

**Internalization Costs and the Multinational Firm:
An Empirical Analysis**

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ABSTRACT

Host country policies restricting the activities of business enterprises owned by foreign multinationals are purported to be a central factor affecting the investment behavior of multinational firms. For example, policies stipulating that subsidiaries of foreign multinationals use domestically produced components, export a share of host country production, or divest themselves of foreign ownership raise the cost of internalizing transactions within a multinational firm relative to an arms-length contract. Previous studies of the issue have evaluated the hypothesis that multinational firms will internalize transactions through subsidiaries rather than arms-length contracts when control is particularly important (e.g., advertised reputation goods, high technology goods). Our analysis builds on the existing literature by taking a somewhat different approach; we search for evidence that specific host country policies raise the cost of internalized transactions, while previous studies have searched for evidence that particular types of transaction require the greater control associated with internalization. Our analysis utilizes panel data on FDI by Japanese and US multinational firms in 30 countries over the years 1982 through 1988. One of our central findings is that direct investment by Japanese multinationals in foreign subsidiaries is much more sensitive to import restrictions and local content requirements than that of US multinationals. This result strongly supports arguments from the multinational firm literature that the Japanese keiretsu system of industrial organization features far stronger vertical relationships with input suppliers than those that exist between US firms.

I. INTRODUCTION

The internalization of international transactions between multinational firms and their foreign subsidiaries is an increasingly important element of international trade and economic development. The United Nations' World Investment Report 1992 notes that there are more than 35,000 multinational firms, which together have in excess of 150,000 foreign subsidiaries. The report estimates that aggregate foreign direct investment (FDI) by multinational firms in foreign subsidiaries amounted to \$225 billion in 1990, and that during the period from 1985 to 1990 global FDI grew at twice the rate of aggregate domestic investment. Importantly, internalized transactions between multinational firms and their foreign subsidiaries are estimated to account for approximately 25 percent of world trade. The report argues that there has been intensified international competition for FDI, and that host country policies regarding foreign-owned business enterprises are a central factor affecting the investment behavior of multinational firms. The testable implication is that the more restrictive a particular host country's policies are toward the subsidiaries of foreign multinational firms, the smaller is the amount of FDI made in that country.¹

In this paper we use empirical methods to investigate the hypothesis that various host country policies restricting the subsidiaries of multinational firms raise internalization costs and thus reduce FDI flows. To illustrate, consider the policy of requiring subsidiaries to use locally-produced components in their production process. Such a policy may increase production costs, destroy valuable quasi rents associated with existing component supply relationships, and impose search costs on multinationals seeking a satisfactory host country supplier. These costs in turn can be expected to motivate firms to seek alternative means of organizing transactions. For example, production in a particular host country market can also be accomplished with an arms-length licensing or franchise contract with a host country firm, while sales in a host country market can be transacted through the use of exports. Moreover, the restrictive policies of one country may be avoided by locating subsidiaries

in less restrictive host countries. We also consider the effect of traditional economic variables on FDI. Following Eaton and Gersovitz (1984) and Kravis and Lipsey (1982), among others, we hypothesize that traditional economic factors also affect the investment decisions of multinational firms. In particular, low factor prices and corporate tax rates, high quality infrastructure, and large markets are all favorable economic conditions that can be expected to attract FDI projects.

There have been relatively few studies attempting to estimate the effects of individual host country policies on the behavior of multinational firms, in part because of the difficulty involved in obtaining measures of policy restrictiveness.² The policy restrictiveness measures that we use are derived from annual "country scores" assigned by the Country Assessment Service of the firm Business International, Inc. (BI) to rate the restrictiveness of various host country policies, which are described in section HI below. Scores range from 0 to 10, with higher scores corresponding with policies imposing fewer restrictions on the foreign subsidiaries of multinational firms. This policy data set is relatively unexplored.³ Estimation of a significant positive coefficient for a particular policy means that lower score values (more restrictive policy) reduce FDI, and can be construed as evidence that the particular policy imposes internalization costs on multinational firms.

Our analysis utilizes panel data on FDI by Japanese and US multinational firms in 30 countries over the years 1982 through 1988. We find substantial support for the hypothesis that import restrictions and local content requirements impose meaningful internalization costs on multinational firms investing in restrictive host countries (section IV). Surprisingly little evidence is found for the notion that minimum export requirements, expropriation, and a privileged environment for local firms impose significant internalization costs. Moreover, policies limiting foreign ownership shares only generate FDI internalization costs in very limited circumstances. Of the traditional economic variables we consider, infrastructure quality is found to be a central determinant of FDI in a wide range of circumstances, while larger market size and lower labor costs and tax rates increase

FDI in more restricted circumstances.

One of our most striking results has to do with our comparative analysis of the sensitivity of FDI by Japanese and US multinational firms to specific host country policies. In particular, it is argued in the multinational firm literature that the Japanese keiretsu system of industrial organization features far stronger vertical relationships with input suppliers than those that exist between US firms. Thus we hypothesize that local content requirements and import restrictions placed on affiliates of foreign multinationals will impose higher internalization costs on Japanese firms relative to US firms. FDI by Japanese multinationals is found to be much more sensitive to import restrictions and local content requirements relative to US multinationals, which supports the comparative hypothesis regarding the nature of vertical relationships in Japanese and US industry. We are not aware of another empirical study that similarly tests the hypothesis that vertical relationships in Japanese industry are stronger than those in US industry.

II. BRIEF OVERVIEW OF THE LITERATURE

Transaction-cost theories of FDI have identified a number of circumstances in which internalization is expected to be an efficient means of organizing transactions. McManus (1975), Buckley and Casson (1976), Rugman (1981), and Caves (1982), among others, have argued that an independently owned host country firm is more difficult to monitor and control through an arms-length contract than is an integrated subsidiary unit of a multinational firm. When monitoring and control are important, such as in transactions involving knowledge-based assets (technology) where agency problems may be particularly acute, transaction costs are more likely to be minimized when the multinational firm owns the foreign facilities that it utilizes in production.⁴ Empirical support for this hypothesis is somewhat mixed. Mansfield and Romeo (1980) and Davidson and McFetridge (1984) find that the probability of intermediate goods being transferred internally rather than through

an arms-length contract is higher when newer technology is to be transferred. In contrast, Gatignon and Anderson (1988) find only a weak linkage between technology transfer and internalized transactions. Benvignati (1990) offers evidence that undercuts the internalization hypothesis, finding that the presence of shared reputational assets or high technology contribute little added explanation for the observed pattern of internal versus arms-length exchanges.

