

# Investment and Location Policies of Multinational Companies\*

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The investment and location policies of multinational enterprises (MNEs) are often an issue of public policy in the industrial countries. A multinational's decision to move some activity away from a nation is feared to lower employment, worsen the balance of trade, or redistribute income away from labor. An inflow of foreign direct investment is feared for its inflationary consequences or the extra congestion it may cause. Behind these fears lies the unstated assumption that the MNE's investment decision corresponds to a net reallocation of society's resources – that when a multinational shifts some of its activities from Switzerland to Belgium total output contracts in Switzerland and expands in Belgium. That assumption might be false at two levels. A Swiss multinational's shift of equity capital to Belgium might or might not increase Belgium's net stock of equity capital. A Swiss pharmaceutical manufacturer's shift of production to Belgium might or might not increase total pharmaceutical production in Belgium and reduce it in Switzerland (whatever the effect on national stocks of equity capital). This paper is concerned with the industry-level (microeconomic) issue: how closely do multinationals' investment and location decisions correspond to changes in overall activity patterns in the affected sectors?

The assumption that the MNE's investment and location decisions are fully reflected in sectoral output levels and patterns is indeed a special one. That special character becomes clear when we consider a view of the MNE's long-run consequences for resource allocation that has evolved in numerous theoretical and empirical investigations: that the MNE's linkage of production establishments in different countries is a transactional phenomenon with no first-order effects on the allocation of real resources. The distribution of production activity (plants) around the world can be explained by conventional comparative-advantage principles. The distribution of ownership linkages among these plants can be explained by the transactional advantages of the multinational company, varying as they do from sector to sector and country to country. But there is no general reason why a disturbance that increases the transactional advantages of the MNE in a given sector (but not the cost of carrying out physical production activities in various locations) should affect the international allocation of the sector's output even if it does increase the share of every country's output that is controlled by MNEs<sup>1</sup>.

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<sup>1</sup> I shall not try to trace the genesis of this view, since many writers have articulated it with varying degrees of formality. It is consistent with various long-run statistical studies of MNEs' activities that have utilized the framework explicitly. For relevant conceptual discussions see *McManus* (1972), *Buckley and Casson* (1976), and *Dunning* (1977).

The views in the two preceding paragraphs differ sharply in their frames of reference as well as their conclusions. The former is concerned with the short run and pays little attention to the forces of market equilibrium. The second addresses the long run and makes strong assumptions about how the MNE affects market equilibrium. The yawning gap between these views could be explored by starting from either end. One could search for short-run market adjustments that offset any reallocations of resources set in motion by MNEs<sup>2</sup>. Or one could test the postulate that the incidence of MNEs is independent of the international distribution of productive activity. The latter approach is followed in this paper. In the first section I describe the conditions under which the existence of multinational ownership links may be expected to affect the allocation of resources. The second section presents some statistical evidence based on Canadian data.

### I. The "Separation" Theorem and Its Limitations

The proposition that transnational ownership links do not affect the distribution of tangible economic activity I shall call the "separation theorem". The theorem depends on the assumption that the costs associated with any given productive activity can be decomposed into those associated with combining tangible inputs to yield tangible outputs and those associated with coordinating the activities of plants (sites of physical production) located in different nations. The term "coordination" here covers a variety of functions that may be profitably carried out by the MNE. Transnational coordination reduces transactions costs that would be attributable to dealings between two plants if they lacked common ownership. These transactions costs can be either the information costs associated with spot transactions or the costs of negotiating (*ex ante*), policing, and haggling (*ex post*) associated with arm's-length contractual relations between independent enterprises. Production and coordination costs may be additive and independent, without elements of jointness. Changes in the cost-minimizing location of production or the scale that minimizes average physical costs then would not affect the extent to which separate plants are joined by multinational ownership links. Changes in the advantages of multinational coordination alter the pattern of ownership links among plants but leave the optimal locations and scale of plants unaffected. This latter proposition, as we noted, deprecates the importance of the MNE's investment and location decisions for the sectoral level and pattern of economic activity.

<sup>2</sup> *Hufbauer and Adler* (1968) is somewhat in this spirit. Also see *Van Loo* (1977).

### *The Multinational as Multiplant Enterprise*

The model of the MNE that gives rise to the separation theorem is an intellectually attractive one, not least because it encourages us to think of the MNE as simply one species of multiplant enterprise and discourages us from concocting special explanations for the existence of multinationals when no special explanations are needed. Multiplant enterprises can be classified by the relation among the outputs or activities of their various plants:

1. The geographic multimarket enterprise turns out the same products (more or less) in each of its plants but sells them in geographically segmented markets.
2. The vertically integrated enterprise produces outputs in some plants that are inputs to others of its plants (although the inputs need not be the same physical units produced by the upstream plant).
3. The diversified enterprise controls plants whose outputs are not related in either of the preceding ways (horizontally or vertically), although they may be related through transactions in nonproduction activities or services.

