THE DETERMINANTS OF KOREAN FOREIGN DIRECT INVESTMENT IN THE UNITED STATES WHOLESALE TRADE

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Using the principal-agent problem, we develop a simple transaction cost model to explain why some Korean manufacturers choose to set up their own sales subsidiaries among various kinds of distribution channels in the United States. The model suggests that agent opportunism, monitoring costs, and the expected costs of providing services explain the shift between alternative institutional modes. Furthermore, the existence of contracting difficulties between Korean manufacturers and U.S. independent distributors proved to be significant in the empirical work.

I. INTRODUCTION

The comparative institutional analysis on foreign direct investment (FDI) is largely static. However, the historical evidence shows that a general pattern of FDI consists of three stages: first, firms export manufactures and use foreign independent distributors to reach consumers; second, they invest in their own sales subsidiaries in foreign countries; third, they invest in production facilities in foreign countries.[1] Prior to 1972, for example, Korean manufacturers had mainly used exporting as a way to serve the U.S. market. From 1974 to 1978, many of them established sales subsidiaries as a form of FDI to serve the U.S. market. Their investment in this period was mainly concentrated in wholesale trade. Since 1979, their investment in manufacturing industries has been growing steadily. As of June 30, 1987, the share of Korean direct investment in U.S. manufacturing was approximately 80 percent of the total investment in the U.S. in terms of dollar value.

Since the existing empirical and theoretical literature evolved to explain U.S. FDI in Europe and the rest of the world and a major part of FDI from the U.S. and the developed countries is in manufacturing, the motivations for a manufacturer to establish down-stream subsidiaries abroad have not been examined thoroughly. Thus, the traditional analysis did not focus on the role of distribution systems in explaining FDI from up-stream or middle-stream firms vertically

[1]In the case of developed countries' multinational corporations, in general, an additional stage, the so-called agency system, should be inserted in between the first and the second stage. See Nicholas (1983).

in an industry in international markets.[2]

The major purpose of this study is to develop a simple model, in terms of the principal-agent problem, that can be used to examine Korean manufacturers' direct investment in the U.S.. The objective is to understand the motivations for establishing down-stream subsidiaries abroad (i.e., to understand the transition from exporting to FDI in a sales subsidiary). Some empirical evidence is presented to support the hypothesis that transaction costs, specifically asymmetric information and monitoring costs, are a significant determinant of Korean firms' decision to undertake direct investment in U.S. sales subsidiaries.

In order to accurately assess the ramifications of internal organization, the view of a firm as a production limit needs to be expected to include the role of a firm as a governance structure. Attention needs to be focused on the transaction costs of running "the price mechanism".[3] In a world of non-zero transaction costs, the use of the market mechanism in transferring a good or service from one party to another can be costly enough to make it profitable to internalize those costs within the organization. Furthermore, the uncertainty inherent in market transactions is compounded when the exchange takes place across national boundaries since economic environments among countries can be quite different. It has been argued, therefore, that FDI occurs in response to the need to diminish the transaction costs associated with the use of the market system across national boundaries.

Traditionally, economists have treated distribution systems as if they were simply a set of convenient warehouse-collection facilities which serve to facilitate the physical flow of goods from manufacturers to consumers. However, distribution systems perform more important function: collecting and communicating information in both directions between manufacturers and consumers. The information problem in distribution systems would be more serious to foreign manufacturing firms than to domestic firms because the successful application of marketing principles depends upon factors such as the character of the country, its social habits, make-up, economic factors, and so on. Even in the case where the foreign manufacturers are accustomed to the domestic environment, there is the most obvious cost of discovering what the profit maximizing prices and quantities are. Therefore, the manufacturing firms face the risk of being treated opportunistically by their domestic and foreign distributors because of the existence of informational asymmetries.[4]

The manufacturer's control over the distribution channel is just as important

[2]See Buckley and Casson (1976), Caves (1982), Tsurumi (1977, 1984), and many others for the traditional approach.