Another situation that is thought to favor the acquisition of an ownership stake in foreign production facilities arises from firm-specific reputational assets shared by the parent firm and the foreign subsidiary. These transaction-cost issues have been studied in the context of services franchising, where parent firm ownership of retail outlets is most likely when the incentive to underinvest has the greatest potential for damaging the reputational asset.⁵ Hennart (1982) and Horstmann and Markusen (1987) develop models in which FDI rather than franchising (licensing) arises to attenuate the transaction-costs associated with underinvestment by foreign franchisees who are difficult to monitor and control. Gatignon and Anderson (1988) and Gomes-Casseres (1989) find that ownership stakes rise as a function of advertising intensity, which is consistent with the notion that advertising creates a product-specific asset, and that internalization protects that asset.

Thus our empirical analysis of the internalization hypothesis, to which we now turn, differs from much of the past empirical work on the issue in that instead of testing for hypothesized benefits of internalization associated with control, we test for policy-based internalization costs.

III. FRAMEWORK FOR ANALYSIS

This section establishes the analytic framework to be used in section IV for estimation. We begin in III. with a motivating description of the various estimation models to be used. We then follow in III. B with a description of the policy and traditional variables that are used in our estimation model, including an explanation of the scoring technique used to measure these variables. We end in

III.C with predictions that relate the sensitivity of **FDI** by Japanese multinationals to **that** of US multinationals.

A. Estimation Models

We seek to estimate the relationship between FDI (measured in US dollars) and various policy and traditional variables (described in m.B. below) using a panel data set consisting of FDI flows from the United States and Japan to 30 countries from around the globe.⁶ Using the panel data we estimate a log-linear investment function that regresses the logarithm of \$FDI on the logarithm of each of the independent variables:⁷

$$I_{it} = \alpha + \beta \cdot X_{it} + e_{it} \quad (1)$$

where $i = 1, \dots, n$ is the number of host countries, and $t = 1, \dots, T$ is the number of observations in the sample. I_{it} represents US or Japanese investment in country i in period t . The X 's are the independent policy and traditional variables.

The panel structure of the data allows us to estimate three different regression models; a pooled regression model, a fixed effects model, and a random effects model. These models are described in detail in the appendix below. The pooled regression model involves estimating equation 1 without making any modifications, and so is based on the assumption that there exists no difference between the n countries. In contrast, the most common formulation of the fixed effects model (which we employ) assumes that differences across countries can be captured by the differences in the constant term in equation 1. By imposing country dummies we measure the within-country variation over a given period of time. The assumption is that country effects are specific and not random. Finally, the random effects model is constructed under the assumption that the constant term in

equation 1 is random, and so provides a solution intermediate between the pooled and the fixed effects models. After conducting the pooled, fixed, and random effects regressions, we then carry out diagnostic tests to determine which of the models best represents the underlying relationships in the data, and report that model in the analysis below.

That "best" model is used in separate regressions for developing countries, developed countries, and the joint sample of all developing and developed countries. The regression coefficients obtained from log-linear estimation provide us with direct estimates of the investment elasticities for various policy and traditional variables.

B. Description of Independent Variables and their Predicted Effects

In this section we describe the policy and traditional variables used in our empirical study, and their predicted effects on investment by multinational firms in foreign subsidiaries. These data have been generated by the Country Assessment Service of BI to provide business clients with annual country rating scores for a variety of social, political, and economic factors that might be relevant for FDI decisions. These variables are measured on a 0-10 scale, and the higher the score the more favorable is the policy or traditional economic circumstance predicted to be for FDI.⁸

Table 1 provides a description of each independent policy variable. The scaling criteria are described in Table 2. The policy variables investigated here were selected from a relatively large set of country score variables in the BI data bank based on the criterion that the particular policy restriction only apply to foreign multinationals and their subsidiaries.⁹ The lower is a particular score in Table 2 the more restrictive is the policy toward subsidiaries of foreign multinationals. The comparative-static prediction is that as these internalization costs rise, firms become increasingly likely to choose alternative institutional structures for organizing their international transactions. While internalization costs are not directly observable, the observable implication of this comparative-

static hypothesis is that FDI flows should be positively related to score values. Table 3 provides a description of each independent traditional variable. These variables are also expressed as scores, and this scoring is described in Table 4.

C. Relative Sensitivity of US and Japanese Multinational Firms to Host Country Policies

We now turn to more specific predictions for differences in the sensitivity of Japanese and US multinationals to certain host country policies. We first predict that FDI by Japanese multinationals will be more sensitive to import controls and local content requirements than that of US multinationals. The reason is that Japanese firms have very close and long-term contractual relationships with their input suppliers relative to US firms. Vernon's (1985) historical analysis is revealing:

"Until World War II, 6 or 8 clusters — the so-called Zaibatsu — made up most of Japan's modern industry. After World War II, Japanese firms continued to be linked in a large number of clusters of a looser sort — the so-called Keiretsu. One consequence of that structure was that most Japanese firms which were users of intermediate materials were linked to Japanese suppliers by vertical ties...." (p. 11).

Similarly, as Aoki (1984) reports, much of Japanese industry has been organized around capital keiretsu groups, which link a dominant parent corporation with many satellite subcontractors through share holdings and vertical relationships. Reciprocal relationships within the capital keiretsu result in extensive interfirm trade credits and share holdings, and mutual favoritism (kashi-kari-kankei) is a widespread practice. Members of the capital keiretsu group tend to specialize in complementary activities such as R&D, parts manufacture, and the assembly of these parts into final products. Ozawa (1991) asserts that the tight vertical relationships binding Japanese firms has had an effect on the way in which keiretsu members coordinate their FDI projects:

"Both downstream firms (final assemblers) and upstream firms (parts/component manufacturers) in tandem have recently begun to advance overseas.... This move represents the strategic response of Japan's assembly-based multinationals to the local content requirements increasingly imposed by both the US and Europe..." (p. 136).

