailored to reduce the combination of foreign and U.S. tax liabilities. Foreign partners may have their own objectives that differ from those associated with

avoiding U.S. tax liabilities. In cases in which the foreign tax rate just equals the U.S. tax rate, the availability of foreign tax credits removes any U.S. tax liabilities on income earned by affiliates, and U.S. tax considerations become unimportant in planning the operations of affiliates. Consequently, significant differences between foreign tax rates and the U.S. tax rate are likely to encourage firms to establish their affiliates as wholly owned ventures.

Firms without extensive experience in foreign markets are often hypothesized to benefit the most from participation in international joint ventures, since it is possible to obtain valuable information from foreign partners. The empirical implication of this relationship is that companies with operations in large numbers of foreign countries should be the least likely to form new ventures with partial ownership. Firms establishing affiliates in new industries stand to benefit from the experience and information of foreign partners and are therefore more likely to create affiliates of which they own less than 100 percent. Firms in research-intensive industries can use foreign affiliates to exploit intangible assets developed with R&D activity in home countries. The proprietary nature of these intangible assets complicates any transactions with outside parties and therefore makes the use of wholly owned foreign affiliates particularly attractive.

The production and trade patterns of foreign affiliates influence the desirability of 100 percent parent ownership, though the empirical identification of such effects is problematic given the potential endogeneity of trade patterns to ownership. Theories of collaboration in local sales markets suggest that firms are more likely to establish joint ventures with foreign partners when these partners can provide information about, and access to, local distribution channels. As a result, affiliates selling high fractions of their output locally are the most likely to be established as joint ventures. By contrast, affiliates that trade extensively with their U.S. parents, or with other related parties, are unlikely to be other than 100 percent owned by the parent company. Such affiliates stand to learn little of value about foreign markets from potential foreign partners, and benefit from the ability to adjust transfer prices and other aspects of their trade with related parties.

5.1 Entry Decisions and Trade Patterns

Table II presents the results of estimating the determinants of whether new affiliates are formed as wholly owned or partially owned ventures. The sample consists of observations of the

first appearances of any affiliates subsequent to 1982; since somewhat more than 18,000 new affiliates appear in the data between 1983-1997 in the countries for which other explanatory variables are available, the sample size slightly exceeds 18,000. The dependent variable is defined to equal one if an affiliate is formed as a wholly owned venture and zero otherwise.

The empirical findings reported in Table II are consistent with the implications of some theories of joint venture formation and are inconsistent with others. The regression reported in column 1 has a large positive estimated coefficient on ownership restrictions, indicating that wholly owned affiliates are more likely to be established in countries whose governments do not restrict foreign ownership of local businesses.[14] The regression reported in column 2 adds country/industry and year fixed effects to the specification of the regression reported in column one. As a result, the impact of ownership restrictions is identified only by changes in such restrictions during the sample period that are not common to all countries. The impact of ownership restrictions remains positive and statistically significant in this specification, though its size is reduced to less than half the magnitude of the effect estimated in the regression reported in column 1.

The regression results reported in column 3 of Table II suggest only an insignificant impact of a multinational firm's tax incentive to avoid joint ventures in countries whose tax rates differ greatly from the U.S. tax rate, since the insignificant estimated coefficient on tax rate differences indicates that affiliates located in countries with tax rates that differ from the U.S. tax rate are no less likely to be wholly owned. Since omitted country attributes have the potential to influence this coefficient, it is useful to consider a specification that includes country fixed effects; in such a specification, the tax rate effects are identified by changes over time in the U.S. tax rate and foreign tax rates. The results of estimating this equation with country/industry and year fixed effects, reported in column 4, differ from those reported in column 3: tax rate differences between foreign countries and the United States now are associated with significantly greater likelihood of establishing wholly owned affiliates. Hence this regression supports the notion that firms with tax planning opportunities are likely to establish their foreign affiliates as wholly owned entities.

[14] Ownership restrictions are coded as a dummy variable equal to one if both the "Acquisition Score" and the "Sector Score" are above 3 for a particular country in a particular year, as classified in Shatz (2000).

The regressions reported in columns 5-10 of Table II add an explanatory variable that proxies for parent experience. This variable is equal to the number of countries in which the parent operated affiliates in the year before the entry of the affiliate, not including the country that the affiliate enters. Estimated coefficients on this variable are uniformly negative and significant, indicating that firms with extensive foreign experience are more likely than others to establish new ventures with less than 100 percent parent company ownership. This pattern is inconsistent with the hypothesis that firms undertake joint ventures in order to substitute the expertise of foreign partners for their own incomplete knowledge of foreign business activity. Alternatively, the results can be interpreted as suggesting that implementing shared ownership requires significant expertise, at least on the part of the American parent.

The propensity to use shared ownership in the context of diversifying moves can similarly shed light on the use of shared ownership to compensate for incomplete knowledge. Affiliates in three-digit SICs other than those of the parent company are less likely than others to be partially owned by the parent company, as indicated by the negative estimated coefficient on the "Same Industry as Parent Dummy" variable in the regressions reported in column 7. With the inclusion of country/industry and year fixed effects in the regression reported in column 8 this coefficient becomes positive and insignificant, but is again negative and significant in the regression specifications reported in columns 9 and 10. This pattern is inconsistent with the implications of theories suggesting that shared ownership facilitates knowledge transfers since firms without such industry-specific knowledge would stand to benefit most from organizing foreign affiliates as joint ventures.

The regression reported in column 9 of Table II adds an explanatory variable equal to the R&D/sales ratio of an affiliate's industry.[15] The positive and significant estimated coefficient on this variable confirms that companies operating in research-intensive industries are the most likely to establish wholly owned ventures, presumably in response to the higher risks of technology appropriation they might face under partial ownership. In order to consider the possibility that these effects are being driven by country level variation in income or other factors, column 10 reports the results of a regression that includes country fixed effects; the results are similar to those reported in column 9.

The regressions presented in Table III repeat those in Table II, but do so with a dependent variable that takes the value one if an affiliate is either wholly owned or majority owned by its American parent company, and takes the value zero if the affiliate is minority owned by its American parent. The results are qualitatively almost identical to those presented in Table II, suggesting that the motivations for sharing ownership are common whether or not the parent retains majority control of its affiliate.

The regressions reported in Table IV analyze the determinants of whether majority owned ventures are 100 percent owned by parent companies at the time that they are formed. The sample therefore omits observations of ventures that are formed with minority ownership on the part of the American parent. There are two reasons to analyze the data in this way. The first is that the choice between 100 percent ownership and majority ownership is an important economic decision that is somewhat less the product of regulatory pressure than is the choice between majority and minority ownership. The second, and perhaps less inspiring, reason is that far more data are available on the operations of majority owned and 100 percent owned affiliates than are available on the operations of minority owned affiliates.

The regression reported in column 1 of Table IV indicates (reassuringly) that ownership restrictions reduce the likelihood of 100 percent American ownership. Affiliates for which sales to local markets represent large fractions of their total sales are the most likely to be majority but not 100 percent owned. Inclusion of country/industry and year fixed effects in the regression reported in column 2 reduces the magnitude and statistical significance of this effect. Ownership restrictions likewise have little impact on the extent of parent ownership in the specifications that include country/industry and year fixed effects. The regressions reported in columns 3 and 4 indicate that affiliates obtaining goods (imports from the United States, scaled by total affiliate sales) from the United States are the most likely to be 100 percent owned by their American parents. These results suggest that reliance on the local market for inputs and as a destination for outputs are important criteria in choosing to share ownership.

In addition to local market characteristics, trade with related parties may exert a distinct effect on the ownership decisions of multinationals. Columns 5 through 8 of Table IV present

[15] This ratio is computed as the mean ratio, within an industry, of R&D to sales for each multinational parent company over the 1982-1997 period.

the results of estimating similar specifications in which the independent trade variables are defined to be the ratio of related party sales to an affiliate's total sales, and the ratio of imports from the U.S. parent to an affiliate's total sales. The results appearing in columns 5 and 6 suggest that affiliates that sell to their parent companies, or to other related affiliates, are more likely than others to be wholly owned by their parents – although the effect is muted with the inclusion of country/industry and year fixed effects. Similarly, the regressions presented in columns 7 and 8 indicate that affiliates that rely heavily on imports from parents are most likely to be wholly owned, and this statistically significant effect persists with the inclusion of country/industry and year fixed effects.

Taken together, the results presented in Table IV suggest that affiliates that are embedded within a worldwide production process are not as amenable to partial ownership as are other affiliates. One possible interpretation of these results is that the costs of coordination with local partners are much larger for those affiliates engaging in intrafirm trade. These costs could stem from anticipated disputes over the selection of suppliers, transfer pricing for inputs and sales, and whether overall production decisions should be driven by affiliate requirements or U.S. parent motivations. The apparent conflicts associated with shared ownership appear large with respect to intrafirm trade decisions. As operational and ownership decisions may or may not be jointly determined, the analysis presented below employs exogenous shifts in the relative costs of ownership forms to identify more precisely the relationship between these decisions.

5.2 Differential Coordination Costs over Tax Planning and Technology Transfer

As discussed above, the costs of joint ownership stem from the need to accommodate the interests of multiple owners and the associated inability to tailor the activities of joint ventures to meet the needs of any one of the owners. This cost is potentially large for U.S. parents that would otherwise engage in sophisticated international tax avoidance, since doing so frequently entails a large number of transactions between parent companies and foreign affiliates designed to reallocate taxable income away from high-tax jurisdictions and into low-tax jurisdictions. There is an extensive literature that analyzes patterns of reported profitability and intrafirm trade by American multinational firms, finding that trade between members of controlled groups

appears to be structured in ways that reduce total tax liabilities.[16] Very little is known, however, about the extent to which minority ownership might impede a firm's ability to reduce tax liabilities in this way.

Table V analyzes the determinants of affiliate net income. The regression reported in column one indicates that net income is an increasing function of affiliate assets, increasing at a rate of 9.05 percent, and a negative function of the product of assets and local tax rates. The –0.0804 coefficient on the interaction of assets and country tax rates implies that ten percent higher tax rates reduce profitability by 8.9 percent (.804/9.05 = 0.089). This finding is consistent with those of the transfer pricing literature, and it persists with the inclusion of industry and year fixed effects, as reported in column 2.