[3]See Coase (1937), pp. 386-405.

[4]Crocker (1983) and Marvel and Reagan (1986) examine the informational asymmetry in a principal-agent setting. They argue that the informational asymmetry is a main reason for integration.

as the price and the product are for successful market penetration. The risks facing the principal, the manufacturer, are that the agent, the distributor, will make a bad decision, which hurts the principal.[5] Therefore, the principal faces costs of monitoring the agent. The control problem is known as the moral hazard problem.[6] The problem is serious especially when the product is a high-priced consumer-durable or a sophisticated good that requires considerable after-sales service and/or marketing.

Thus, using the principal-agent problem, we develop a simple transaction cost model to expalin why some domestic manufacturers choose to set up their own sales subsidiaries among various kinds of distribution channels across national boundaries.[7] The model suggests that agent opportunism, monitoring costs, and the expected costs of providing services explain the shift between alternative institutional modes. Furthermore, the existence of contracting difficulties between the domestic manufacturer and foreign independent distributor proved to be significant in the empirical work.

The structure of the paper will be as follows. Section II will develop an estimable equation. In Section III, the principal-agent problem will be tested empirically. Section IV will contain summary and conclusions.

II. THE MODEL

Recently a wide variety of institutional alternatives has been analyzed in theoretical work. In this study, however, we adopt the Coasian firm-market dichotomy because the data is limited and because exports (i.e., market mode) correspond to the hierarchical firm alternative in international markets.

Our basic approach is that vertical foreign direct investment into wholesale trade occurs when principal-agent problems are severe between a domestic manufacturer and a foreign marketing-and-distribution subsidiary. We compute and compare expected total revenue and expected total costs of the domestic manufacturer before and after integration at any point in time. To do so, we figure out the factors which affect total revenue or costs.

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[5]Since advertising externality exists and the manufacturer sets a transfer price contingent on the agent's prices and profits, the independent foreign distributor does not appropriate the additional increament in profits that flows to the up-stream manufacturer when the agent lowers price or raises its own advertising efforts. That is the reason why the distributor can not fully capture the rents from the services, and therefore provides a suboptimal amount of the sevices, which hurts the principal. See Mathewson and Winter (1984) and many others for the reason why some potential externalities affect retailers' decisions.

[6]For example, the principal would not be sure that sales performance and service quality of the agent are adequate.

[7]Anderson and Schmittlein (1983) empirically tested the principal-agent problem as a motivation for integration in the electronic components industry in domestic market.

Following the work of Crocker (1983), we incorporate a relevant transaction cost factor that is expected to influence joint profit maximization by a single manufacturer with an independent overseas agent into the analysis. The costs of measuring and computing another firm's costs are often high and we might expect many firms to have private information about their own costs. It is only one kind of uncertainty which involves the value of the distribution subsidiary's productivity parameter. The uncertainty is the source of informational asymmetry in the model. In fact, productivity parameter is variable since the distribution firm's services to customers can be varied. To make the model tractable, however, we assume that it is known and constant. In Crocker (1983), the down-stream firm strategically discloses a low productivity parameter from the parameter set to gain quasi-rents. In order to get the independent distributor to accurately reveal its private information, the manufacturer may have to sacrifice rents or productive efficiency. To prevent the distributor from appropriating the rents, the manufacturer can integrate the down-stream entity and maximize joint profits by restructuring incentives and increasing the efficiency of production in the down-stream operations. The outcome from incorporating information asymmetry into the calculation of expected total revenue of the domestic manufacturer before and after integration is that net expected profit of the integrated firm will be positively related to intra-firm trade (IFT) of the finished goods.[8]

Now, we should figure out what the monitoring costs are. The manufacturer may attempt to pay high monitoring costs when it is expected that the independent agent has the likelihood of opportunism. The agent opportunism is positively related to investment in brand names, good will, product differentiation, and advertising undertaken by the manufacturer since they create an appropriable rent that the agent could exploit at the expense of the manufacturer. Thus, the monitoring costs are a function of the manufacturer's investment in product differentia-