Cable and Yasuki (1985) provide further evidence of tight vertical relationships in Japanese industry:

"Trading relationships between members of the same [Japanese] business group would be subject to less uncertainty and risk than with outsiders, because of the greater information held by each trading partner about the other, and the feelings of group loyalty that are likely to exist between them. ...[T]he diversified nature of the groups' activities means that the scope for securing intermediate goods supplies and market outlets within the group will often be large" (p. 404).

Mody (1993) similarly argues that "[t]he Japanese firm is the best-documented nexus of network alliances", and "[sub]contracting relationships with suppliers are not only for acquiring inputs but also for learning" (p. 154).

Finally, it has been argued that these vertical relationships between Japanese multinationals and their keiretsu subcontractors are stronger than those of multinationals from other countries. The comments of Froot (1991) illustrate:

"Japanese manufacturing affiliates tend to avoid using domestic suppliers, importing roughly three times as much per worker as other foreign manufacturing affiliates in the US. Evidence on Japanese affiliates in Australia suggests that they purchase their capital goods almost exclusively from Japan, whereas other foreign affiliates in Australia purchase from nations other than their home" (p. 22).

Import controls and local content requirements are thus predicted to entail greater internalization costs for FDI by Japanese firms because of the dependence that final goods producers have on their domestic subcontractors within the capital keiretsu network. Either (i) productivity is harmed by breaking off relations with subcontractors, (ii) penalties are paid to continue subcontracting relationships, or (iii) the added cost of vertically coordinating FDI by various members of the keiretsu group must be borne.

Differences in the criteria used to tabulate US and Japanese FDI data suggest additional sensitivity predictions. The US Department of Commerce tabulates US FDI data for capital expenditures on majority-owned foreign subsidiaries. In contrast, the Japanese Ministry of Finance tabulates FDI data for capital expenditures on both majority and minority-owned foreign subsidiaries. Based on this difference in data collection, FDI by Japanese firms may actually be less sensitive to

host country policies restrictive of foreign ownership, since that data allows for investment in foreign production facilities that are majority-owned by local companies. Minority foreign ownership may be a necessary adaptation to restrictive host country policies.

IV. ANALYSIS OF THE DATA

Data on US FDI is tabulated by the US Department of Commerce and published in the Survey of Current Business. In contrast, data on Japanese FDI is not published, and was made available to us by the Japanese Ministry of Finance. Data on explanatory variables has been selected from the data bank of Business International. We begin by describing the estimated effects of policy and traditional variables on FDI. After presenting the regression results, we compare these results to the internalization-cost predictions and discuss their economic implications.

A. Regression Results

We begin by reporting the regression results for FDI by Japanese multinational firms, followed by that of US firms. The coefficient of variation for the each of the independent variables used in the analysis is given in the appendix. Separate regressions are reported for the subsample of developing countries, developed countries, and the overall sample containing observations from both developing and developed countries. We report the regression results for FDI by Japanese multinational firms in Table 5. Based on the LM and Hausman test we find evidence for random effects in the estimation, and were able to reject the pooled regression and fixed effects models. Thus the regression results reported in Table 5 are based on log-linear, random effects estimation models.

The analysis finds considerable variation in the effects of policy and traditional variables on FDI by Japanese multinationals across the three regressions. First consider the regression for developing countries. Higher score values for restrictions on imports and local content requirements

imply less restrictive policy, and are found to significantly increase Japanese FDI in developing countries. Both elasticities are estimated to be greater than one, but local content requirements have a particularly large elasticity (4.1). The regression analysis estimates that higher score values for currency convertibility (less restrictive policy) actually reduce FDI, an unanticipated result. We will discuss this result in greater detail below. Lower labor costs and higher quality infrastructure both significantly increase FDI in developing countries. These elasticity values are also both greater than one, with quality of infrastructure having a very large elasticity (5.72).

The estimated effect of policy and traditional variables on FDI by Japanese multinationals in developed countries differs from that of developing countries in several important ways. First, limits on foreign ownership are estimated to have a large and significant effect on Japanese FDI in developed countries, as are market size and low corporate tax rates. Second, a significantly negative constant term together with generally larger estimated coefficients reflect a steeper regression equation. As with developing countries, less restrictive local content requirements and higher quality infrastructure both increase FDI. Finally, in the joint sample of developing and developed countries, a more favorable score for restrictions on imports, local content requirements, and quality of infrastructure all significantly increase FDI by Japanese multinationals, while a more favorable score for restrictions on convertibility of currency is estimated to decrease FDI by Japanese firms.

We report the regression results for FDI by US multinational firms in Table 6. Based on the Hausman test we were able to reject the hypothesis of no random effects for the analysis of FDI in developing, developed, and all countries. As with the regressions reported for FDI by Japanese multinationals, the regressions reported in Table 6 are based on random effects estimation models. The policy and traditional variables under analysis are estimated to have a much smaller effect on FDI by US multinationals. More favorable scores for restrictions on imports and quality of infrastructure are both found to increase FDI by US multinationals in both developing and developed countries.

More favorable scores for currency convertibility restrictions increase FDI by US firms in developed countries, and market size is found to increase FDI in the pooled regression.

B. Discussion

A central question addressed in this paper is the extent to which particular host country policies increase the costs of internalizing transactions, and thus reduce FDI flows by multinational firms. The analysis suggests that significant and economically important internalized transaction costs are generated by restrictions on imports and local content requirements, particularly for Japanese multinationals. To see this, note first that local content requirements are estimated to have no significant effect on FDI by US firms, while in contrast local content requirements have highly significant and very large elasticity effects on FDI by Japanese firms. Second, while import restrictions do have highly significant effects on FDI by US firms, the estimated elasticities are less than one-half the size those estimated for Japanese firms (except for the case of import restrictions in developed countries).