The multiplant enterprise becomes multinational when two or more of its plants lie in different national economies. The multinational enterprise can thus be considered one type, or a combination of types, of multiplant firm<sup>3</sup>. What determines the incidence of multinationals' activities becomes just one aspect of the question of what determines the prevalence of multiplant firms. If our quest is for exceptions to the separation theorem, the inventory of economic models of the multiplant enterprise should contain all the transactional factors that might be at work.

### *Exceptions to the Separation Theorem*

The long-run factors indicated by various models of multiplant operation suggest at least two channels by which multinational enterprise may influence the scales of plants, as one salient feature of investment decisions. The first is that optimal plant scale (defined as the one that minimizes average costs of production) may be determined by shadow prices of inputs that are themselves affected by the multiplant operation of the enterprise that operates it. The second channel assumes that technology does not give rise to a unique cost-minimizing output at the plant level (the average cost curve is flat over a range at its minimum cost level). The MNE may then choose a different plant size because some rent-yielding asset possessed by the MNE affects the quantity of its output demanded. In simple terms, the MNE builds a larger plant because it can sell more units of output at a given price.

<sup>3</sup> This approach to the multiplant firm of course stems from Coase (1937). Important discussions are found in Williamson (1975, chaps. 2, 5-7, 9) and Scherer *et al.* (1975).

The most likely example of the first channel of influence on plant size is surely the cost of capital, if one supposes that multinational status can bring a company a favorable cost of capital. In the world described by the Capital Asset Pricing Model (CAPM), of course, we expect that the capital market looks through the enterprise to the ultimate project to be financed. It prices the project's net-revenue stream in a way independent of the characteristics of the enterprise that constructs and operates it. The cost of capital would then be the same for a plant designed for a given location and purpose no matter who builds it. This independence of capital cost from the characteristics of the borrowing enterprise is lost when we recognize any of several factors that the CAPM assumes away – transactions costs incurred by holders of wealth portfolios, bankruptcy costs that weigh upon the enterprise's managers, problems of "agency" and opportunistic behavior by managers, and so forth. Each of these exceptions to the CAPM has its own implications for the multiplant company's access to capital. Transactions costs for shareholders, for example, imply that investors will pay a premium for the liabilities of enterprises that are themselves diversified. Casual evidence suggests that the international diversification of securities portfolios is much less prevalent than simulated optimizations would imply<sup>4</sup>. The cost of capital influencing plant design by an ongoing MNE therefore may be less than the discount rate that would be applied by a single-country enterprise designing the same project. If optimal scale of plant should increase as the opportunity cost of capital declines relative to the costs of other inputs, the MNE would then construct a larger plant. We have no systematic evidence on the relation of optimal plant scale to the cost of capital relative to other inputs, but a positive relation seems likely. We do know that within narrowly defined U.S. manufacturing industries large plants are typically more capital-intensive than small ones (Caves and Pugel, 1980, Table 2).

The second channel by which ownership status can affect plant scale turns on the MNE's apparent advantages in transferring of intangible assets administratively within the firm rather than through arm's-length transactions. When these intangible assets are attached to the physical output of a plant, they not only differentiate its output from those of competing plants but also shift outward the demand curve for the plant's output. A plant controlled by a MNE that can attach an "effective" intangible asset to its output sells more units at a given price than does another lacking this asset, and so the MNE constructs a larger plant if the two use the same constant-average-cost technology. A number of studies have established that the importance of intangible assets to an industry is an excellent predictor of "horizontal" foreign direct investment. One observable indicator of these assets is an industry's advertising-sales ratio, which signals not

<sup>4</sup> See, for example, *Levy and Sarnat (1970)*. According to calculations by *David G. Hartman*, U.S. securities portfolios contain less than one percent of non-U.S. securities, European portfolios somewhat more U.S. securities.

only the established goodwill asset itself but also marketing skills that may allow the firm to replicate the asset in geographically segmented markets. Another indicator is the extent of an industry's research and development activity, for the output of R&D activity is typically an intangible knowledge asset that can be transferred from place to place. In the case of technology we have direct evidence that transfers from one location to another are costly, but more costly to transfer at arm's length than within the MNE (Teece, 1977). In general, the sharing of intangible assets between independent firms is expected to encounter many difficulties of both pre-contract negotiation costs and post-contract haggling and monitoring costs. Numerous statistical studies of variation among industries in the prevalence of MNEs have found that they flourish in sectors where intangible assets are important, or where employees presumably engaged in establishing them are prominent in the industry's labor force<sup>5</sup>.