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[8]Assuming that the manufacturer has monopoly power in the domestic market, but the distribution firm in a foreign country faces a competitive market, that there are two countries, two factors of production, and one final goods in the model, and that a part of the output produced in country 1 is exported to country 2 through the local distributor or the manufacturer-owned down-stream subsidiary, we can generate the following relationship between net expected profit of the integrated firm at any point in time (NEP_{at}) and intra-firm trade of the finished goods:

$$NEP_{at} = P_3 X \frac{A_b(1 + A_a)}{(1 + A_b)}$$

where P_3 is the transfer price between the parent and the subsidiary, X is the amount of intra-firm trade if the manufacturer integrates its own sales subsidiary or the amount of inter-firm trade (i.e., simple exporting) if the manufacturer uses the local independent distributor as its sales outlet, and A_a and A_b represent post-integration marginal distribution costs and marginal distribution costs of the independent down-stream firm respectively. Details for this derivation are available upon request from the author.

tion, advertising, and so on. For simplicity, the monitoring costs are assumed to be a function of advertising expenses of the manufacturer. Therefore, whenever advertising expenses are expected to be higher, the manufacturer has more willingness to integrate overseas sales subsidiary. In the model, advertising expenses are normalized by sales volume (ASR).

To the extent that there are benefits of control, there will always be potential costs associated with removing control (i.e., ownership) from those who manage productive activities. For example, there will be costs associate with weakened employee incentives and/or the over-investment of the integrating firm.[9] In addition, any of the monitoring costs of internal organization through firms discussed by Alchian and Demsetz (1972) or Williamson (1975) are positive. Therefore, additional monitoring costs for integration across countries should be considered. Thus, vertical integration into wholesale trade by the manufacturer would be negatively related to potential integration costs.

Obviously, the manufacturer should consider expected costs of service production (SPD) of the distributor. If additional costs for providing the service production are expected to be high, then integration will be less attractive and, therefore, the manufacturer uses the market mode to serve the U.S. market.

Every market exchange has contracting problems since resource allocation between two conflicting parties is too complex to be described completely and the effort of each party is, in many cases, nonverifiable. Given the contractual incompleteness and hence the possibility for opportunistic behavior, Grossman and Hart (1986) argue that integration is optimal when one firm's investment decision is particularly important relative to the other firm's. The empirical implication is that the manufacturer may integrate sales subsidiary (subsidiaries) across national boundaries when the manufacturer's investment decision is particularly important relative to the distributor's decision. The firm size (FS) of each Korean manufacturer potentially reflects the importance of the manufacturer's investment decision.[10] In effect, the larger the firm size of the Korean manufacturer, the more likely the manufacturer will integrate.[11]

To the exent that the role of down-stream subsidiaries in part is to promote exports and smooth out the activities which are related to exports, for example, warehousing and/or marketing, exports and FDI would be complements. In some cases, the effect of product characteristics on manufacturer exports should wash out. Thus, the characteristic of the product which the sales subsidiaries support will be included in the estimation equation. In Marvel (1980), research and develop-

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[9]See Grossman and Hart (1986), pp. 691-719.

[10]Ray (1988) finds evidence that contracting costs play a significant role in promoting FDI in the U.S..

[11]The relative size of the manufacturer to the subsidiary should be included. However, information on the size of the down-stream entity is not available. Therefore, the absolute firm size of the manufacturer is included.

ment is positively related to U.S. exports and negatively to U.S. imports in 1967. From the paper, we hypothesize that Korean firms, on average, export less R & D intensive goods to the U.S.. Unfortunately, Korean R & D data are not available. Therefore, we use U.S. R & D data at the four-digit industry level. As long as direct investment complements exports, U.S. imports from Korea (i.e., exports of Korea) should be negatively related to U.S. R & D intensity (RND).