These differences in the influence of policies specifying import restrictions and local content requirements on Japanese and US multinational firms are largely consistent with those predicted to occur as a consequence of the tight keiretsu organizational network in Japanese industry. While the coordinating benefits of the keiretsu system have been clearly argued by Aoki (1984), Ozawa (1991), and others, our analysis suggests that the keiretsu system is relatively vulnerable to host country policies restricting input sourcing. Such policies either encourage multinationals to invest elsewhere, to bear the added cost of host country input sourcing, or having their former input suppliers invest in component manufacturing facilities in the same host country as the downstream (multinational) component buyer. Ozawa (1991) offers evidence that such tandem FDI by Japanese multinationals and their upstream component suppliers has become increasingly important. The added costs of

vertically coordinating FDI is itself a transaction cost associated with internalized exchange.

Of the remaining host country policies considered here, those implying expropriation or a privileged environment for local firms are not found to generate significant internalization costs. Others such as export requirements and limits on foreign ownership are found to generate internalization costs that are either marginal or limited to rather narrow circumstances. Recall that the FDI data for US multinationals only includes observations on majority-owned subsidiaries, while Japanese FDI data includes all foreign investment projects. Thus if limits on foreign ownership have a greater or more significant impact on FDI by US multinationals relative to Japanese firms, such a result would be consistent with problems caused by differences in data collection. In fact, the policy of limiting foreign ownership is estimated to have no significant effect on FDI by US firms, and only has a significant effect on FDI by Japanese firms in developed countries. As a consequence we do not find evidence that differences in data collection criteria across Japan and the US affect the regression results.

Host country policies restricting the conversion of host country currency are found to actually increase FDI by Japanese multinational firms, a result that undercuts the internalization prediction. To investigate this issue in greater detail, we disaggregated the analysis to the country level. We found that of the 30 countries in our sample for FDI by Japanese multinational firms, convertibility scores were negatively correlated with Japanese FDI in only five — Chile (-.9), Mexico (-.11), the Philippines (-.57), Thailand (-.37), and Venezuela (-.20) — all of them developing countries.¹⁰ Zero or positive correlation coefficients were calculated for the other 25 countries. These findings suggest that the perverse effect of convertibility restrictions on Japanese multinationals is rather narrow as opposed to general in scope, and that case study analysis of convertibility restrictions at the individual country level may be fruitful in future research.

It has been argued that during the 1980s Japanese multinationals used FDI as a substitute for

exports into developed countries with large markets, especially the US. In contrast, many US firms are said to have used FDI in developing countries as platforms from which to export finished goods into developed countries with large markets (e.g., the US market).¹¹ Based on this argument, host country market size should be more important to Japanese multinationals, while in contrast US multinationals may find that minimum export policies of developing countries imply little if any internalization cost. Our analysis offers some support for this argument. First, we find a large (2.53) and highly significant coefficient on market size in the regression for Japanese FDI in developed countries. In contrast, market size is not significant for US FDI in developed countries, and is significant but small (.38) in the regression for the overall sample. Second, the estimated coefficient on export requirements is negative (-.34) and marginally significant (p-value = .14) in the regression for FDI by US multinationals in developing countries. Similar results with slightly greater significance are found for the regression addressing FDI by US multinationals in the overall sample of host countries. These results offer support for the claim that there is some tendency for Japanese multinationals to use subsidiaries to penetrate host country markets, while the tendency for some US multinationals is to use their foreign subsidiaries as a platform from which to export goods.

In a recent theoretical study of FDI, Raff (1992) offers empirical predictions regarding the relationship between expropriation policy and a host country's economic characteristics. In Raff's model, host countries view expropriation as one of several instruments, including taxation, for extracting value from multinational firms. The host country trades off extracting value from multinationals against discouraging FDI with highly extractive policies. First, Raff predicts that countries with relatively high tax rates put multinationals at relatively low risk of expropriation since taxes are already being used to extract value, and high tax and high expropriation probability will excessively drive away investment. Second, countries with relatively high labor costs are predicted to generate relatively less risk of expropriation, since high wages and high expropriation likelihood will

excessively drive away investment. We evaluate these predictions by calculating the correlation coefficient between (i) expropriation score and corporate tax rate, and (ii) expropriation score and manufacturing wage rate.

For (i) we find a correlation coefficient of .14, which is significant below the 5 percent level ($t=2.03$).¹² A positive correlation means that high risk of expropriation (low expropriation policy scores) is positively related to high tax rates (low tax rate scores). This small positive correlation somewhat undercuts Raff's prediction that countries with policies of relatively frequent expropriation will tend to also have relatively low corporate tax rates. In contrast, for (ii) we find a correlation of -.55, which is significant at well below the 1 percent level ($t=9.4$). This latter result strongly supports Raff's prediction that low wage countries are more likely to engage in expropriation. Thus our analysis offers somewhat mixed support for Raff's predictions.

Of the traditional variables we include in our analysis, the quality of a host country's infrastructure is found to have the most important implications for FDI by both Japanese and US multinational firms, and in both developing and developed countries. The estimation generally yields large and highly significant elasticities. As one would expect, the significance of infrastructure quality is higher in developing countries relative to developed countries. It is instructive to compare our results for the effect of traditional variables on FDI flows to those from the empirical literature. Kravis and Lipsey (1982) have analyzed the importance of market size and labor cost in influencing FDI by US multinationals. They conclude that while market size significantly increases FDI from US multinationals, labor cost has played a relatively minor role. We similarly find that while market size significantly increases FDI from US multinationals in our overall sample, labor cost have no significant affect.¹³ In terms of the effects of corporate tax rates on FDI, Graham and Krugman (1991) conclude from cross-sectional evidence that changes in tax rates in the US have not been important in influencing the inflow of FDI into the US. A similar observation is made by Shah and

Slemrod (1990) in a study of FDI in Mexico. Wheeler and Mody (1992) also report that taxes have an insignificant impact on FDI by US multinationals. However, Grubert and Mutti (1989) find some evidence for sensitivity to relative tax rates in a study of US multinational investment in Canada. Our results are also rather mixed; corporate tax rates generally are insignificant, except for FDI by Japanese multinationals in developed countries, where more favorable tax scores (lower tax rates) significantly increase FDI.