We have seen that the separation theorem may fail because the MNE's transactional advantages affect the scale of the plants it constructs through both cost and demand influences. These influences probably take many specific forms other than those mentioned in the two preceding paragraphs, although my reading of the literature on the incidence of MNEs suggests that these examples are indeed the most important ones. Nor are these forms of interdependence exhaustive. We know, for example, that patterns of oligopolistic rivalry among actual and potential MNEs can affect their investment decisions. Knickerbocker (1973) found that U.S. companies bunch their foreign investments (both in time and in national market of destination) as a result of imitative behavior in oligopoly, and Graham (1978) found that U.S. investment in Europe led to retaliatory investment in the United States by European multinationals. These forms of oligopolistic behavior should affect the character of investment and the location of production overall. Knickerbocker's pattern, for example, implies an exaggerated shift of output toward the national markets entered by the imitative rivals, and an investment in smaller production facilities than if no such imitation occurred<sup>6</sup>. The dilemma posed by oligopoly for economic analysis is of course that anything can happen. Imitative behavior is not the only pattern, and indeed the literature on international cartels in the interwar period suggests a contrary pattern of spheres of influence and avoidance of direct rivalry among rival MNEs – especially those based in different sovereign nations. In any industry subject to entry barriers this practice of dividing the market could mean fewer plants and smaller total outputs in a given national market than in its absence. Similarly, the international location of production could be distorted away from the one that serves global criteria of cost minimization by considerations of preserving a balance of interests among equally strong rivals.

<sup>5</sup> See Dunning (1973), Caves (1974), Baumann (1975), Pugel (1978, pp. 64–70).

<sup>6</sup> Caves, Porter and Spence (1980, chap. 3) confirm Canadian manufacturing industries with high levels of foreign investment exhibit seller concentration ratios more similar to concentration ratios of their U.S. counterpart industries than do other Canadian manufacturing sectors.

So far we have considered how multinational ownership links can color the long-run pattern of investment and location. The effects are long run not in the sense of abstracting from all fixed factors, but in the sense of invoking only those fixed factors that are fundamental to the existence of multinational companies. The separation theorem may also fail because of strictly short-run properties of the MNE, if it reacts differently from a single-nation enterprise when it adapts its fixed assets to some unexpected disturbance. The multiplant enterprise acquires at each of its operating locations the flow of information about local cost and market conditions that is required for the prudent management of any establishment. One transactional advantage of the MNE is the low-cost dissemination of this information among the company's decision centers – an advantage that derives from the many failures to which the arm's-length marketing of information is subject<sup>7</sup>. Informational advantages place the MNE in a position to enjoy lower costs of adjustment to disturbances than does the single-plant enterprise. These lower adjustment costs may manifest themselves in several patterns of market adjustment. The MNE responds more quickly to a disturbance because it has more confidence in the information on which it acts. It may make fewer mistakes because it operates on better information and thereby incurs lower transaction costs when it must correct mistakes and false starts. The important difference in relation to economic policy is probably the speed of adjustment. Consider, for example, the effect of a rise in the exchange rate of a country whose economy contains a number of production units belonging to MNEs (either parents or subsidiaries). Assume that all parties hold the same expectations about the persistence of the exchange-rate increase. Companies producing traded goods face a general incentive to restrict output or shift their production into non-traded goods. The extent of the optimal contraction may be uncertain, however, because it depends not simply on the exchange-rate change but also on expected future levels of cost (local currency) in other producing locations and perhaps as well (in impurely competitive markets) on reactions expected of foreign producers. Here the MNE's informational advantage can produce either a quicker or more accurate response.

Similarly, the MNE may be in a position to treat as variable certain costs that are treated as fixed by the single-plant or single-nation enterprise. These would be the costs of any inputs contractually attached to the firm but physically mobile among locations. This is another transactional advantage of the MNE: if the balance of market forces favors attaching a given input to an enterprise through a longterm contract, a rent accrues to the enterprise that can adapt the hired input to various uses in the face of varying economic circumstances. A MNE that

<sup>7</sup> The informational advantages of multinational companies appear in clearest profile in arbitrage activities such as grain trading, where the efficient utilization of information is a large part of the firm's activities. See *Caves* (1977–78).

can move such mobile but contractually attached inputs among its plants would close down a given plant that does not cover its remaining fixed costs when a single-nation enterprise, lacking this flexibility, would keep it operating.

## II. Statistical Evidence on the Separation Theorem

In this section we employ Canadian data on differences between MNE-controlled establishments and those controlled by domestic companies in order to test hypotheses suggested by the separation theorem and its exceptions. The tests will focus on differences in plant size and net revenue productivity per employee between MNEs' plants and those of domestic firms. To set the basis for these tests, however, we must first consider the implications of comparing diverse types of establishments that are classified by the industrial census to a common industry.

### *MNEs and Domestic Firms as Strategic Groups*

Why does the typical industry contain some establishment that are controlled by MNEs and some that are not? If the MNE always enjoys some advantages by virtue of the administrative coordination of separate plants, why are not all enterprises multinational (or at least multiplant)? Or if the MNE's advantages prevail only in certain sectors, why is not a given sector either dominated by MNEs or largely free of them? To avoid these corner solutions we must suppose that establishments classified to the same sector do not all carry on exactly the same economic functions. This supposition may be true for the trivial reason that industries as defined in census data lump together firms that in fact operate in different markets. It may also be true for the more interesting reason that directly competing firms employ different "strategies". That is, they commit diverse bundles of resources to the market that they share and hence react in different ways to disturbances affecting that market. Strategic differences are sufficient to explain the coexistence of multinational and single-nation competing firms, and indeed are necessary to validate the research designs that have been employed to explain the varying proportions of industries' activities accounted for by MNEs.