The regressions reported in Table V are run on the whole sample, including minority owned, majority owned, and 100 percent owned affiliates. Columns 3 and 4 interact dummy variables for partial ownership with assets and asset-tax rate interactions, in order to distinguish the net income determination of partially owned affiliates from that of wholly owned affiliates. The results suggest that the net incomes of partially owned affiliates are considerably less sensitive to local tax rates than are net incomes of wholly owned affiliates. The coefficient on the country tax rate and asset interaction in the regression reported in column 3 is –0.099, while the same interaction with a partial ownership dummy is 0.063, indicating that almost two thirds of the tax rate effect disappears when affiliates are partially owned. Similar results appear when industry and year fixed effects are introduced, in the regression reported in column 4. The regressions reported in columns 5 and 6 distinguish between minority and majority ownership and indicate that the reduced sensitivity of net income to local taxes is most pronounced for minority owned affiliates. These findings therefore suggest that shared ownership, and minority ownership in particular, comes at the cost of considerably reduced ability to fine-tune affiliate operations to minimize taxes of the parent's controlled group. That transfer pricing appears to be constrained in the presence of minority ownership illuminates the coincident interests of local owners and governments in constraining aggressive transfer pricing by U.S. multinationals and provides an intriguing alternative possible justification for ownership restrictions.

[16] See, for example, Grubert and Mutti (1991), Harris, Morck, Slemrod and Yeung (1993), Klassen, Lang and Wolfson (1993), Hines and Rice (1994), Collins, Kemsley, and Lang (1998), and Clausing (2001); this literature is critically reviewed in Hines (1999).

The use of proprietary technology and other intangible assets can be one of the most difficult operational aspects over which joint venture partners must agree. It is difficult to attach values to such assets, and it can be difficult for parent companies that own them to retain control if they are used by joint ventures in which the parent company has only a minority ownership stake. As a result, parent companies may be very reluctant to license their intangible properties to joint ventures, despite the high-tech nature of many international joint ventures. Consequently, it is reasonable to expect that foreign operations that are designed to exploit intangible property developed in the United States will typically be organized as majority owned or 100 percent owned affiliates.

Table VI explores the impact of these incentives by analyzing the determinants of royalty payments to American parent companies. Foreign affiliates using intangible property developed by their parent companies are required to remit royalties equal to the market value of the technologies used. While there is some evidence that royalty rates are sensitive to tax planning opportunities (and not surprisingly, given the inherent vagueness of the market value criterion), it is believed that firms generally comply with the requirement to pay royalties when intangible capital is used by foreign affiliates.[17] Consequently, royalty payments can be used as indicators of technology transfer.

Column 1 of Table VI reports the result of a simple logit specification in which the dependent variable equals one if an affiliate pays a nonzero royalty to its American parent company, and equals zero otherwise.[18] The positive and significant coefficient on the dummy variable for majority or 100 percent ownership indicates that these majority or wholly owned affiliates are more likely than minority owned affiliates to receive intangible property from parent companies. Omitted country, industry, and time attributes may influence the coefficient on this dummy variable. In the specification reported in column 2, which includes country/industry and year fixed effects, the coefficient on the majority or whole ownership dummy increases substantially and remains statistically significant.

If a high degree of ownership particularly facilitates the transfer of intangibles in industries in which the parent has developed technologies, then the effects of ownership should

[17] See, for example, Hines (1995) and Grubert (1998).
[18] Tobit specifications of the determinants of dollar volumes of royalty payments produce results that are similar to those presented in Table VI.

be associated with the R&D intensiveness of the affiliate's industry. Accordingly, column 3 of Table VI adds a measure of an industry's R&D intensiveness and this variable interacted with the ownership measure. The positive and significant coefficients on the industry R&D/sales ratio and its interaction with the majority or whole ownership dummy, and the reduced size of the coefficient on the dummy alone, confirm that the likelihood of transferring intangibles is higher in R&D intensive industries, and that the importance of majority or whole ownership is most pronounced in R&D intensive industries. The results in column 4 indicate that the interaction term remains significant when country/industry and year fixed effects are included.

The specifications reported in columns 5-8 repeat the analysis adding a dummy variable for 100 percent ownership. In the absence of controls for country/industry and year fixed effects, whole ownership appears to be associated with a slightly reduced probability of paying royalties. This finding is not robust to the inclusion of these fixed effects, as displayed in column 6, but the results in columns 7 and 8 indicate that the interaction of whole ownership and R&D intensiveness has a smaller effect on royalty payments than does the interaction of majority ownership and R&D intensiveness. Taken together, this evidence is consistent with reluctance on the part of parent firms to establish joint ventures with minority ownership in situations in which it would be valuable to exploit intangible capital developed by the parent, and, should a joint venture be established, to permit the joint venture to use intangible capital owned by the parent company.

The dimensions upon which conflicts appear to make shared ownership most costly – the intrafirm trade required for integrated worldwide production processes, the coordination of international activity to reduce tax obligations, and the transfers of proprietary technology – are precisely those activities that have risen over the last two decades. Figures 6 and 7 provide evidence of the changing nature of the relationship between parents and their affiliates for intrafirm trade and technology transfer, respectively. Figure 6 plots the share of a parent's overall exports and imports that are sent to, or received from, their foreign affiliates. In 1982, U.S. parents relied on their foreign affiliates as a destination for 30.6 percent of their exports, and that figure rose to 45.8 percent by 1997. Figure 7 illustrates that the ratio of aggregate royalty payments to sales of foreign affiliates rose from 0.4 percent to 1.0 percent between 1982 and 1994. That trend is consistent across all industries with the exception of industrial machinery and equipment. In order to isolate the relationship between these aggregate phenomena – the

heightened requirements to trade internally, transfer knowledge internally, and take advantage of tax arbitrage opportunities – and the declining propensity to share ownership, the following section considers two exogenous changes in the relative costs of sharing ownership.

5.3 Two Experiments

The link between the pattern of increased levels of activities that require coordination, and the declining use of shared ownership, can be identified through exogenous shifts in the ability to undertake such activity or the relative costs of using different ownership forms. The analysis that follows uses two changes in the costs of minority ownership to identify whether, in fact, at least some of the reduced willingness to share ownership, and the greater incidence of activities that appear to be associated with higher coordination costs, reflect the same underlying phenomenon. Specifically, the regressions reported in Tables VII and VIII analyze the impact of two dramatic policy shifts: the liberalization of host country ownership restrictions during the 1980s and 1990s, and the "10-50 basket" provisions of the U.S. Tax Reform Act of 1986 (TRA86). Both policy shifts encouraged greater majority and whole ownership, the first by permitting it, the second by penalizing minority ownership after 1986.

Table VII reports regressions that capture the effect of changes in local ownership restrictions. These complex restrictions are reviewed and summarized by Shatz (2000), which considers restrictions on the acquisition of majority ownership of local enterprises, and limitations on the creation of greenfield majority owned enterprises in certain sectors, by multinational firms for 54 countries from 1986 to 1995.[19] From these detailed data, we identify 16 significant liberalizations in our sample and are able to use these liberalizations to explore their ownership effects at the industry level. Ownership responses to liberalization then represent the first stage in identifying the link between greater intrafirm trade and increased internalization through whole ownership.[20]

[19] Specifically, a country is defined to have liberalized ownership restrictions when both the "Acquisition Score" and the "Sector Score" are both at least 3 (on a scale from 1 to 5). The countries experiencing a liberalization during this period are Argentina (1990), Australia (1987), Colombia (1992), Ecuador (1991), Finland (1990), Honduras (1993), Japan (1993), Malaysia (1987), Mexico (1990), Norway (1995), Peru (1992), Philippines (1992), Portugal (1987), Sweden (1992), Trinidad and Tobago (1994), and Venezuela (1990).

[20] In order to address the possible serial correlation in the error terms that may arise in this setting, the OLS regressions reported in Table VII were also performed with standard errors that were clustered at the country/industry level. Clustering of the standard errors in this manner did not materially reduce the significance level of any of the coefficients in these regressions.

The first four columns of Table VII present estimated regression coefficients from specifications in which the dependent variable is the share of all sales attributed to wholly owned affiliates in each country/industry pair. The sample is restricted to country/industry pairs in countries that experience ownership liberalizations between 1986 and 1995. In column 1, the positive and significant coefficient on the post-liberalization dummy variable reflects the impact of increased adoption of whole ownership subsequent to liberalizations. The inclusion of country/industry fixed effects in column 2 restricts the estimated effects of liberalizations to those arising from changes over time; the estimated magnitude of the impact of liberalizations is reduced only slightly. Columns 3 and 4 consider the differential reaction of industries based on the intensity of R&D activity in that industry. With and without country/industry fixed effects, the coefficients reported in columns 3 and 4 indicate that industries with above sample median R&D-intensity responded most aggressively to the liberalization of ownership restrictions, suggesting the greater importance of whole ownership to such industries.

The link between changed ownership patterns and changed trade patterns is the focus of the regression reported in column 5 of Table VII, in which the dependent variable is the share of affiliates sales made to related parties. The positive and significant coefficient on the share of affiliate sales made through wholly owned affiliates offers a simple correlation between the degree of intrafirm trade and internalization through ownership in country/industry pairs. The inclusion of country/industry fixed effects in column 6 allows for the identification of that relationship through temporal changes in the reliance on whole ownership. The positive and significant coefficient reported in column 6 indicates that those country/industry pairs experiencing greater internalization through ownership also experience greater intrafirm trade. In part, this result suggests that the increased reliance on whole ownership is not associated with greater arms-length trade to subcontractors, but rather with greater intrafirm trade.

Columns 7 and 8 of Table VII present instrumental variables (IV) estimates of the link between intrafirm trade and the establishment of 100 percent owned foreign affiliates. The method is to use the specification presented in column 4 as the first stage of an IV equation in which liberalizations are instruments for ownership levels. IV estimation of this relationship, reported in columns 7 and 8, yields positive and significant coefficients on the predicted values of shares of sales through wholly owned affiliates; the magnitude of the coefficient is robust to the inclusion of year-effects as reported in column 8. These IV results confirm that an

exogenous change in the ability to own 100 percent of local affiliates is accompanied by a greater reliance on intrafirm trade. The 0.76 coefficient reported in column 8 is more than ten times the size of the corresponding coefficient in column 6, suggesting that the presence of correlated omitted variables reduces the estimated impact of ownership on related party trade in OLS regressions. This coefficient implies that ten percent greater sales through wholly owned affiliates increases affiliate sales to related parties by 7.6 percent.

Table VIII employs the increased tax penalties imposed by TRA86 in an analogous manner to the ownership liberalizations, with the difference that the tax instrument exploits heterogeneity at the parent level.[21] In particular, the segregation of foreign source income associated with minority ownership positions would penalize minority ownership disproportionately for those parents facing high average worldwide foreign tax rates for income generated by their majority and wholly owned affiliates.[22] Accordingly, the specifications presented in columns 1 and 2 of Table VIII establish the link between increased reliance on whole ownership by American multinationals and their tax positions prior to TRA86. The positive and significant coefficient on the interaction of the post-TRA86 dummy and the high average foreign tax rate dummy in column 2 indicates that parents facing the greatest relative tax costs associated with joint venture activity were those that employed whole ownership most aggressively.