V. CONCLUDING COMMENTS

To what extent do host country policies restrictive of foreign-owned subsidiaries result in meaningful internalization costs that significantly retard FDI projects? Our analysis of BI policy restrictiveness data offers some clues. Of the host country policies considered here, our results suggest that import restrictions and local content requirements are the most important sources of internalization cost for multinational firms. FDI by Japanese multinationals is found to be much more sensitive to import restrictions and local content requirements relative to US multinationals, which supports the argument that the Japanese keiretsu system features stronger vertical linkages with import suppliers. These results may have policy implications for host countries that are molding policies to attract FDI. The clearest result of our analysis is that countries attempting to attract FDI from Japanese multinational firms should focus on relaxing local content requirements and investing in infrastructure. The policy implications for attracting FDI from US firms are less clear.

One of the more surprising results of our analysis is that the marginal impact of expropriation policy on FDI is insignificant. One plausible explanation is that by and large the countries in our sample engaged in relatively little expropriation during this period; the mean country score for expropriation was approximately 9 (out of 10 maximum) in the various sample; this was the highest mean score of all the policy variables included in our sample. Moreover, the coefficient of variation

for expropriation is only 5.6. It is possible that the relatively small variation in the generally favorable expropriation policy observed in the countries making up our sample is not economically significant.

Most empirical studies of the internalization hypothesis have largely focused on the issue of control (e.g., advertised reputation goods, high technology goods). In contrast, there has been relatively little empirical research addressed to the question of whether particular host country policies restricting foreign subsidiaries of multinational firms imply internalization costs that in turn reduce FDI flows. The difficulty of measuring the restrictiveness of individual host country policies directed at foreign subsidiaries is a formidable barrier to such research, and one approach to this problem has been to construct aggregate "country risk" indices.¹⁴ One recent empirical study of the internalization hypothesis that has included aggregate policy measures is Gagnon and Anderson (1988). They construct a "country risk" dummy variable based on the degree that "a country's political, cultural, and economic environment threatens the stability of a business operation" (p. 315). Thus in contrast to our work, which investigates policies directed at the activities of multinational firms, their risk variable is not specific to the activities of foreign subsidiaries, and so raises costs on domestic as well as foreign-owned firms.¹⁵ They sorted countries into high, medium, and low risk categories, and found that the higher the risk category the lower the degree to which a foreign affiliate was owned by a multinational firm. Importantly, they also found that a dummy variable identifying the six countries with the greatest legal restrictions against foreign ownership also was inversely related to FDI.¹⁶ Thus by estimating the response of FDI flows to policies restricting the activities of subsidiaries, we provide a new approach to measuring internalization costs, and thus to understanding the choice between direct investment, arms-length contracting, and other alternative arrangements for organizing international transactions.

APPENDIX

Panel Estimation Models:

As mentioned in section III above, the panel structure of our data allows us to estimate three different regression models; a pooled regression model, a fixed effects model, and a random effects model. First, the pooled regression model involves estimating equation 1 without making any modifications, and so is based on the assumption that there exists no difference between the n countries, and is subject to the following constraints:

$$E(e_{it}) = 0 \quad E(e_{it}^2) = \sigma^2, \quad E(e_{it}, e_{js}) = 0 \quad \text{if } t \neq s, i \neq j$$

In contrast, the most common formulation of the fixed effects model assumes that differences across the n countries can be captured by the differences in the constant term in equation 1. By imposing country dummies we measure the within-country variation over a given period of time. The assumption is that country effects are specific and not random. Thus, we have:

$$I_{it} = \alpha_i + \beta \cdot X_{it} + e_{it} \tag{2}$$

Finally, the random effects model is constructed under the assumption that the constant term in equation 1 is random, and so provides a solution intermediate between the pooled and the fixed effects models. The random effects model is estimated using the generalized least squares technique. The equation we estimate is given by:

$$I_{it} = \alpha + \beta X_{it} + U_i + e_{it} \tag{3}$$

where U_i is the random disturbance characterizing the i th country and is assumed to be constant over time. These U_i , which are randomly distributed across the various countries, can be viewed as the collection of factors outside the regression that are specific to the country.

As the variation in the explanatory variables widens across the countries, we would expect the weight given to the between-group variation to converge towards the value of one. However, as long as this weight is not equal to one the OLS estimate will be 'inefficient'. To analyze the importance of this inefficiency, we carry out an LM test (Breusch and Pagan, 1980) to examine the following hypothesis:

$$H_0 : \sigma_u^2 = 0 \quad \text{against} \quad H_A : \sigma_u^2 \neq 0$$

If the null hypothesis is not rejected, we can fully justify a weight of 1 to the between-country variation and hence, the OLS estimate, which is BLUE, would suffice. However, if the null

hypothesis is rejected, we need to do away with the OLS estimates and rely on the REM.

Having established the presence or absence of country-specific effects, we test for whether these effects are fixed or random by carrying out the Hausman test (see Hausman, 1978). The test is based on the null hypothesis of no correlation between country-specific effects and the regressors in the estimated equation. Under this null hypothesis the OLS estimate in the fixed effects model and the GLS estimates in the random effects model are consistent, while under the alternative hypothesis the GLS estimates are inconsistent. Consistency differences are diagnosed with the Hausman test. Based on the outcomes of the LM and Hausman tests we report the results of the best fitting model.

List of Host Countries

The following is an exhaustive listing of the cross section of countries included in our analysis. FDI by Japanese and US multinationals is studied over a common set of 29 countries. In the estimation of FDI by Japanese multinationals we included the US as the 30th host country, as omitting it would result in the omission of nearly 1/2 of all FDI flows by Japanese firms. To give US multinationals symmetric treatment, Japan was included as the 30th host country.