This general proposition about strategic differences and the prevalence of MNEs implies two further propositions that underlie the following statistical analysis:

1. MNEs may earn intramarginal rents to reward their services of multiplant coordination, but these rents at the margin must go to zero in any industry that in equilibrium contains a fringe of non-MNE firms. Symmetrically, non-MNE strategies may also yield intramarginal rents to firms that pursue them. These propositions do not imply that entry barriers limit the expansion of either MNEs or their domestic-market competitors and protect these rents

from erosion. Rather, they suggest that firms may vary in the quality of the particular skills or assets that underlie their strategies.

2. Plants controlled by MNEs should differ systematically and persistently from other plants in ways that reflect the failings of the separation theorem, hypothesized above. Put differently, if the separation theorem holds, we would lack any operational basis for explaining why the plants of MNEs should differ except randomly from the plants of single-nation enterprises, even if the two sets of competitors should on close examination prove to follow distinctive strategies.

If we can explain why rents (and quasi-rents) differ between competing groups of MNE-controlled plants and single-nation plants, we have support for the central hypothesis investigated in this paper – that the MNEs compete with other firms in the typical market, so that the MNEs' investment and location policies may influence but need not dominate the overall allocations attained in the market. And if our hypotheses are correct about the failings of the separation theorem, they should serve to explain the differences we observe between the plants of multinational and single-nation companies.

These considerations suggest many comparative features of MNE-controlled and single-nation firms that could be examined to test propositions about the separation theorem. Several key differences can be examined in data from the Canadian census of manufactures, which since 1969 has distinguished manufacturing and mining establishments by nationality of control (Statistics Canada, 1976). Canada is an attractive site for this investigation for several reasons apart from the availability of these data. Foreign-controlled establishments are quite prevalent, and in 1970 originated 52 percent of all manufacturing shipments. Control by U.S.-based multinationals (42 of the 52 percent) was dominant but not total. Research has been done on the forces determining the shares held by multinationals in Canadian markets, so that we have some empirical ground for employing a research procedure that rests on the strategic-group approach suggested above (Caves, 1974; Baumann, 1975). Canadian public policy has not constrained multinationals in ways that should seriously distort the group differences under investigation here.

Although a number of variables could serve to reveal differences between foreign and domestic establishments, two of them seem particularly strategic for the questions raised in this paper – relative size of establishments (shipments) and relative productivity (value added per employee). Their size differences in Canada are substantial, and in the average industry included in our sample domestic establishment are only 38 percent as large as foreign ones. Aggregate data suggest that this raw comparison is somewhat deceptive, however. For manufacturing establishments employing more than 100 persons there is no systematic decrease in the proportion of value added accounted for by Canadian-controlled establishments as we observe larger and larger size classes. Most small enterprises, however, are under domestic control. Therefore the variation we observe from

industry to industry in the relative average size of home- and foreign-controlled establishments is strongly associated with differences in the relative numbers of small establishments (less than 100 employees) classified to the industry. Relative labor productivity in domestic plants in the average industry is 81 percent of that in foreign-controlled ones (the difference from 100 percent is statistically significant). Domestic-controlled plants are also proportionally lower in wages per production worker (90 percent), the fraction of employees engaged in non-production activities (86 percent), and the ratio of value added to shipments – a measure of vertical integration (96 percent); all but the last of these differences are statistically significant<sup>8</sup>.

### *Relative Plant Size*

We first consider the determinants of the relative size of domestic-controlled establishments, specifically:

*FRS* Shipments per domestic-controlled establishment divided by shipments per foreign-controlled establishment classified to the industry.

Several determinants are suggested by the preceding discussion of reasons why MNEs' plant sizes might be affected by their input costs and demand-increasing intangible assets. On the demand side MNEs' relative plant sizes can be inflated by the presence of product differentiation. This is indicated by either

*ADI* Total advertising costs divided by industry shipments;

or

*CNPR* A dummy variable set equal to one when the industry is deemed to market its goods primarily to household buyers.

Negative relations are expected between *FRS* and either of these two variables. The MNEs' plant sizes might also be inflated (and *FRS* thus reduced) by the prevalence of substantial exports. The information resources of MNEs, in industries for which Canada is a potential exporter, might yield larger profit-maximizing levels of export shipments and therefore larger MNE plant sizes than domestic firms. *FRS* then would be negatively related to

*EXP* Exports expressed as a fraction of domestic shipments.

On the cost side we suggested the influence of favorable capital costs for MNEs as a basis for differences in the sizes of plants they would choose to construct. Previous research on industrial organization suggests that capital-intensity itself matters not so much as the absolute size of the capital investment required to build a plant of efficient scale. To construct this variable a statistical proxy is first estimated for the output level of the minimum-efficient-scale (MES) plant,

<sup>8</sup> To secure the sample of industries used here we excluded a few Canadian standard industrial classification industries that were deemed too miscellaneous and also those for which either domestic-controlled or foreign-controlled establishments accounted for less than 10 percent of shipments. Full descriptions and sources of all variables used in this paper can be found in *Caves, Porter and Spence* (1980, Appendix A).

i. e. for which scale economies in production are apparently exhausted. It is then multiplied by an average assets-to-sales ratio for the industry to convert it into an absolute capital cost:

*CAPC* Shipments level apparently required to achieve minimum efficient plant scale, multiplied by industry assets-to-sales ratio.