At the parent level, it is possible to identify the link between ownership decisions and intrafirm transfers by examining a parent company's propensity to export to, or import from, related parties. The regressions reported in columns 3 through 6, and 7 through 10, of Table VIII explore the degree to which U.S. parents export to related parties and import from related parties, respectively, as a function of the degree to which they choose to operate through wholly owned affiliates. Columns 3 and 7 identify a simple positive correlation between intrafirm trade (either exports to related parties or imports from related parties) and 100 percent ownership of affiliates.

[21] As with the results reported in Table VII, standard errors for the OLS regressions in Table VIII were also calculated allowing for clustering at the parent level to address possible serial correlation. This procedure did not reduce the significance level of any coefficient except for the coefficient on the interaction term reported in column 2, which loses its statistical significance.

[22] Such parents would be most likely to be faced with excess foreign tax credits subsequent to TRA86. Accordingly, the segregation of foreign source income from lightly taxed minority ownership positions would reduce the attraction of minority ownership for such parents as they would no longer be able to utilize foreign tax credits generated from other activities through worldwide averaging. Desai and Hines (1999) elaborate on this point.

The inclusion of parent fixed effects in the regressions reported in columns 4 and 8 of Table VIII permits the effect of whole ownership to be identified only through its temporal variation, but the estimated impact remains positive and significant in the export equation, if rather less so in the import equation. This result provides further evidence that increased ownership over affiliates is associated with greater intrafirm trade and puts to rest one potential concern about the results presented in Table VII. If firms are shifting from the use of affiliates to contracts with unrelated parties, the results in Table VII could be confounded by censorship as firms that historically used joint ventures exit the sample because they shift to exclusively using contractual relations. Given the results with parent fixed effects, however, this kind of censorship does not appear to be problematic.[23]

Columns 5 and 9 of Table VIII present IV estimates of the link between intrafirm trade and affiliate ownership by using the right hand side variables of column 2 as instruments for ownership in trade equations. The estimated effect of sales by wholly owned affiliates is positive and significant in the export equation, and positive but insignificant in the import equation. The inclusion of year effects in these specifications, the results of which are reported in columns 6 and 10, reduces the magnitude and statistical significance of the coefficient on whole ownership in the export equation, while having the opposite effect on the coefficient in the import equation.

Firms have incentives to select ownership levels and intrafirm trading patterns that correspond to profit maximizing combinations. Assuming that observed behavior is in fact generated by profit maximization, then it follows from the analysis reviewed in section 3 that the impact of ownership on trade is identical to the effect of trade on ownership. Consequently, the IV trade results reported in Tables VII and VIII are consistent with the OLS ownership results reported in Table IV. Hence, the OLS pattern that affiliates that trade with related parties are more likely to be wholly owned is not merely the byproduct of correlated omitted variables. Indeed, the opposite appears to be the case, since all of the IV results in Table VIII – those reported in columns 5, 6, 9, and 10 – indicate much stronger effects of 100 percent ownership than do their OLS counterparts reported in columns 3, 4, 7, and 8. This is consistent with the

[23] As long as a multinational firm has any affiliates abroad, they remain in the sample further attenuating this concern. More generally, there is no reason to believe that the propensity to exit the sample in this manner is correlated with the instrument used in Table VII. Finally, logit analysis of the propensity of parent company exit reveals that those firms that leave the BEA sample exhibit neither larger growth in the share of arm's length trade in

results reported in Table VII, obtained in a very different way, indicating that omitted variables if anything tend to make simple OLS regressions understate the effect of ownership on intrafirm trade, and intrafirm trade on ownership.

5.4 Managing Risk through Ownership Shares

While it is infeasible to consider every possible alternative motivation for establishing an international joint venture rather than a wholly owned foreign affiliate, it is useful to analyze the role of joint ventures in attenuating local risk by reducing the investment exposure of parent firms. If shared ownership is driven by the desire to mitigate business risks, then the declining incidence of shared ownership could be traced to the reduction in environmental risks over the last two decades. In order to identify the link between risk management and the choice of organizational form, Table IX analyzes the relationship between affiliate size and ownership forms and a measure of the expropriation risk.[24] If risk management motivates ownership decisions, then interactions between measures of expropriation risk and ownership form should exhibit predictable signs.

Columns 1 and 2 of Table IX report regressions in which the dependent variable is affiliate assets at time of entry. The estimated coefficient on the majority or wholly owned dummy variable, reported in column one, indicates that the assets of minority owned affiliates exceed those of majority or wholly owned affiliates by $50.9 million. The inclusion of country/industry fixed effects in the regression reported in column 2 reduces the estimated size difference to $43.0 million. The regressions reported in columns 3 and 4 indicate that wholly owned affiliates are smaller than majority owned affiliates, and that these differences are robust to the inclusion of country and industry fixed effects.

The apparent larger size of minority owned affiliates can be interpreted in multiple ways. In particular, the larger size could be interpreted as reflecting the decision to split ownership for larger projects in an effort to manage the attendant risks. In order to test this hypothesis, the specifications in columns 5 through 8 include a measure of the risk of expropriation, and interact that measure with ownership form dummies. In these specifications, there is no significant

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the year before exit, nor larger growth in the use of joint ventures in the year before exit, than do firms that remain in the data.

differential responsiveness of investment levels to expropriation risk based on ownership levels, suggesting that risk management is not a primary motivator in choosing ownership forms. The analysis presented in Appendix Table I replicates this analysis with paid-in-capital owned by the U.S. parent as the dependent variable and similarly finds no systematic relationship between investment levels, ownership forms, and expropriation risk.

6. Conclusion

International joint ventures offer multinational firms the opportunity to make profitable use of market-specific capabilities of joint venture partners, may facilitate cooperation with foreign governments, and offer the prospect of generating knowledge that could be valuable in future business operations. These advantages may be offset by the costs implicit in split ownership of the same assets, and the resulting inability to exploit fully certain fixed assets developed by parent firms, as well as any opportunities to coordinate worldwide operations through financial and other exchanges.

The evidence indicates that American firms were decreasingly likely to establish their foreign affiliates as joint ventures over the 1982-1997 period. In part, this trend reflects changing U.S. tax policies and legal requirements in foreign countries – but the evidence provided in the paper suggests a deeper unease with international joint ventures that stems from their higher associated coordination costs. The evidence indicates that, in settings characterized by close coordination between foreign affiliates and American parent companies, firms are much less likely than in other settings to establish new ventures with minority parent ownership. Specifically, it appears that international production coordination, tax planning, and the use of intangible property are all much more easily executed with majority or wholly owned foreign affiliates and that firms establish their foreign affiliates cognizant of this difference. This conclusion is strengthened by evidence that regulatory and tax changes that encourage whole ownership of affiliates are accompanied by greater trade between affiliates and related parties.

The reduced significance of distance and nationality that accompanies globalization creates opportunities but also strong competitive pressures for multinational enterprises. While opportunities to trade and communicate between continents more reliably and quickly, and at

[24] The index employed in Table IX measures the risk of "outright confiscation" or "forced nationalization" and is produced by the International Country Risk Guide. This index is the average of the April and October monthly

reduced cost, enhance the attractiveness of international alliances, they likewise increase the return to coordinating operations within multinational firms. The impact of globalization on international joint venture activity depends, therefore, on the relative strength of these two forces. The evidence to date indicates that American firms respond to recent developments by reducing their joint venture activity, preferring instead to strengthen control over their foreign affiliates.

The reduced willingness of multinationals to share ownership also carries implications for countries considering policies related to foreign direct investment. The results in the paper regarding the transfer pricing activities of multinational firms suggest that local owners reduce the aggressive relocation of profits in response to tax incentives. Consequently, policies related to ownership restrictions have indirect implications for the degree to which multinational firms adjust transfer prices to move profits out of a country. In addition, many of the presumed benefits of foreign direct investment - direct economic linkages and indirect spillovers - may be attenuated by the reduced desire of multinationals to share ownership and by the underlying trend to decentralize production processes around the world. As such, the quest for control by multinationals over their worldwide operations may fundamentally alter the nature of the benefits of these investments to host countries.

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index over the 1982-1995 period. The index is scaled between 0 and 10, and lower scores reflect higher risks.

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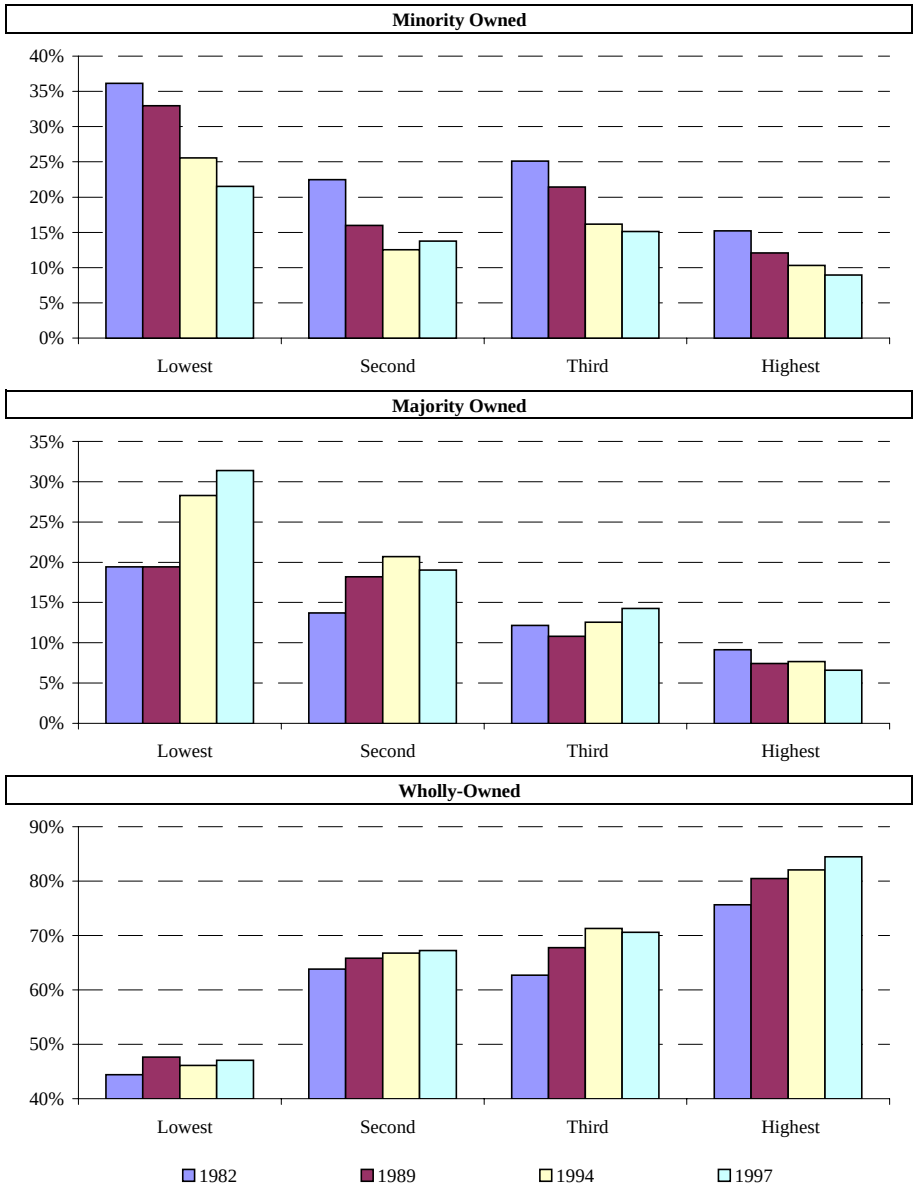
Figure 1a
Percent Of Affiliates, By Ownership Restriction And Year