Developing Countries	Developed Countries
Argentina	Australia
Brazil	Austria
Chile	Belgium
Columbia	Canada
Greece	France
India	Germany
Korea	Ireland
Malaysia	Italy
Mexico	Japan
Nigeria	Netherlands
Panama	Norway
Peru	Spain
Philippines	United Kingdom
Singapore	USA
Thailand	
Turkey	
Venezuela	

Below we provide the coefficients of variation for each of the independent variables used in our regression analysis:

Coefficient of Variation for the Independent Variables*			
	All Countries	Developed Countries	Developing Countries
Convertibility to Foreign Currency	18.3	6.4	22.2
Export Requirements	11.1	5.2	12.5
Expropriation	5.6	3.2	5.6
Import Restrictions	23.0	5.9	28.1
Limits on Foreign Ownership	12.3	7.6	13.2
Local Content Requirements	10.3	6.9	10.4
Privileged Environment for Local firms	9.9	9.3	9.6
Cost of Local Labor	49.4	78.3	10.9
Level of Corporate Taxation	27.3	24.3	29.4
Market Size	39.5	28.4	43.3
Quality of Infrastructure	12.0	5.6	11.5

* The coefficient of variation is the standard deviation divided by the mean, and multiplied by 100. These coefficients are calculated using the 30-country data set that includes the US (the host countries for Japanese FDI in our analysis)

REFERENCES

- Aoki, M., "Aspects of the Japanese Firm," in The Economic Analysis of the Japanese Firm, M. Aoki, ed., Amsterdam: North-Holland, 1984.
- Benvignati, A., "Industry Determinants and 'Differences' in U.S. Intrafirm and Arms-Length Exports," Review of Economics and Statistics, August 1990, 72, 481-88.
- Breusch, T., and R. Pagan, "A Simple Test for Heteroskedasticity and Random Coefficient Variation," Econometrica, 1980, 47, 1287-94.
- Buckley, P., and M. Casson, The Future of the Multinational Enterprise. London: Macmillan, 1976.
- _____, and _____, The Economic Theory of the Multinational Enterprise, New York: St. Martin's Press, 1985.
- Cable, J., and H. Yasuki, "Internal Organization, Business Groups, and Corporate Performance," International Journal of Industrial Organization, 1985, 3, 401-20.
- Caves, R., Multinational Enterprise and Economic Analysis. Cambridge: Cambridge University Press, 1982.
- Davidson, W., and D. McFetridge, "International Technology Transfers and the Theory of the Firm," Journal of Industrial Economics, 1984, 32, 253-64.
- Dunning, J., "The Determinants of International Production," Oxford Economic Papers, January 1973, 25, 289-336.
- _____, "Trade, Location of Economic Activity, and the Multinational Enterprise: A Search for an Eclectic Approach," in B. Ohlin and P. Hesselborn and P. Wijkman, eds., The International Allocation of Economic Activity. London: Macmillan, 1977.
- Eaton, J., and M. Gersovitz, "A Theory of Expropriation and Deviations from Perfect Capital Mobility," Economic Journal, 1984, 94, 16-40.
- Ethier, W., and J. Markusen, "Multinational Firms, Technology Diffusion and Trade," Discussion paper 26, EERC, University of Pennsylvania, Philadelphia, August 1991.
- Gatignon, H., and E. Anderson, "The Multinational Corporation Degree of Control Over Subsidiaries: An Empirical Test of a Transaction-Cost Explanation," Journal of Law, Economics, and Organization, Fall 1988, 4, 305-36.
- Gomes-Casseres, B., "Ownership Structures of Foreign Subsidiaries: Theory and Evidence," Journal of Economic Behavior and Organization 1989, 11, 1-25.
- Graham, E., and P. Krugman, "Foreign Direct Investment in the United States," Institute for International Economics. Washington. D.C., 1991.

- Grubert, H., and J. Mutti, "Financial Flows versus Capital Spending: Alternative Measures of US-Canadian Investment and Trade in the Analysis of Taxes," Mimeo.
- Hausman, J., "Specification Tests in Econometrics," Econometrics, 1978, 46, 1251-71.
- Hennart, J., "The Transaction-Cost Theory of the Multinational Enterprise," in C. Pitelis and R. Stigden, eds., The Nature of the Transnational Firm, London: Routledge, 1991.
- _____, "The Transaction-Cost Theory of Joint Ventures: An Empirical Study of Japanese Subsidiaries in the United States," Management Science, forthcoming, 1992.
- Horstmann, I., and J. Markusen, "Licensing Versus Direct Investment: A Model of Internalization by the Multinational Enterprise," Canadian Journal of Economics, August 1987, 20, 464-81.
- Kravis, I., and R. Lipsey, "Location of Overseas Production and Production for Export by US Multinational Firms," Journal of International Economics, 1982, 12, 201-223.
- Mansfield, E., and A. Romeo, "Technology Transfer to Overseas Subsidiaries of U.S.-Based Firms," Quarterly Journal of Economics, 1980, 94, 737-50.
- McManus, J., "The Theory of the International Firm," in The Multinational Firm and the Nation State, G. Paquet, ed., Toronto: Collier-Macmillan, 1975.
- Mody, A., "Learning Through Alliances," Journal of Economic Behavior and Organization, February 1993, 20, 151-70.
- Ozawa, T., "Japanese Multinationals and 1992," in Multinationals and Europe 1992, B. Burgenmeier and J. Mucchielli, eds., London: Routledge, 1991.
- Raff, H., "A Model of Expropriation with Asymmetric Information," Journal of International Economics, November 1992, 33, 245-65.
- Rugman, A., Inside the Multinationals: The Economics of Internal Markets, London: CroomHelm, 1981.
- Sakurai, M., "Japanese FDI and Asia," in The US - Japan Economic Relationship in East and Southeast Asia, K. Okuizumi, K. Calder, and G. Gong, eds., Asia Pacific Association of Japan, 1992.
- Schollhammer, H., Locational Strategies of Multinational Firms, Pepperdine University: Center for International Business, 1974.
- Shah, A., and J. Slemrod, "Tax Sensitivity of Foreign Direct Investments: An Empirical Assessment," Policy, Research and External Affairs Working Paper no. 434 (The World Bank, Washington DC) 1990.
- Srinivasan, Krishna, Three Essays on Foreign Investment, unpublished Ph.D dissertation, Indiana University, 1993.

United Nations, World Investment Report 1992: Transnational Corporations as Engines of Growth, 1992.

Vernon, R., Exploring the Global Economy. Harvard University: Center for International Affairs, 1985.

Wheeler, D., and A. Mody, "International Investment Location Decisions: The Case of US Firms," Journal of International Economics, August 1992, 33, 57-76.