We were concerned about this variable because the statistical proxy for MES, taken from the observed plant size distribution, can itself be influenced by policies of MNEs operating in the industry. Therefore we constructed an alternative proxy taken from the plant-size distribution of the United States counterpart industry:

*CAPU* Shipments level apparently required to achieve minimum efficient plant scale in U.S. counterpart industry, multiplied by (Canadian) industry assets-to-sales ratio.

Either *CAPC* or *CAPU* should be negatively related to *FRS*. A doubt intrudes, however, when we reflect that capital-intensity and large MES may be associated with substantial diseconomies of small scale. MNEs then may build large plants, but no viable domestic enterprises would be found building small ones. Our sign prediction then reverses. Hence it is not clear whether *CAPC* or *CAPU* can supply a valid test of the hypothesis originally drawn from the separation theorem.

Two more steps were taken in order to complete the regression model. First, the advantages for the MNE in cost or demand conditions identified here are only the more obvious ones, selected from a much larger set of possibilities. Those other possibilities largely defy embodiment in simple statistical proxies. However, we may be able to provide a general control for their presence by simply including as an independent variable:

*FSE* The share of the Canadian industry's shipments accounted for by enterprises under 50 percent or more foreign control.

The larger the multinationals' share, the greater should be the incidence of advantages not captured by the independent variables so far defined; the sign of *FRS*'s relation to *FSE* should be negative.

Finally, we need to consider the fact noted above that small establishments in Canada are mostly under domestic control, while large ones may or may not be. This observation is consistent with the transactional advantages of the MNE, which obviously run to far-flung and large-scale coordination that is irrelevant to the small business capable of efficiently carrying out some specialized or localized task. A complete model demands some control for the extent to which small enterprises are viable in an industry. One variable is

*PRB* Number of working proprietors in the industry divided by total number of establishments.

The managing owner performs functions that can be filled in the MNE's plant only by a hired manager; *PRB* should thus indicate the viability of small and domestically controlled plants, and hence be negatively related to *FRS*. Another control recognizes the skewed size distribution of plants found in most manu-

facturing industries: some large plants but a greater number of small ones. Where the proportion of small plants is large, there is more scope for viable small domestic establishments, and the industry's average plant size is reduced (if not necessarily the sizes of the largest plants, or the sizes of plants controlled by MNEs). *FRS* should be positively related to

*VPE* Total value added in the Canadian industry divided by number of establishments.

The somewhat complex estimation methods used on this model are described in full in Caves, Porter, and Spence (1980, chap. 2). They were developed in response to two problems. First, for various reasons observations are often missing from industrial census data, and the problem was quite acute with some of the variables included in this model. A special procedure was developed to estimate missing observations. Second, a good deal of simultaneity enters into cross-section relations of the type explored here. Therefore the model was estimated by two-stage least squares with the variables *FSE* and *EXP* treated as endogenous. Thus, Table 1 contains three equations – OLS with the unmodified data base, OLS with the filled-in data base, and TSLS with the filled-in data base.

Table 1  
Determinants of size (shipments) of Canadian-controlled establishments relative to foreign-controlled establishments, Canadian manufacturing industries<sup>a</sup>

| Independent variables   | Estimation method         |                          |                           |
|-------------------------|---------------------------|--------------------------|---------------------------|
|                         | OLS, unmodified data base | OLS, filled-in data base | TSLS, filled-in data base |
| <i>EXP</i> <sup>b</sup> | -0.388<br>(1.66)          | 0.116<br>(0.49)          | -0.118<br>(0.30)          |
| <i>FSE</i> <sup>b</sup> | -0.640<br>(3.16)          | -0.350<br>(2.03)         | -0.522<br>(1.36)          |
| <i>ADI</i>              | -2.93<br>(1.73)           | -4.13<br>(2.34)          | -6.816<br>(2.18)          |
| <i>CAPU</i>             | 0.660<br>(5.67)           | 0.300<br>(4.79)          | 0.485<br>(3.89)           |
| <i>VPE</i>              | 0.431<br>(2.48)           | 0.080<br>(1.08)          | 0.068<br>(0.60)           |
| <i>PRB</i>              | -0.490<br>(2.36)          | -0.726<br>(3.41)         | -0.967<br>(1.88)          |
| Constant                | 0.618<br>(5.09)           | 0.690<br>(5.79)          | 0.828<br>(3.07)           |
| $\bar{R}^2$             | 0.796                     | 0.410                    | –                         |
| F                       | 28.2                      | 10.6                     | 12.0                      |
| Degrees of freedom      | 36                        | 77                       | 77                        |

<sup>a</sup> The figures appearing in parentheses below the regression coefficients are *t*-statistics (signs omitted).