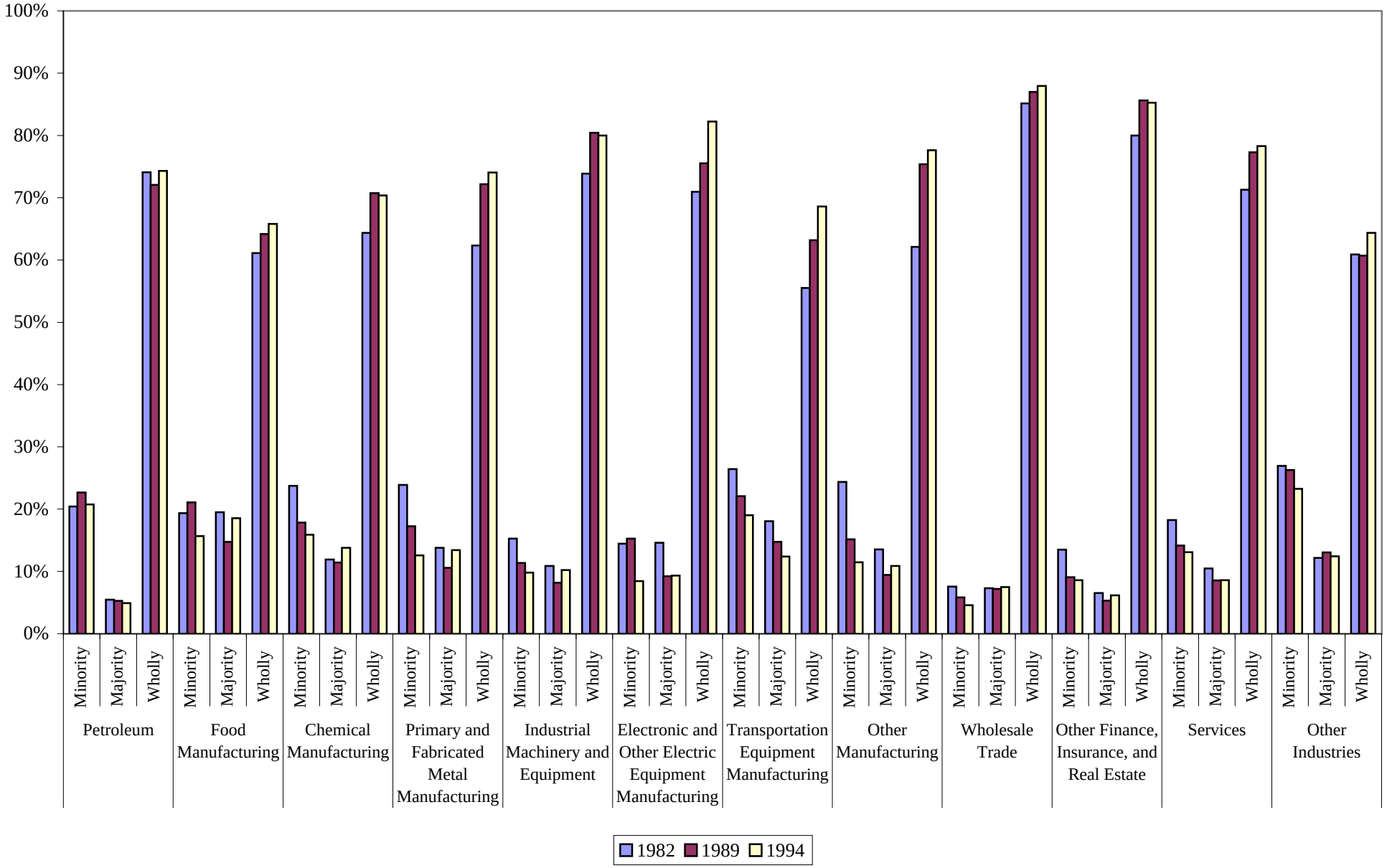
Notes: For each panel, countries are sorted into quartiles based on the nature of their ownership restrictions as measured in Shatz (2000) and described in the text. The "most illiberal quartile" consists of countries imposing the most stringent restrictions on foreign ownership (particularly whole ownership) of local enterprises. The "most liberal quartile" consists of countries imposing the fewest (or no) restrictions on foreign ownership (particularly whole ownership) of local enterprises. The three panels represent the share of all affiliates with minority ownership, majority ownership and whole ownership by U.S. parents, respectively, for 1982, 1989, 1994 and 1997. Wholly owned affiliates are those affiliates that are 100 percent owned by an American parent company. Majority owned affiliates are those affiliates in which the largest ownership claim by an American parent exceeds 50 percent and is less than 100 percent; minority owned affiliates are those affiliates in which the largest ownership claim by an American parent company is at least 10 percent but not more than 50 percent.

Figure 1b
Percent Of Affiliates, By Per Capita Income And Year



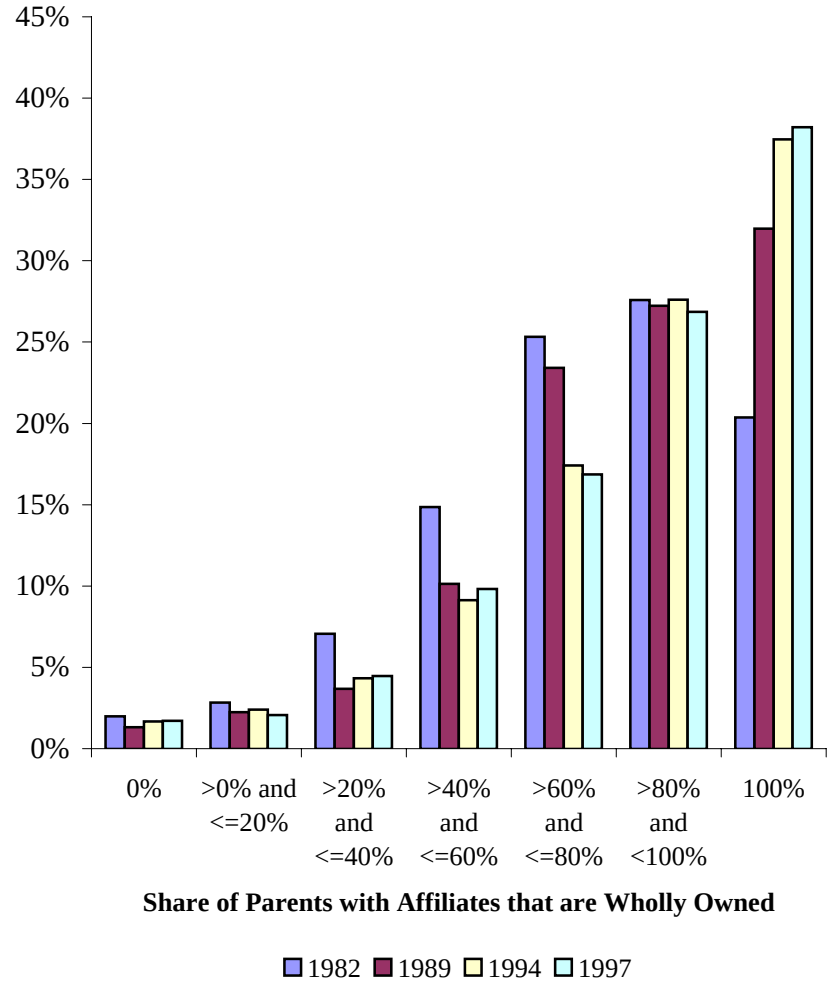
Notes: For each panel, countries are sorted into quartiles based on their average GNP per capita from 1982 to 1997. The "lowest" quartile consists of countries with the lowest average GNP per capita from 1982 to 1997. The "highest" quartile consists of countries with the highest average GNP per capita from 1982 to 1997. The three panels represent the share of all affiliates with minority ownership, majority ownership and whole ownership by U.S. parents, respectively, in 1982, 1989, 1994 and 1997. Wholly owned affiliates are those affiliates that are 100 percent owned by an American parent company. Majority owned affiliates are those affiliates in which the largest ownership claim by an American parent exceeds 50 percent and is less than 100 percent; minority owned affiliates are those affiliates in which the largest ownership claim by an American parent company is at least 10 percent but not more than 50 percent.

Figure 2: The Use of Ownership Forms by Industry, 1982, 1989, 1994



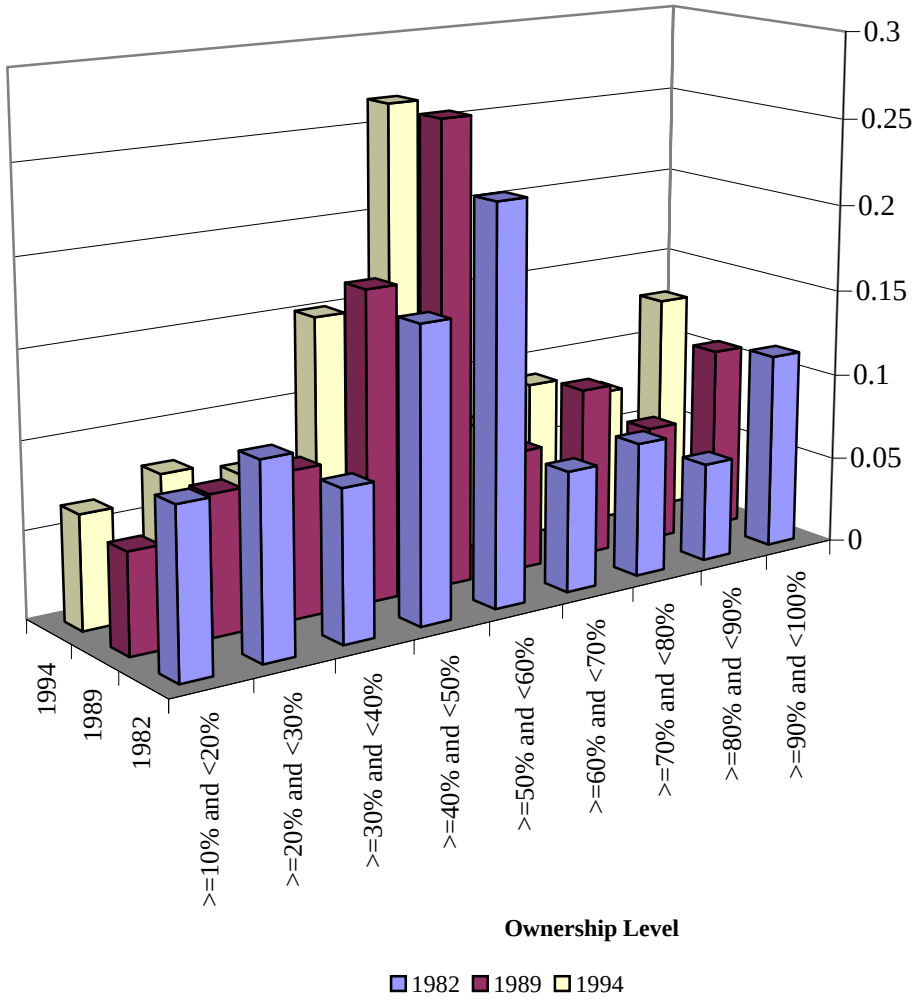
Notes: The bars represent the share of affiliates with minority, majority and whole ownership by U.S. parents by industry for 1982, 1989 and 1994. Wholly owned affiliates are those affiliates that are 100 percent owned by an American parent company. Majority owned affiliates are those affiliates in which the largest ownership claim by an American parent exceeds 50 percent and is less than 100 percent; minority owned affiliates are those affiliates in which the largest ownership claim by an American parent company is at least 10 percent but not more than 50 percent.