Williamson, O, Markets and Hierarchies, New York: Free Press, 1975.

ENDNOTES

1. Presumably host country policy makers must trade off the benefits of encouraging **FDI** (e.g., expanded tax base) against the benefits of extracting value from foreign multinational firms (e.g., expropriation of subsidiary assets). See Raff (1992) for a theoretical treatment of this issue. We take host country policies as given and determine their effects on FDI.
2. We briefly discuss the transaction-cost literature on the multinational firm in section II below.
3. The only other empirical study of which we are aware that has utilized this data set is Wheeler and Mody (1992), and they focus on agglomeration economies rather than internalization costs.
4. See Ethier and Markusen (1992) for a detailed theoretical model addressing the FDI issues associated with knowledge-based assets. Their model predicts integrated foreign subsidiaries based on a complex set of factors including the importance of knowledge-based assets relative to physical assets, discount rates, exporting costs, wages, and industry structure.
5. Firms may also choose to own foreign production facilities because of small numbers problems in the host country. As Williamson (1975) has argued, unified ownership (FDI) may be an organizational structure that minimizes the transaction-costs associated with opportunistic ex-post renegotiations.
6. Specifically, we evaluate FDI by US and Japanese multinationals in a common set of 29 countries. For FDI by Japanese multinationals we include the US as the 30th country. We believe there would be serious implications associated with ignoring the US as a host country for Japanese FDI. For example, as Sakurai (1992) points out, by the latter 1980s the US absorbed nearly one-half of all FDI by Japanese multinationals. To be symmetric, we then included Japan in the set of countries in which we evaluate FDI by US multinationals.
7. We used a base-10 logarithm for our transformation.
8. Like Wheeler and Mody (1992) we transform the scores to a 1 - 11 scale by adding 1 to each

value, to avoid taking the logarithm of 0.

9. Three of these — Export Requirements, Local Content Requirements, and Limits on Foreign Ownership - are commonly referred to as "performance requirements" in the multinational firm literature. The only internalization-cost policy variable in the BI data set that we did not include was capital and profit repatriation controls. This variable is highly collinear with currency convertibility restrictions, and so was omitted from the regressions.

10. Because of the low number of time-series observations (7) on each individual country, hypothesis tests regarding whether these correlation coefficients are significantly different from zero have relatively low power. Nevertheless, the correlation coefficient for the Chile sample is significant at below the 1 percent level, while that for the Philippines is significant at approximately the 13 percent level. None of the others are significant at near the usual levels.

11. During the 1980s (the relevant time period for our empirical analysis), a substantial portion of FDI by Japanese multinationals was largely intended to be a substitute for exports into the US and Europe. As Sakurai (1992) states, "From the end of the 1970s Japanese FDI in industrialized countries, mainly the US, had begun to increase. This shift in FDI had strong links with the frequent trade conflicts that had begun to occur between Japan and the US in the late 1970s. In the latter 1980s, over 70 percent of Japanese FDI went to industrialized countries, with the US absorbing nearly 50 percent of the total" (p. 102). Organized labor is a common source for the argument that US multinationals are using FDI to create "export platforms."

12. This correlation value was computed based on 30 countries including the US (the set of host countries for Japanese FDI). When the correlation is computed based on 30 countries including Japan (the set of host countries for US FDI), the correlation value is .07, which is not significantly different from zero at the 10 percent level.

13. Wheeler and Mody (1992) also find evidence that market size significantly increases FDI flows.

14. One exception is a survey study by Schollhammer (1974), who contacted 140 multinational firms from France, Germany, the UK, and the US, asking them to rank in order of importance over 75 country-specific factors. Of the transaction costs considered in the present study, all but import restrictions were among the ten most important factors for US firms, while the rankings varied widely depending on the national origin of the multinational firm. Interestingly, the transaction-cost factors listed above were ranked much higher in importance by US multinationals relative to European multinationals, with French firms being the most nonchalant.

15. Similarly, Srinivasan (1992) has studied the effects of both traditional economic variables as well as country risk measures on location decisions by multinational firms. He finds evidence that country risk, export restrictions, and labor costs decrease short-run FDI flows.

16. In a related vein, Murtha (1993) uses survey data to evaluate the effects of host country policy inconsistency on multinational firms. Murtha finds evidence that the transaction costs of subcontracting with subsidized local suppliers increase with host country inconsistency, as it may cause suppliers to demand new contracts.

Table 1

Description of Policy Variables

Convertibility to Foreign Currencies	Government regulation of convertibility, with particular focus on "capital account" transactions that limit the ability of multinational firms to invest or repatriate capital in foreign subsidiaries
Export Requirements	Degree to which foreign-owned firms are required to export products or services as a condition for operating in a particular country
Expropriation	The possibility that foreign-owned companies might be expropriated by the host country government, with or without compensation
Import Restrictions	Level of restrictions on imports, particularly for political rather than economic reasons, that would affect the ability of foreign-owned firms to import needed components and materials
Limits on Foreign Ownership	Any restrictions requiring existing foreign-owned firms to reach a certain level of local ownership, or limited in their ability to expand
Local Content Requirements	Degree to which foreign-owned firms are required to use locally-produced components or other inputs. Differs from import restrictions in that the policy is believed to derive from economic rather than political motives
Privileged Environment for Local Firms	The degree to which host country laws, regulations, and government actions favor locally-owned companies to the disadvantage of foreign-owned firms