<sup>b</sup> These variables are endogenous in the TSLS estimations.

Of the variants in the substantive specifications suggested above, Table 1 contains what seems to be the most revealing combination. The advertising variable *ADI* is significant (one-tailed test) and has the expected sign in all equations. (*CNPR*, not shown here, performs similarly but is a bit less significant.) *EXP*, however, is not significant and erratic in sign. *CAPU* is highly significant but with the positive sign that we noted might occur if small (domestically-controlled) plants suffer diseconomies of small scale in capital-intensive industries. This effect seems to dominate, and we cannot test the hypothesis originally posed. Another problem with *CAPU* is collinearity with *VPE*; that collinearity is even higher with *CAPC*, and the coefficients for those two variables become quite unstable when *CAPC* replaces *CAPU*. *FSE*, the catch-all indicator of MNEs' advantages in multiplant coordination, is negative as expected and significant, although it weakens in the TSLS equation. *PRB* and *VPE* obtain the expected signs, although only the former is robustly significant. We conclude that there is substantial if not complete support for the hypotheses based on reasons why the separation theorem might fail.

#### *Relative Value Added per Worker*

The other comparative feature to be explored is:

*FRP* Value added per employee in Canadian-controlled establishments divided by value added per employee in foreign-controlled establishments.

An establishment's value added includes payments to labor, the cost of capital's services, certain purchased services, and any differential and monopoly rents accruing to the enterprise. The ratio form of *FRP* should remove the influence of monopoly rents to the industry as a whole, but the other components must all be considered in formulating the independent variables. We shall put a good deal of emphasis on hypotheses about the differential-rent component, which should be affected by the demandshifting intangible assets of the MNE discussed above. These assets may be signalled by the variables *ADI* and *CNPR*, already defined. We also included another advertising-related variable, which recognizes that advertising seems capable of creating barriers to entry and generating substantial rents mainly in the "convenience-good" industries, in which advertising is the predominant source of information used by buyers:

*CONO* Dummy variable equal to one if the industry is deemed to be a consumers' convenience-good industry, zero otherwise.

Other variables that indicate the importance in the industry of rent-yielding assets advantageously handled through transnational ownership links are:

*RDIU* Research and development outlays expressed as a proportion of sales in the United States counterpart industry;

*NPW* Nonproduction employees expressed as a proportion of total employees. U.S. data were used to construct *RDIU* in order to indicate the stock of intangible

technology assets available to the (primarily American) MNEs operating in Canada. *NPW* recognizes that nonproduction employees are the ones chiefly (though not exclusively) responsible for producing and utilizing the firm's intangible assets. Any of these variables should be negatively related to *FRP*, indicating a revenue-productivity advantage for the MNE.

In the determinants of *FRP* we can include a variable that gives us another chance at the hypothesis that MNEs enjoy a capital-cost advantage. The variable draws on the observation that relative prices of capital and labor over the period of the data base clearly made labor relatively cheaper in Canada than in the United States. Firms facing higher costs of capital should choose to construct less capital-intensive plants. If the characteristics of firms affect their costs of capital, MNEs in Canada should typically experience lower capital costs than domestic companies and hence build more capital-intensive plants than their domestic rivals. They should report higher capital rentals per worker. That difference affects individual industries to an extent dependent on the elasticity of substitution between capital and labor: the more readily can labor be substituted for capital as one shifts from United States to Canadian factor prices, the less capitalintensive should Canadian-controlled establishments be relative to their MNE-controlled rivals. Therefore *FRP* should be negatively related to:

*LABI* Ratio of payroll to value added in the Canadian industry divided by ratio of payroll to value added in the U.S. counterpart industry.

Some attributes of industries may be negative as well as positive predictors of the revenue-productivity advantages of MNE-controlled plants. Two hypotheses, admittedly based on loose conjectures, are advanced. First, success in localized industries presumably requires immediate entrepreneurial supervision and tends to nullify the MNE's transactional advantages. *FRP* then should be positively related to:

*REG* Dummy variable equals one if the industry is deemed to sell in regional or local markets, zero otherwise.

Direct entrepreneurial control of the establishment may also be more advantageous in highly uncertain market environments, such as those in which demand is highly variable over time:

*SSI* Standard deviation of value of industry shipments around their logarithmic regression on time.

*FRP* should also be positively related to *SSI*.

Finally, two independent variables were included in consideration of the large difference in average plant size between domestic and MNE-controlled establishments. *FRP* could be low simply because an industry's domestic plants are relatively small and small plants are at a cost (or other competitive) disadvantage. This pattern can be controlled by including two independent variables – *FRS* and a statistical proxy for the revenue-productivity disadvantage of small plants in Canada:

*CDRC* Value added per worker in the smallest establishments accounting for (approximately) half of employment in the industry divided by value added per worker in the largest establishments accounting for the other half.