Figure 3: The Changing Use of Ownership Levels by Parents with more than 5 affiliates



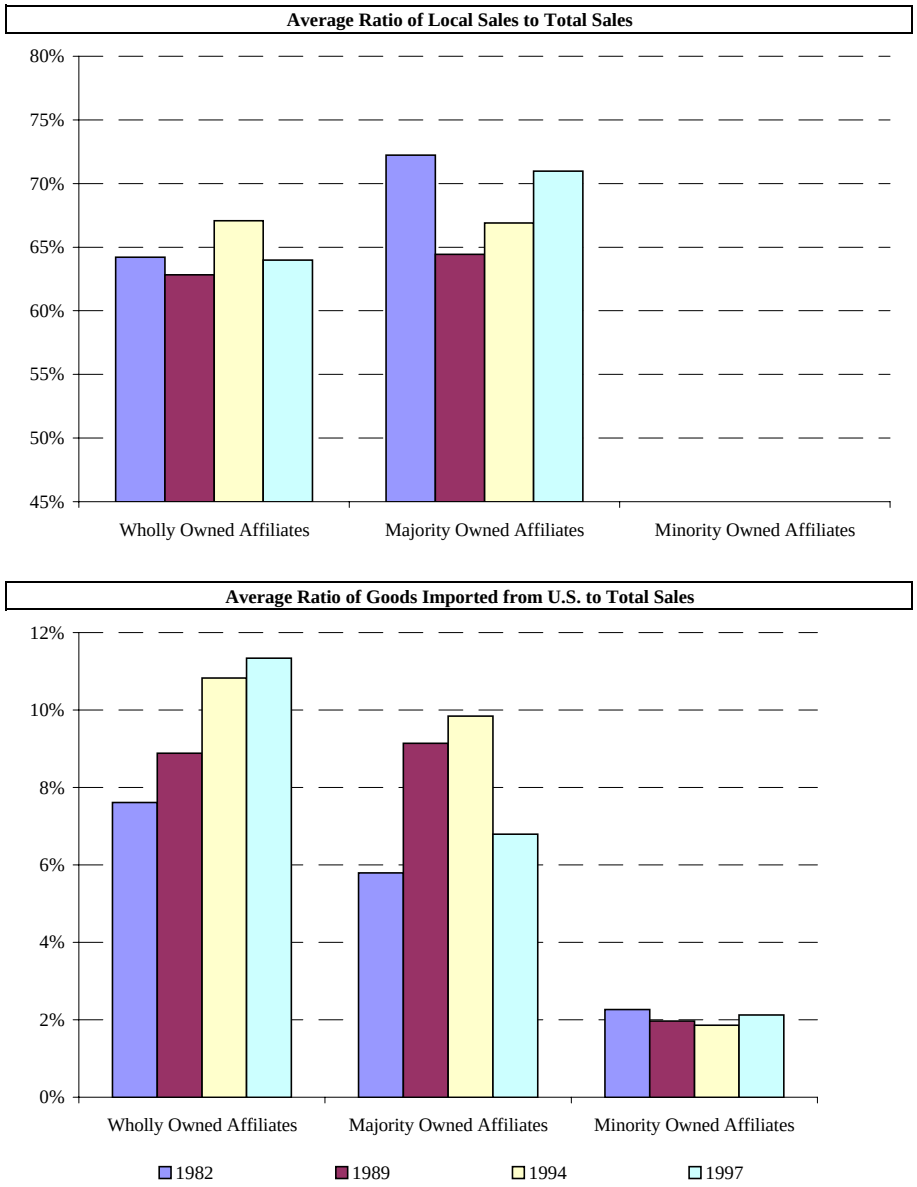
Notes: Each bar represents the share of parents in a given year that wholly own a particular fraction of their affiliates. The sample is restricted to those parents with at least five affiliates.

Figure 4: The Changing Distribution of Partial Ownership, 1982, 1989, 1994



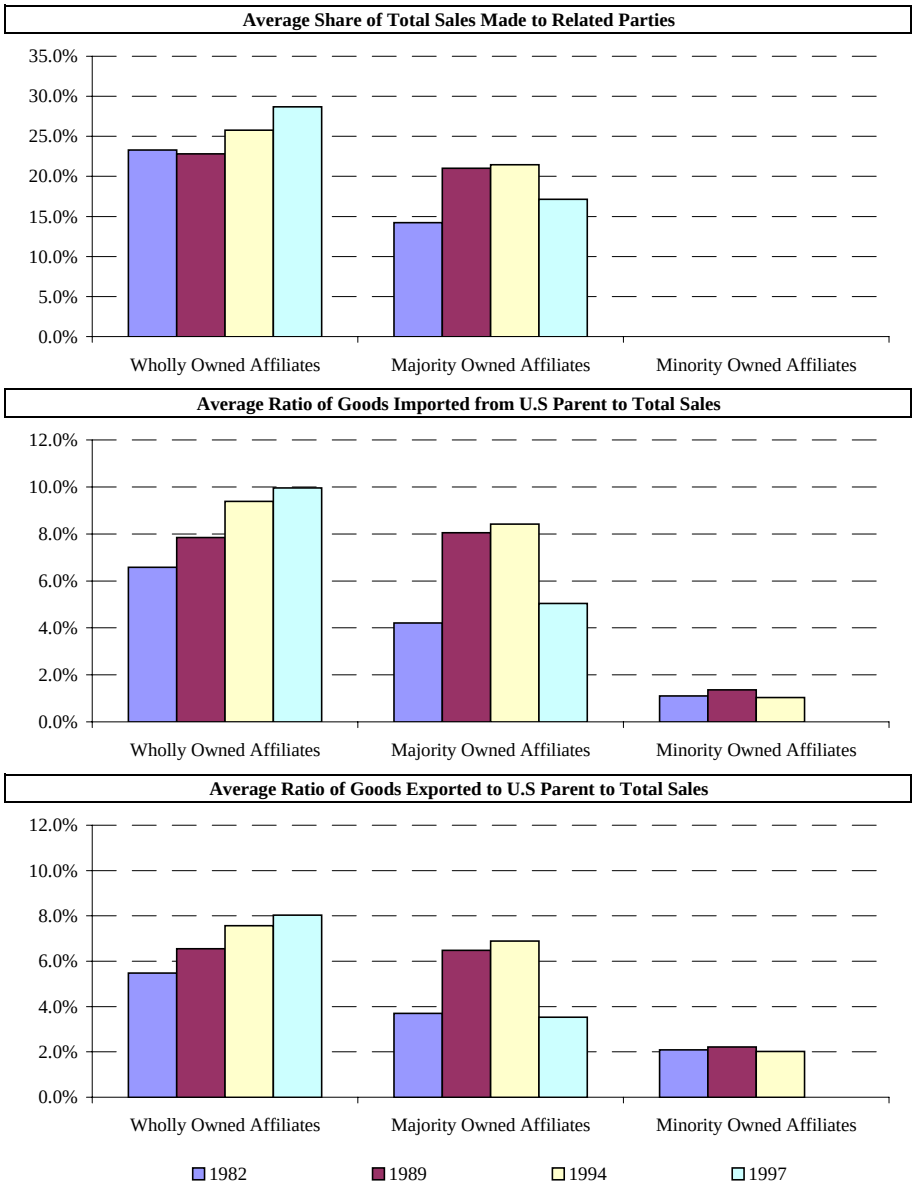
Notes: For each year, the histogram depicts the distribution of partial ownership shares of the largest U.S. parent claim. The bars represent ratios in which the numerator is the number of affiliates owned within the indicated range of ownership by American parents, and the denominator is the total number of affiliates owned less than 100 percent by American parents in that year.