Table 2
Measures of Policy Variables

Variable	10-9	8 - 7	6 - 5	4 - 3	2 - 1	0
Convertibility to Foreign Currencies	None	Minor restrictions	Strict controls on specific transfers	Prior approval for all transfers	Inconvertible on a sporadic, short-term basis	Inconvertible for practical purposes
Export Requirements	None	Pressure to generate exports	Selective require. to export a certain % of domestic production	General requirements to export a certain % of domestic production	Strict requirements to primarily produce for export	Foreign-owned firms only allowed to produce for export
Expropriation	None	Govt. participation in and control of certain firms	Selective, sporadic govt. takeover of some firms	Compensated takeover of numerous firms	Takeover of numerous firms; little or no compens.	Almost total elimination of private sector
Import Restrictions	None	Minor restrictions on a small number of imports	Significant restrictions on a few key imports from time to time	Substantial restrictions on wide range of imports from time to time	Substantial restrictions continuously applied to most imports	Stiff restrictions and occasional outright banning of most imports
Limits on Foreign Ownership	None	Pressure for local ownership shares; some obstacles to expansion	Majority local ownership required	Strict joint venture requirements; general policy against expansion	Foreign minority position or even divestiture required; rigid policy against expansion	No foreign ownership allowed
Local Content Requirements	None	Pressure to use local components	Specific selective requirements for local content	General requirements for a specified percentage of local content	Strictly enforced requirements for fully utilizing local content	No outside components allowed
Privileged Environment for Local Firms	None	Selective protection of a few local firms	Generally protective of local firms	Significant privileges for local firms	Foreign-owned firms uncompetitive due to excessive protection	Foreign-owned firms not allowed to compete

Table 3

Description of Traditional Economic Variables

Cost of Local Labor	Average hourly manufacturing wage
Level of Corporate Taxation	Assuming as an example a wholly foreign-owned subsidiary, enjoying no tax holidays, and earning \$1 million profits, of which 50% is remitted abroad
Market Size	Size of host country GDP in \$
Quality of Infrastructure	Physical and services infrastructure as it realistically affects business operations; how dependable and subject to breakdown or shortcomings

Table 4

Measures of Traditional Variables

Variable	10	9	8	7	6	5	4	3	2	1	0
Avg. Hourly Manufacturing Wage	< \$.50	\$.51 - \$1.00	\$1.01 - \$1.50	\$1.51 - \$2.00	\$2.01 - \$2.50	\$2.51 - \$3.00	\$3.01 - \$4.00	\$4.01 - \$5.00	\$5.01 - \$6.00	\$6.01 - \$7.00	\$7.01 - \$8.00
Corporate Tax Rate	< 20%	20.1% - 25%	25.1% - 30%	30.1% - 35%	35.1% - 40%	40.1% - 45%	45.1% - 50%	50.1% - 55%	55.1% - 60%	60.1% - 65%	65.1% - 70%

Variable	10 - 9	8 - 7	6 - 5	4 - 3	2 - 1	0
Market Size	> \$250 billion	\$100 - \$249.9 billion	\$75 - \$99.9 billion	\$50 - \$74.9 billion	\$20 - \$49.9 billion	< \$20 billion
Quality of infrastructure	Excellent transportation, communication, and energy services available	Normally good services but specific shortcomings	Widespread shortcomings but basically adequate	Inadequate infrastructure; only a few adequate services	Totally inadequate overall infrastructure	Practically no infrastructure to support business activity

Table 5: Log-Linear Estimates of Japanese Foreign Investment Function
Time Period: 1982 - 1988

	All Countries	Developing Countries	Developed Countries
Constant	-0.961 (0.5)	-3.344 (1.2)	-7.503** (2.1)
Convertibility of Currency	-1.197** (2.0)	-1.218* (1.8)	-1.615 (1.2)
Export Requirements	-0.842 (1.0)	-0.491 (0.6)	-0.947 (0.5)
Expropriation	1.116 (0.8)	0.965 (0.5)	2.087 (1.1)
Import Restrictions	1.753** (3.9)	1.877** (3.8)	2.441 (1.4)
Limits on Foreign Ownership	0.315 (0.4)	-0.293 (0.3)	4.158** (2.8)
Local Content Requirements	3.712** (3.0)	4.112** (2.6)	6.305** (3.0)
Privileged Environment for Local Firms	-0.768 (0.8)	-0.696 (0.5)	-0.748 (0.8)
Cost of Local Labor	-0.050 (0.2)	1.901** (1.9)	-0.312 (1.1)
Level of Corporate Tax	0.348 (0.7)	0.014 (0.02)	1.569** (2.1)
Market Size	0.458 (1.2)	0.381 (0.7)	2.534** (6.2)
Quality of Infrastructure	4.360** (3.8)	5.721** (4.3)	3.151* (1.6)
	N = 182 Number of Countries = 30 R ² = 0.22 LM = 97.59 Hausman = 23.88	N = 93 Number of Countries = 17 R ² = 0.38 LM = 11.66 Hausman = 17.99	N = 89 Number of Countries = 13 R ² = 0.54 LM = 31.31 Hausman = 44.63
** and * indicate significance at the 5% and 10% levels respectively; t-statistics in parentheses			

Table 6: Log-Linear Estimates of US Foreign Investment Function
Time Period: 1982 - 1988

	All Countries	Developing Countries	Developed Countries
Constant	0.356 (0.6)	0.578 (0.5)	-1.349 (0.9)
Convertibility of Currency	0.253* (1.6)	0.199 (0.9)	0.918* (1.7)
Export Requirements	-0.317 (1.5)	-0.341 (1.5)	-0.422 (0.4)
Expropriation	0.002 (0.01)	0.014 (0.01)	-0.249 (0.4)
Import Restrictions	0.516** (4.0)	0.433** (2.9)	1.901** (3.0)
Limits on Foreign Ownership	0.072 (0.3)	-0.009 (0.03)	0.321 (0.5)
Local Content Requirements	-0.489 (1.4)	-0.584 (1.1)	-0.505 (0.7)
Privileged Environment for Local Firms	0.140 (0.4)	0.221 (0.4)	0.167 (0.4)
Cost of Local Labor	-0.115 (1.2)	-0.211 (0.5)	-0.001 (0.01)
Level of Corporate Tax	0.019 (0.2)	0.273 (1.3)	-0.158 (1.1)
Market Size	0.378** (2.6)	0.285 (1.3)	0.130 (0.5)
Quality of Infrastructure	1.557** (4.1)	1.211** (2.4)	2.019* (1.8)
	N = 208 Number of Countries = 30 R ² = 0.40 LM = 383.26 Hausman = 24.69	N = 117 Number of Countries = 17 R ² = 0.25 LM = 207.13 Hausman = 11.11	N = 91 Number of Countries = 13 R ² = 0.54 LM = 100.01 Hausman = 8.23
** and * indicate significance at the 5% and 10% levels respectively; t-statistics in parentheses			