If the revenue productivity of domestic-controlled plants is low because they are small and small plants are disadvantaged, *FRP* should be positively related to both *FRS* and *CDRC*.

Table 2 reports regression equations explaining *FRP* in the same statistical format used for *FRS*. Among the variables describing the MNE's demand-increasing assets it includes *NPW* and *RDIU* along with *CONO*; we considered *CONO* as a hypothetical alternative to *CNPR* and *ADI*, whose statistical performance was inferior. Of these variables only *NPW*'s coefficient is negative (as expected) and significant throughout. *CONO* is negatively signed and at least

Table 2  
Determinant of value added per worker in domestic-controlled establishments relative to value added per worker in foreign-controlled establishments<sup>a</sup>

| Independent variables    | Estimation method         |                          |                           |
|--------------------------|---------------------------|--------------------------|---------------------------|
|                          | OLS, unmodified data base | OLS, filled-in data base | TSLs, filled-in data base |
| <i>FRS</i> <sup>b</sup>  | 0.117<br>(3.49)           | 0.090<br>(3.29)          | 0.030<br>(0.87)           |
| <i>CDRC</i> <sup>b</sup> | 0.275<br>(1.95)           | 0.077<br>(1.17)          | 0.110<br>(0.79)           |
| <i>LABI</i>              | -0.021<br>(2.21)          | -0.010<br>(1.74)         | -0.012<br>(1.82)          |
| <i>NPW</i>               | -0.282<br>(2.46)          | -0.346<br>(4.09)         | -0.381<br>(3.69)          |
| <i>RDIU</i>              | 0.012<br>(1.34)           | 0.009<br>(1.37)          | 0.013<br>(1.05)           |
| <i>CONO</i>              | 0.024<br>(0.40)           | -0.056<br>(1.73)         | -0.046<br>(1.28)          |
| <i>REG</i>               | 0.019<br>(0.42)           | 0.240<br>(0.79)          | 0.011<br>(0.31)           |
| <i>SSI</i>               | 5.11<br>(1.08)            | -0.490<br>(0.18)         | 0.249<br>(0.08)           |
| Constant                 | 0.758<br>(4.36)           | 0.896<br>(9.34)          | 0.907<br>(6.15)           |
| R <sup>2</sup>           | 0.534                     | 0.404                    | -                         |
| F                        | 6.73                      | 8.02                     | 4.23                      |
| Degrees of freedom       | 32                        | 75                       | 75                        |

<sup>a</sup> The figures appearing in parentheses below the regression coefficients are *t*-statistics (signs omitted).

<sup>b</sup> These variables are endogenous in the TSLs estimations.

weakly significant in the equations using the filled-in data base. *RDIU*'s coefficient takes the wrong sign, for which we have no explanation. *LABI*'s coefficient is negative as expected and significant (one-tailed test). This gives us some support for the hypothesis that the separation theorem fails because the shadow prices affecting the MNE's decisions alter the technology of the plants it builds; recall that we could not detect an analogous influence on plant scale among the determinants of *FRS*. Neither *REG* nor *SSI*, included to expose possible rent-yielding advantages of domestic-controlled establishments, is significant. The variables *FRS* and *CDRC*, included to filter out a size-productivity relationship, are positive as expected but fluctuate in significance from equation to equation. Since they are endogenous in the model, their loss of significance in the TSLS equations may indicate that their success in the OLS equations rested on a simultaneous-equations bias<sup>9</sup>. We conclude that the analysis of *FRP*'s determinants offers some support for the hypotheses that the separation theorem fails on both the demand and cost sides.

### III. Summary and Conclusions

Most investigations of the MNE's investment and location choices concentrate on the factors that influence its decisions. This study has come from the other end, so to speak, by inquiring whether the MNE's decisions affect the pattern and scale of production in the industries where it operates. The organizational theory of the MNE treats it as a transactional phenomenon, yielding what we have called the "separation theorem": the creation and adjustment of ownership links among establishments need not affect scales of output or allocations of tangible inputs in national product markets, which are determined by the traditional forces of location and comparative advantage. The theorem is falsified if the MNE's transactional advantages affect the scale or productivity of the plants it operates. If we find the theorem falsified, we expect the MNE's decisions to affect the output levels of national industries and the international location of production as well.

Our statistical evidence from Canadian manufacturing industries gives appreciable although incomplete support to statistical hypotheses derived from failures of the separation theorem. We analyzed differences between the plants of MNE-controlled and Canadian-controlled companies and found that significant differences not only exist but also can be substantially explained by variables indicating failures of the separation theorem and other appropriate controls. MNEs in Canada behave as if favorable shadow prices of capital influence their decisions on the capital-intensity of their Canadian plants. The revenue pro-

<sup>9</sup> In the equation for *FRP* we did not follow the practice with *FRS* of including the MNEs' market share (*FSE*) as a catch-all variable to register otherwise unmeasured transactional advantages of the MNEs. Since the correlation between *FRP* and *FSE* is negative and significant (-.261), the maneuver might have worked.

ductivity of their plants is increased in industries where their transactional advantages with intangible assets are large, and these same demand increasing intangible assets enlarge the scale of their plant outputs. Therefore it does indeed appear that the MNE's transactional presence matters for the allocation of resources.