Figure 5a
Sources of Inputs and Destination of Sales by Organizational Form



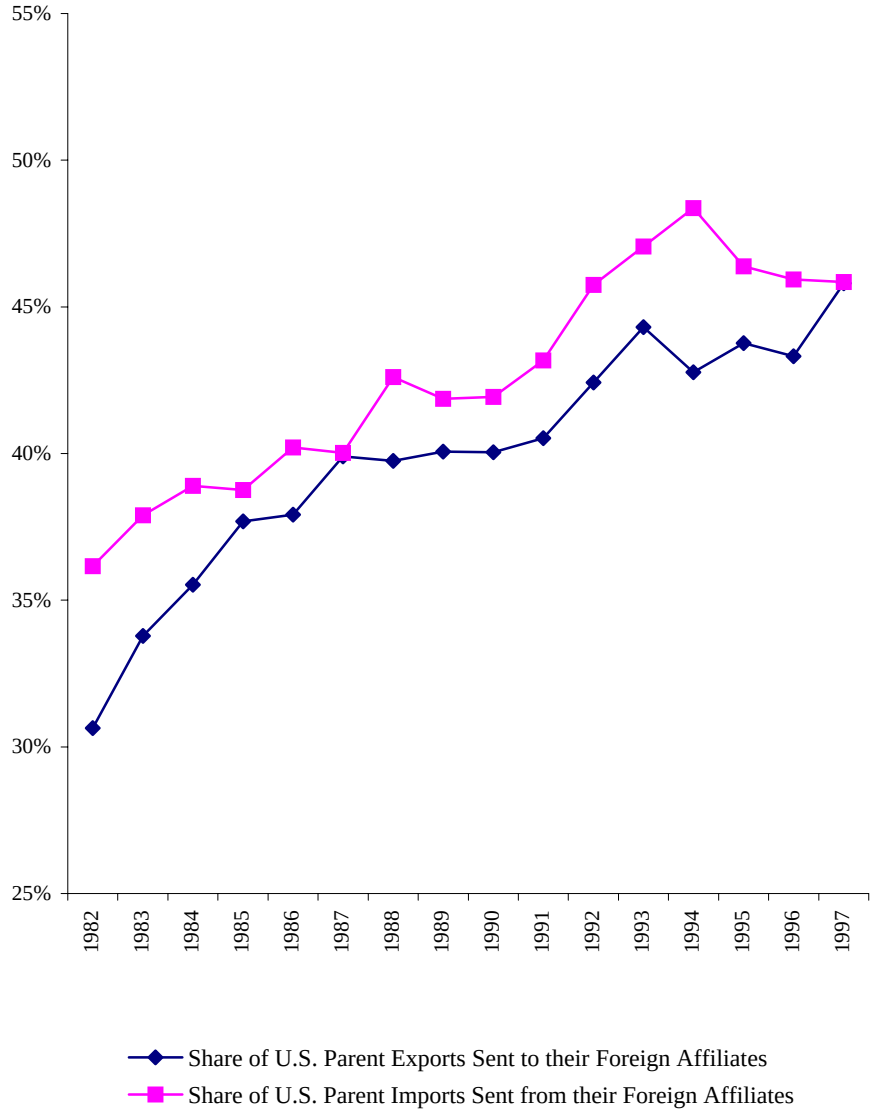
Notes: The top panel displays, by ownership form, the ratio of local sales to total sales for affiliates for 1982, 1989, 1994, and 1997. The bottom panel displays, by ownership form, the ratio of imports from the U.S. to total sales for affiliates for 1982, 1989, 1994, and 1997. Wholly owned affiliates are those affiliates that are 100 percent owned by an American parent company. Majority owned affiliates are those affiliates in which the largest ownership claim by an American parent exceeds 50 percent and is less than 100 percent; minority owned affiliates are those affiliates in which the largest ownership claim by an American parent company is at least 10 percent but not more than 50 percent. Data on the destination of affiliate sales are unavailable for minority owned affiliates.

Figure 5b
Related Party Exchanges



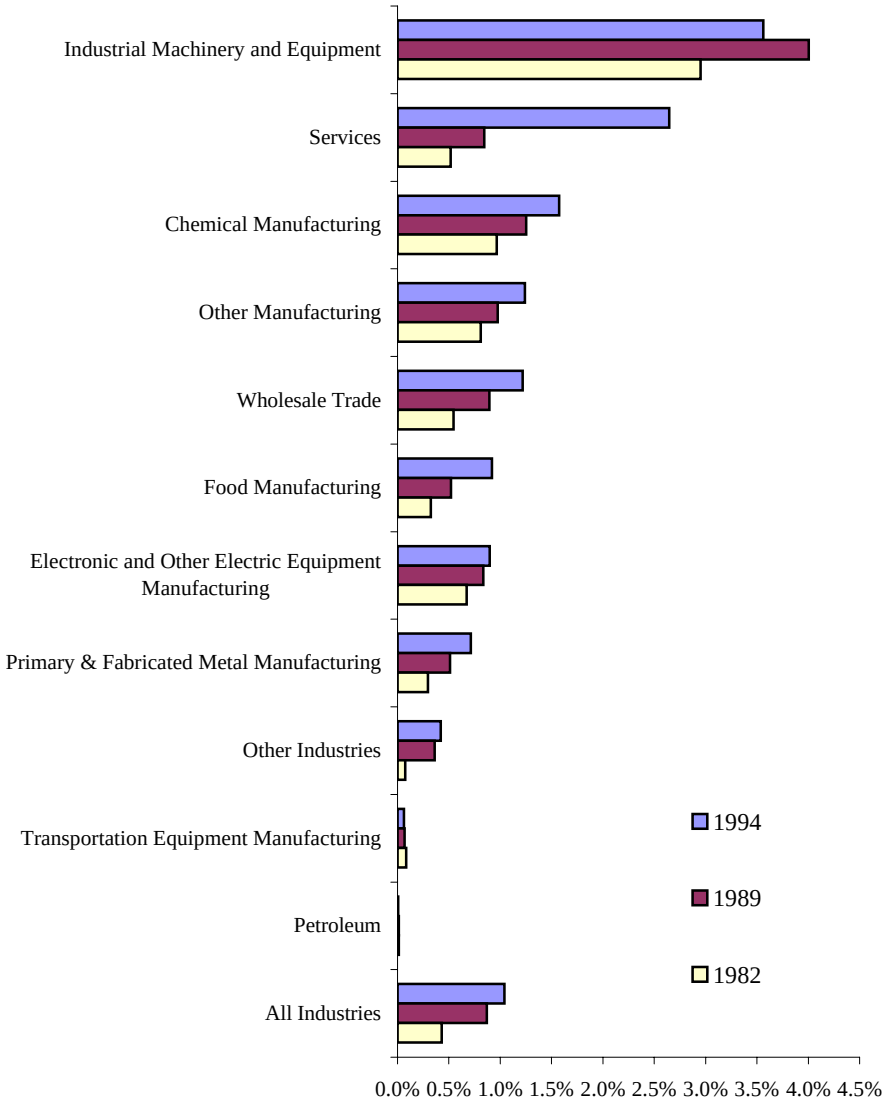
Notes: The top panel displays, by ownership form, the ratio of sales to related parties to total sales for affiliates for 1982, 1989, 1994, and 1997. The middle panel displays, by ownership form, the ratio of imports from the U.S parent to total sales for affiliates for 1982, 1989, 1994, and 1997. The bottom panel displays, by ownership form, the ratio of exports to the U.S. parent to total sales for affiliates for 1982, 1989, 1994, and 1997. Wholly owned affiliates are those affiliates that are 100 percent owned by an American parent company. Majority owned affiliates are those affiliates in which the largest ownership claim by an American parent exceeds 50 percent and is less than 100 percent; minority owned affiliates are those affiliates in which the largest ownership claim by an American parent company is at least 10 percent but not more than 50 percent. Data on the destination of affiliate sales are unavailable for minority owned affiliates and data on related party trade are unavailable for minority owned affiliates in non-benchmark years.

Figure 6: The Reliance on Intrafirm Trade for U.S. Multinational Parents, 1982-1997



Notes: The lines depict shares of U. S. parent exports and imports associated with their foreign affiliates.

Figure 7: Ratio of Royalty Payments to Sales of Multinational Affiliates, by Industry and Year



Notes: The bars represent the ratio of royalty payments from affiliates to their U.S. parents to sales by those affiliates, by industry, for 1982, 1989, and 1994.

Table I

Descriptive Statistics by Organizational Form

	Benchmark Years			
	1982	1989	1994	1997
Number of Affiliates				
Wholly Owned Affiliates	13,429	14,661	16,495	10,642
Majority Owned Affiliates	1,830	1,596	1,961	1,192
Minority Owned Affiliates	3,319	2,637	2,441	1,396
Median Sales				
Wholly Owned Affiliates	$ 10,267	$ 12,511	$ 13,489	$ 41,058
Majority Owned Affiliates	$ 12,982	$ 13,448	$ 16,839	$ 44,892
Minority Owned Affiliates	$ 12,476	$ 14,120	$ 16,572	$ 46,653
Median Assets				
Wholly Owned Affiliates	$ 9,445	$ 13,091	$ 14,045	$ 44,202
Majority Owned Affiliates	$ 10,413	$ 12,442	$ 16,369	$ 46,515
Minority Owned Affiliates	$ 11,544	$ 13,684	$ 15,382	$ 58,786
Median Employees				
Wholly Owned Affiliates	70	59	61	124
Majority Owned Affiliates	155	117	116	258
Minority Owned Affiliates	87	70	94	182

	1982-1989	**1989-1994**
Entry Rate		
Wholly Owned Affiliates	75.1%	57.7%
Majority Owned Affiliates	60.5%	71.1%
Minority Owned Affiliates	54.2%	54.0%
Exit Rate		
Wholly Owned Affiliates	64.8%	45.2%
Majority Owned Affiliates	64.4%	48.3%
Minority Owned Affiliates	79.0%	52.7%

Notes: The top panel provides the number count, median sales, median assets and median employees for all affiliates of U.S. multinationals in the sample by ownership form of the affiliate for 1982, 1989, 1994 and 1997. In 1982, 1989, and 1994, Benchmark Surveys were conducted and, consequently, the cutoff for inclusion in the sample is lower than other years as discussed in the text. Wholly owned affiliates are those affiliates that are 100 percent owned by an American parent company. Majority owned affiliates are those affiliates in which the largest ownership claim by an American parent exceeds 50 percent and is less than 100 percent; minority owned affiliates are those affiliates in which the largest ownership claim by an American parent company is at least 10 percent but not more than 50 percent. The bottom panel reports entry rates and exit rates between Benchmark Surveys by ownership form. Entry rates are defined as the ratio of affiliates appearing for the first time during the period but not in the beginning year to all affiliates appearing in the beginning year. Exit rates are defined as the ratio of affiliates leaving the sample during the period to all affiliates appearing in the beginning year.