These findings are admittedly somewhat remote from the questions usually addressed to the MNE's investment and location decisions. However, our findings do imply certain limited and qualified answers to those questions:

1. Is the presence of MNEs in a given national industry likely to increase that industry's output, in long-run equilibrium? We have not tested the relation directly, but the findings reported above do imply an affirmative answer. MNEs' transactional advantages seem to account for their relative prevalence in various sectors. Where they are present these transactional advantages seem to cause them to operate larger and more productive establishments than would single-nation firms. By implication, the national industry's equilibrium output would be larger than otherwise.

2. Does the presence of MNEs in a given national industry change the rate at which the industry responds to disturbances? There seem to be two schools of thought on this question. Those impressed by the transactional advantages of the MNE infer that adjustments to disturbances are accelerated by their presence, or made more accurate on the average. Those impressed by the scope for non-profit-maximizing behavior in large and secure enterprises suspect that adjustments are retarded and resource allocation left in nonoptimal patterns. Our findings do something to affirm the transactional and information advantages but do not exclude the latter effect.

3. Do the activities of MNEs reallocate stocks of factors of production among nations and thereby influence total (as well as sectoral) outputs? Here our evidence is less revealing, but the transactional approach does have a noteworthy implication. It locates the MNE's essence in the tasks of coordinating and efficiently displacing market transactions. These activities do not depend on international movements of capital and labor (as conventionally conceived). A MNE cannot exert control over a foreign establishment without having exported equity capital, of course, but it need only borrow in local currency as a hedge against its risk in order to offset the net capital flow. A MNE's transfers of intangible skills among its establishments normally involve some movement of personnel, but these movements may be temporary, and survey evidence typically shows that most employees of foreign-controlled plants are nationals of the country in which the plant is located. The failures of the separation theorem tested in this paper do nothing to modulate the implication that the MNE is not itself an important force for changing international allocations of factors of production.

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## Zusammenfassung

### *Investitions- und Standortpolitik multinationaler Unternehmen*

Caves untersucht in seinem Diskussionsbeitrag, inwieweit Investitionsentscheide und Standortwahl multinationaler Unternehmen mit einer Nettoumverteilung von Ressourcen zwischen den beteiligten Ländern einhergeht. Er setzt sich damit bewusst von der traditionellen Fragestellung ab, die sich auf die Bestimmungsfaktoren der Standortwahl konzentrieren. Caves rollt die Fragestellung umgekehrt auf, indem er vom Separationstheorem ausgeht. Diese Hypothese besagt, dass der transnationale Zusammenschluss von Betrieben nicht die Höhe der Produktion und die Allokation materieller Ressourcen auf den nationalen Märkten zu beeinflussen braucht, sondern dass diese weiterhin vom komparativen Vorteil bestimmt werden. Mögliche Abweichungen von der Separationshypothese werden von Caves anhand von kanadischen Daten getestet. Aufgrund der vorliegenden Daten wird festgestellt, dass das Wesen der multinationalen Gesellschaften in der Aufgabe besteht, Markttransaktionen zu koordinieren und räumlich effizient zu verteilen. Diese Aktivitäten hängen jedoch nach Caves entgegen der bisherigen Anschauung nicht von internationalen Kapitalbewegungen und Arbeitskräftewanderungen ab. Er schliesst daraus, dass die von ihm getesteten Abweichungen nicht in der Lage sind, die Separationshypothese zu falsifizieren.

## Résumé

### *Politique d'investissement et de localisation des entreprises multinationales*

Les analyses décisionnelles faites par les sociétés multinationales en matière d'investissement et de localisation tiennent comme implicitement établi que lesdites décisions influent de façon significative sur l'allocation des ressources au sein et parmi les industries nationales. Cependant, bien des recherches sur les multinationales caractérisent ces dernières en tant que chaînons de transaction entre unités de production. Sous des suppositions restrictives ces liens administratifs n'affectent en rien l'allocation des ressources physiques («théorème de séparation»). Les raisons pour lesquelles le théorème de séparation ne serait pas pertinent proposent des hypothèses sur les différences existant entre entreprises nationales et celles sous contrôle étranger dans le cadre des industries manufacturières canadiennes. Leurs conclusions rejettent le théorème de séparation et ouvrent la voie enchaînant les décisions des multinationales aux effets directs sur l'allocation des ressources.

## Summary

### *Investment and Location Policies of Multinational Companies*

Investigations of the multinational firm's investment and location decisions implicitly assume that these decisions significantly influence the allocation of resources within and among national industries. However, much research on multinationals characterizes them as transactional links among production units. Under strong assumptions these administrative links do not affect the allocation of physical resources (the "separation theorem"). The reasons why the separation theorem may not hold suggest hypotheses testable on differences between foreign-controlled and national-company plants in Canadian manufacturing industries. The findings reject the separation theorem and pave the way for linking the multinational's decisions to net effects on resource allocation.