Table II

Determinants of Ownership at Entry: Whole vs. Partial Ownership

Dependent Variable: Dummy for Whole Ownership vs. Partial Ownership										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	0.4482		0.4461		0.7106		0.8956		0.8307	1.3237
	(0.0348)		(0.0453)		(0.0494)		(0.0534)		(0.0550)	(0.5764)
Ownership Restrictions Dummy	0.8874	0.3502	0.8882	0.3565	0.8097	0.3097	0.7972	0.3089	0.7931	0.2274
	(0.0403)	(0.1181)	(0.0427)	(0.1182)	(0.0432)	(0.1188)	(0.0433)	(0.1189)	(0.0437)	(0.0919)
Absolute Value of Difference of Median Country Tax Rates from U.S. Statutory Rate			0.0154	2.3781	0.1573	2.3580	0.1461	2.3561	0.2113	1.7744
			(0.2073)	(0.7518)	(0.2090)	(0.7530)	(0.2097)	(0.7529)	(0.2108)	(0.5556)
Number of Other Countries Operated in by Controlled Group					-0.0145	-0.0113	-0.0172	-0.0110	-0.0157	-0.0139
					(0.0010)	(0.0015)	(0.0011)	(0.0016)	(0.0011)	(0.0012)
Same Industry as Parent Dummy							-0.3601	0.0430	-0.3778	-0.3285
							(0.0380)	(0.0548)	(0.0382)	(0.0395)
R&D/Sales Ratio for Industry									2.2000	3.0577
									(0.4814)	(0.5063)
Country/Industry Fixed Effects?	N	Y	N	Y	N	Y	N	Y	N	N
Country Fixed Effects?	N	N	N	N	N	N	N	N	N	Y
Year Fixed Effects?	N	Y	N	Y	N	Y	N	Y	N	Y
No. of Obs.	18,108	14,016	18,106	14,015	18,106	14,015	18,106	14,015	17,989	17,989
Log Likelihood	-9,809	-5,229	-9,808	-5,223	-9,710	-5,196	-9,665	-5,196	-9,582	-9,197

Notes: The dependent variable equals one if an affiliate is wholly owned at entry and equals zero if an affiliate is partially owned at entry. The specifications in columns 1, 3, 5, 7, and 9 are estimated as logits while the specifications in columns 2, 4, 6, and 8 are conditional logits with country/industry and year fixed effects. The specification in column 10 is estimated as a logit using dummies to control for country and year fixed effects. "Ownership Restrictions Dummy" equals one if two of the measures of restrictions on foreign ownership as measured by Shatz (2000) are above three on a scale of one to five and is zero otherwise. "Absolute Value of Difference of Median Country Tax Rates from U.S. Statutory Rate" is the absolute value of the difference between the median tax rate faced by an affiliate in a country and the U.S. statutory rate in a given year. "Number of Other Countries Operated in by Controlled Group" for an affiliate is the number of other countries in which the affiliate's parent has an affiliate. "Same Industry as Parent Dummy" equals one if the affiliate is in the same industry group as the parent and zero otherwise. "R&D/Sales Ratio for Industry" is the average ratio of R&D expenditures to sales for the parents in the industry of the affiliate as measured by domestic parent spending on R&D and domestic parent sales. Standard errors are in parentheses.

Table III

Determinants of Ownership at Entry: Majority vs. Minority Ownership

Dependent Variable: Dummy for Whole Ownership and Majority Ownership vs. Minority Ownership										
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	1.0643		1.0511		1.4401		1.6259		1.5561	2.9607
	(0.0389)		(0.0519)		(0.0575)		(0.0630)		(0.0651)	(1.0452)
Ownership Restrictions Dummy	0.9295	0.4265	0.9356	0.4348	0.8233	0.3542	0.8094	0.3547	0.8052	0.2277
	(0.0465)	(0.1352)	(0.0493)	(0.1354)	(0.0501)	(0.1367)	(0.0503)	(0.1368)	(0.0508)	(0.1045)
Absolute Value of Difference of Median Country Tax Rates from U.S. Statutory Rate			0.0945	1.6714	0.3027	1.5888	0.2954	1.6037	0.3934	1.3604
			(0.2465)	(0.9044)	(0.2502)	(0.9106)	(0.2510)	(0.9108)	(0.2534)	(0.6518)
Number of Other Countries Operated in by Controlled Group					-0.0202	-0.0174	-0.0228	-0.0164	-0.0206	-0.0202
					(0.0012)	(0.0018)	(0.0012)	(0.0018)	(0.0013)	(0.0013)
Same Industry as Parent Dummy							-0.3569	0.1430	-0.3750	-0.3455
							(0.0465)	(0.0681)	(0.0467)	(0.0483)
R&D/Sales Ratio for Industry									1.9785	3.0430
									(0.5914)	(0.6214)
Country/Industry Fixed Effects?	N	Y	N	Y	N	Y	N	Y	N	N
Country Fixed Effects?	N	N	N	N	N	N	N	N	N	Y
Year Fixed Effects?	N	Y	N	Y	N	Y	N	Y	N	Y
No. of Obs.	18,108	11,902	18,106	11,901	18,106	11,901	18,106	11,901	17,989	17,964
Log Likelihood	-7,342	-3,509	-7,342	-3,507	-7,198	-3,460	-7,168	-3,458	-7,079	-6,750

Notes: The dependent variable equals one if the affiliate is wholly owned or majority owned at entry and equals zero if an affiliate is minority owned at entry. The specifications in columns 1, 3, 5, 7 and 9 are estimated as logits while the specifications in columns 2, 4, 6, and 8 are conditional logits with country/industry and year fixed effects. The specification in column 10 is estimated as a logit using dummies to control for country and year fixed effects. "Ownership Restrictions Dummy" equals one if two of the measures of restrictions on foreign ownership as measured by Shatz (2000) are above three on a scale of one to five and equals zero otherwise. "Absolute Value of Difference of Median Country Tax Rates from U.S. Statutory Rate" is the absolute value of the difference between the median tax rate faced by an affiliate in a country and the U.S. statutory rate in a given year. "Number of Other Countries Operated in by Controlled Group" for an affiliate is the number of other countries in which the affiliate's parent has an affiliate. "Same Industry as Parent Dummy" equals one if the affiliate is in the same industry group as the parent and zero otherwise. "R&D/Sales Ratio for Industry" is the average ratio of R&D expenditures to sales for the parents in the industry of the affiliate as measured by domestic parent spending and domestic parent sales. Standard errors are in parentheses.

Table IV

Determinants of Ownership at Entry: Reliance on Local Markets and Related Party Trade

Dependent Variable: Dummy for Whole Ownership vs. Majority Ownership									
	(1)	(2)	(3)	(4)		(5)	(6)	(7)	(8)
Constant	1.6677		1.5984		Constant	1.4275		1.3489	
	(0.0768)		(0.0784)			(0.0535)		(0.0547)	
Ownership Restrictions Dummy	0.6800	0.1199	0.6732	0.1146	Ownership Restrictions Dummy	0.6873	0.1306	0.6928	0.1563
	(0.0599)	(0.1879)	(0.0607)	(0.1928)		(0.0600)	(0.1879)	(0.0603)	(0.1916)
Ratio of Local Sales to Total Sales	-0.2466	-0.0219	-0.2456	-0.0180	Ratio of Related Party Sales to Total Sales	0.3103	0.1999	0.3334	0.1965
	(0.0720)	(0.1004)	(0.0727)	(0.1013)		(0.0877)	(0.1156)	(0.0887)	(0.1166)
Ratio of Goods Imported from U.S. to Total Sales			0.8857	0.7509	Ratio of Imports from Parent to Total Sales			0.8911	0.6801
			(0.1579)	(0.2074)				(0.1510)	(0.1833)
Country/Industry Fixed Effects?	N	Y	N	Y	Country/Industry Fixed Effects?	N	Y	N	Y
Year Fixed Effects?	N	Y	N	Y	Year Fixed Effects?	N	Y	N	Y
No. of Obs.	14,484	8,673	14,291	8,534	No. of Obs.	14,484	8,673	14,418	8,629
Log Likelihood	-5,181	-2,510	-5,096	-2,458	Log Likelihood	-5,180	-2,509	-5,131	-2,484

Notes: The dependent variable equals one if an affiliate is wholly owned at entry and equals zero if the largest ownership claim by an American parent is between 50 and 100 percent at entry. The specifications in columns 1, 3, 5, and 7 are estimated as logits while the specifications in columns 2, 4, 6, and 8 are conditional logits with country/industry fixed effects. "Ownership Restrictions Dummy" equals one if two of the measures of restrictions on foreign ownership as measured by Shatz (2000) are above three on a scale of one to five and equals zero otherwise. "Ratio of Local Sales to Total Sales" is the ratio of local sales to total affiliate sales. "Ratio of Goods Imported from U.S. to Total Sales" is the ratio of imports from the U.S. to total affiliate sales. "Ratio of Related Party Sales to Total Sales" is the ratio of sales to related parties to total affiliate sales. "Ratio of Imports from Parent to Total Sales" is the ratio of imports from the U.S. parent to total affiliate sales. Standard errors are in parentheses.

Table V

Organizational Form, Profitability and Coordination of Tax Activity

Dependent Variable: Net Income						
	(1)	(2)	(3)	(4)	(5)	(6)
Assets	0.0905	1.0479	0.1048	1.0509	0.1048	1.0502
	(0.0046)	(0.0845)	(0.0060)	(0.0862)	(0.0060)	(0.0849)
Country Tax Rate Interacted with Assets	-0.0804	-0.0951	-0.0991	-0.1181	-0.0991	-0.1181
	(0.0120)	(0.0124)	(0.0170)	(0.0165)	(0.0170)	(0.0165)
Partial Ownership Dummy Interacted with Assets			-0.0459	-0.0221		
			(0.0097)	(0.0108)		
Partial Ownership Dummy Interacted with Assets and Country Tax Rate			0.0627	0.0569		
			(0.0235)	(0.0244)		
Majority Ownership Dummy Interacted with Assets					-0.0336	-0.0144
					(0.0105)	(0.0118)
Majority Ownership Dummy Interacted with Assets and Country Tax Rate					0.0352	0.0304
					(0.0280)	(0.0304)
Minority Ownership Dummy Interacted with Assets					-0.0517	-0.0245
					(0.0120)	(0.0130)
Minority Ownership Dummy Interacted with Assets and Country Tax Rate					0.0751	0.0663
					(0.0270)	(0.0280)
Industry Fixed Effects?	N	Y	N	Y	N	Y
Year Fixed Effects?	N	Y	N	Y	N	Y
No. of Obs.	160,777	160,777	160,772	160,772	160,772	160,772
R-Squared	0.2582	0.3417	0.2675	0.3423	0.2677	0.3425

Notes: The dependent variable is the net (after-tax) income of an affiliate. The regressions are estimated using OLS, and the specifications in columns 2, 4, and 6 include industry and year fixed effects. "Assets" are affiliate assets. "Country Tax Rate Interacted with Assets" is product of "Assets" and the median country tax rate as calculated in the text. The remaining terms are interactions of ownership dummies with "Assets" and "Country Tax Rate Interacted with Assets." Partial ownership dummies equal one for any affiliate not wholly-owned by the U.S. parent. Heteroskedasticity-consistent standard errors are in parentheses.

Table VI

Organizational Form and Coordination of Intellectual Property

Dependent Variable: Dummy for Payment of Royalties								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	-1.5236		-1.5951		-1.5236		-1.5951	
	(0.0312)		(0.0377)		(0.0312)		(0.0377)	
Majority or Whole Ownership Dummy	0.1599	0.3760	0.0361	0.1881	0.2533	0.4015	0.0973	0.1077
	(0.0335)	(0.0468)	(0.0407)	(0.0615)	(0.0470)	(0.0613)	(0.0578)	(0.0807)
R&D/Sales Ratio for Industry			4.1531				4.1531	
			(0.8708)				(0.8708)	
Majority or Whole Ownership Dummy Interacted with R&D/Sales Ratio for Industry			2.2715	6.1457			4.2797	9.6020
			(0.9140)	(1.3690)			(1.2298)	(1.7429)
Whole Ownership Dummy					-0.1059	-0.0312	-0.0709	0.0929
					(0.0376)	(0.0485)	(0.0468)	(0.0633)
Whole Ownership Dummy Interacted with R&D/Sales Ratio for Industry							-2.1925	-3.9922
							(0.9167)	(1.2511)
Country/Industry Fixed Effects?	N	Y	N	Y	N	Y	N	Y
Year Fixed Effects?	N	Y	N	Y	N	Y	N	Y
No. of Obs.	48,053	36,574	47,847	36,574	48,053	36,574	47,847	36,574
Log Likelihood	-24,036	-15,288	-23,730	-15,277	-24,032	-15,288	-23,721	-15,272

Notes: The dependent variable equals one if positive royalties are paid from the affiliate to its American parent; the dependent variable equals zero otherwise. The specifications in columns 1, 3, 5 and 7 are logits, and the specifications in columns 2, 4, 6, and 8 are conditional logits that control for country/industry and year fixed effects. "Majority or Whole Ownership dummy" equals one if an affiliate is whole or majority owned, and equals zero otherwise. "Whole Ownership dummy" equals one if the affiliate is wholly owned, and equals zero otherwise. "R&D/Sales Ratio for Industry" is the average ratio of R&D expenditures to sales for the parents in the industry of the affiliate as measured by domestic

Table VII

Trade and Ownership: Effects of Liberalizations

	Dependent Variable: Share of Sales through Wholly Owned Affiliates			
	(1)	(2)	(3)	(4)
Constant	0.6020	0.6132	0.6286	0.6141
	(0.0057)	(0.0038)	(0.0083)	(0.0038)
Post Liberalization Dummy	0.0873	0.0640	0.0398	0.0389
	(0.0080)	(0.0062)	(0.0117)	(0.0094)
High R&D Intensity Dummy			-0.0506	
			(0.0115)	
Post Liberalization Dummy Interacted with High R&D Intensity Dummy			0.0919	0.0466
			(0.0161)	(0.0124)
Country/Industry FE?	N	Y	N	Y
No. of Obs.	11,053	11,053	10,953	10,953
R-Squared	0.0106	0.7039	0.0135	0.7031

	Dependent Variable: Share of Affiliates Sales to Related Parties			
	(5)	(6)	(7)	(8)
Constant	0.0612	0.0710	-0.3211	-0.4287
	(0.0043)	(0.0060)	(0.0591)	(0.1679)
Share of Sales through Wholly Owned Affiliates	0.0774	0.0641	0.6018	0.7582
	(0.0060)	(0.0081)	(0.0809)	(0.2220)
Country/Industry FE?	N	Y	Y	Y
IV w/ Predicted Ownership from (4)?	N	N	Y	Y
Year Effects?	N	N	N	Y
No. of Obs.	9,726	9,726	9,657	9,657
R-Squared	0.0145	0.7380		

Notes: The dependent variable in the left panel is the share of all affiliate sales within a country/industry pair that are sold through wholly owned affiliates. The sample is restricted to those countries experiencing a liberalization of ownership restrictions between 1986 and 1995 as described in the text. The equations reported in columns 1-4 are estimated by OLS; the specifications in columns 2 and 4 include country/industry fixed-effects. "Post Liberalization Dummy" equals one for years after a liberalization of ownership restrictions and equals zero otherwise. "High R&D Intensity Dummy" equals one if the industry has an R&D/Sales ratio above the median and equals zero otherwise. "Post Liberalization Dummy Interacted with High R&D Intensity Dummy" is the product of "Post Liberalization Dummy" and "High R&D Intensity Dummy." The dependent variable in the right panel is the ratio of sales to related parties to total sales within a country/industry pair. "Share of Sales through Wholly Owned Affiliates" is the share of all sales within a country/industry pair that is sold through wholly owned affiliates. The equations reported in columns 5 and 6 are estimated by OLS; the specification in column 6 includes country/industry fixed effects. The specifications in columns 7 and 8 use the predicted value from the specification in column 4 as an instrument, and the specification in column 8 adds year effects. Standard errors are in parentheses.

Table VIII

Trade and Ownership: Effects of the U.S. Tax Reform Act of 1986

	Dependent Variable: Share of Sales through Wholly Owned Affiliates			Dependent Variable: Share of Exports to Related Parties				Dependent Variable: Share of Imports from Related Parties			
	(1)	(2)		(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
Constant	0.7566	0.7584	Constant	0.2717	0.3828	-0.3430	0.0264	0.4053	0.4928	0.3129	-0.0886
	(0.0029)	(0.0027)		(0.0068)	(0.0087)	(0.1676)	(0.2418)	(0.0092)	(0.0135)	(0.1525)	(0.2514)
Post TRA86 Dummy	0.0193	0.0015	Share of Sales through Wholly Owned Affiliates	0.1811	0.0389	0.9751	0.4988	0.1401	0.0275	0.2662	0.7748
	(0.0036)	(0.0078)		(0.0082)	(0.0110)	(0.2157)	(0.3079)	(0.0110)	(0.0172)	(0.1978)	(0.3218)
Post TRA86 Dummy Interacted with High Average Foreign Tax Rate Dummy		0.0231									
		(0.0087)									
Parent Fixed Effects?	Y	Y	Parent Fixed Effects?	N	Y	Y	Y	N	Y	Y	Y
No. of Obs.	22,558	17,146	IV w/ Predicted Ownership from (2)?	N	N	Y	Y	N	N	Y	Y
R-Squared	0.7791	0.7489									
			Year Effects?	N	N	N	Y	N	N	N	Y
			No. of Obs.	15,699	15,699	12,384	12,384	12,941	12,941	10,313	10,313
			R-Squared	0.0290	0.7152			0.0123	0.6984		

Notes: The dependent variable in the left panel is the share of all affiliate sales within a parent system that are sold through wholly owned affiliates. The specifications in columns 1 and 2 include parent fixed effects. "Post-TRA86 dummy" equals one for years after 1986 and equals zero otherwise. "High Average Tax Rate Dummy" equals one if the average foreign tax rate faced by majority owned affiliates is greater than the U.S. statutory rate in a given year and equals zero otherwise. "Post-TRA86 dummy interacted with High Average Foreign Tax Rate Dummy" is the product of "Post-TRA86 dummy" and "High Average Foreign Tax Rate Dummy." The dependent variable in columns 3 through 6 is the ratio of parent exports to related parties to total parent exports. The dependent variable in columns 7 through 10 is the ratio of parent imports from related parties to total parent imports. "Share of Sales through Wholly Owned Affiliates" is the share of all affiliate sales within a parent system that are sold through wholly owned affiliates. Specifications presented in columns 3 and 7 are OLS, those presented in 4, 5, 6, 8, 9, and 10 include parent fixed effects, and those in columns 6 and 10 include year fixed effects. The specifications in columns 5, 6, 9, and 10 use the predicted value from the specification in column 2 as an instrument. Standard errors are in parentheses.

Table IX

Organizational Form and Risk Management

Dependent Variable: Affiliate Assets								
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Constant	106,785.40	51,312.54	106,785.40	51,402.55	68,891.11	60,050.46	68,891.11	60,115.37
	(8,198.85)	(12,288.82)	(8,199.03)	(12,270.11)	(69,822.92)	(13,304.33)	(69,826.38)	(13,355.66)
Majority or Whole Ownership Dummy	-50,936.23	-43,004.45	-39,200.77	-17,984.26	-126,969.60	-146,304.30	-121,029.40	-121,206.60
	(8,455.46)	(9,646.47)	(10,942.38)	(12,772.67)	(70,778.83)	(88,779.83)	(86,122.40)	(102,678.00)
Whole Ownership Dummy			-13,316.59	-29,531.19			-12,310.38	-41,109.15
			(7,553.82)	(10,544.58)			(51,532.04)	(85,178.95)
Expropriation Risk Measure					4,849.80		4,849.80	
					(7,758.05)		(7,758.43)	
Majority or Whole Ownership Dummy Interacted with Expropriation Risk					7,384.41	11,047.01	8,815.11	10,944.55
					(7,887.62)	(9,737.46)	(9,937.58)	(11,700.11)
Whole Ownership Dummy Interacted with Expropriation Risk							-996.11	1,408.52
							(6,353.17)	(9,770.99)
Country/Industry Fixed Effects?	N	Y	N	Y	N	Y	N	Y
Year Fixed Effects?	N	Y	N	Y	N	Y	N	Y
No. of Obs.	23,135	23,135	23,135	23,135	20,185	20,185	20,185	20,185
R-Squared	0.0031	0.2053	0.0032	0.2058	0.0049	0.1981	0.0053	0.1985

Notes: The dependent variable is affiliate assets. Equations are estimated using OLS; the specifications in columns 2, 4, 6 and 8 include country/industry and year fixed effects. "Majority or Whole Ownership dummy" equals one if an affiliate is owned more than 50 percent by its American parent and equals zero otherwise. "Whole Ownership dummy" equals one if the affiliate is wholly owned and equals zero otherwise. "Expropriation Risk Measure" is an index of the risk of "outright confiscation" or "forced nationalization" produced by the International Country Risk Guide. This index is the average of the April and October monthly index over the 1982-1995 period. The index is scaled between 0 and 10, and lower scores reflect higher risks. The remaining terms are interactions of ownership dummies with "Expropriation Risk Measure." Heteroskedasticity-consistent standard errors are in parentheses.

Appendix Table I

Organizational Form, Equity Investments and Risk Management

Dependent Variable: Paid-in-Capital Owned by U.S. Parent				
	(1)	(2)	(3)	(4)
Constant	5,336.76	24,460.83	13,218.66	24,154.18
	(484.52)	(6,633.55)	(5,025.55)	(6,862.14)
Whole Ownership Dummy	188.30	2,238.09	-10,947.51	-6,064.79
	(584.28)	(1,275.39)	(5,461.37)	(11,368.17)
Expropriation Risk Measure			-1,192.98	
			(512.76)	
Whole Ownership Dummy Interacted with Expropriation Risk			1,249.80	895.58
			(579.43)	(1,179.42)
Country/Industry Fixed Effects?	N	Y	N	Y
Year Fixed Effects?	N	Y	N	Y
No. of Obs.	14,580	14,580	13,159	13,159
R-Squared	0.0000	0.3097	0.0002	0.3054

Notes: The dependent variable is the paid in capital of an affiliate owned by the U.S. parent. Equations are estimated using OLS; the specifications in columns 2 and 4 include country/industry and year fixed effects. "Whole Ownership dummy" equals one if the affiliate is wholly owned and equals zero otherwise. "Expropriation Risk Measure" is an index of the risk of "outright confiscation" or "forced nationalization" produced by the International Country Risk Guide. This index is the average of the April and October monthly index over the 1982-1995 period. The index is scaled between 0 and 10, and lower scores reflect higher risks. The remaining terms are interactions of the ownership dummy with "Expropriation Risk Measure." Heteroskedasticity-consistent standard errors are in parentheses.