Thus, the discounted present value of the next expected profit stream from integration ($PVNEP_a$) which is the final estimable equation is:

(1) $PVNEP_a$ = F (LIFT, LSPD, LASR, LFS, LRND)

where LIFT, LSPD, LASR, LFS, LRND are natural log form of IFT, SPD, ASR, FS, RND, the expected sign of LIFT, LASR, and LFS is positive, and that of LSPD, and LRND is negative.[12]

Finally, the parent manufacturer establishes its own sales entity in a foreign country if $PVNEP_a$ is positive or it simply exports manufactured goods to a foreign independent distributor if it is negative or zero.

In other words,

Y_i = 1 if $PVNEP_a > 0$
Y_i = 0 if $PVNEP_a \leq 0$

where $Y_i = 1$ means manufacturer i establishes a down-stream subsidiary in a foreign region, $Y_i = 0$ means the parent i exports its goods through a foreign independent distributor. Thus, we can use a choice-based sampling estimator.

III. DATA AND EMPIRICAL RESULTS

The empirical analysis used data for Korean firm level investment in the U.S. as of June 30, 1987, obtained primarily from the unpublished sources of the Bank of Korea. The data was supplemented with balance sheets and profit and loss statements of each Korean firm in Maekyung's Annual Corporation Reports and U.S. industry level data from the Census of Wholesale Trade, and the Census of Population.

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[12]The integration costs variable (CI) is deleted in empirical regression in section III since it is very hard to obtain a good proxy for CI. In the case of over-investment, investment is constant because it is done prior to integration and therefore it does not affect the estimation of the explanatory variables included. Moreover, the negative sign of LSPD reflects both the direct costs of service production and the integration costs associated with coordinating activities within the firm.

[**Table 1**] The Determinants of Korean Firms' Direct Investment in U.S. Wholesale Trade
and Their Expected Signs

Variable	Definition	Expected Sign
LIFT	intra-firm trade between the Korean parent and the U.S. subsidiary	+
LEX	export volume of the Korean firm (1986)	+
LSPD	operating expenses of U.S. manufacturers' sales branches and offices at 4-digit SIC level (1982)	−
LASR	advertising sales ratio of the Korean firm (1986)	+
LFS	firm size	+
LTA	total asset of the Korean firm (1986)	+
LRND	the intensity of research & development expenditure at U.S. 4-digit SIC level (1980)	−

Sources:
a. Research and Development employments and total employment—1980 data from U.S. Bureau of the Census, *Census of Population: 1980.* Occupation by industry., U.S. Government Printing Office, Washington, D.C.. Detailed industry classification data ratio attributed to component SIC industries using information in the source volume, list c, p. xv.
b. Net book value of tangible and intangible fixed assets, number of employees, total assets, sales volumes, total export volumes, sales & general administrative expenses—1986 data from Mae-il Kyung Jae Shin Moon Sa, *Mae Kyung: Annual Corporation Reports,* Sam-Hwa Printing Co., Seoul, Korea, 1987.
c. Operating expenses of manufacturers' sales branches and offices—1977 data from U.S. Bureau of the Census, *Census of Wholesale Trade,* 1977, Vol. II, part I, U.S. Government Office, Washington, D.C., 1981.

The total number of usable obervations is 60.[13] One way to analyze the deter-minants of FDI is to examine our sample of 60 observations using a Truncated Tobit analysis. Truncated Tobit analysis is inefficient since the dependent variable, the amount of each Korean firm's FDI in U.S. wholesale trade, has small varia-tion. Alternatively, we have randomly collected additional data from firms which do not invest in the U.S. but export their goods to the U.S. and analyze the com-bined data using a choice-based sampling estimator. Choice-based sampling is ap-propriate when some alternatives of particular interest are infrequently chosen. In fact, the number of Korean firms which invest in the U.S. is a small portion of the total number of firms in Korea. Now, we make the size of the subsets the same because it is most efficient to do so. Thus, the total sample size is 120. We examine the sample using the Manski-McFadden estimator. This estimator is con-

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[13]As of June 30, 1987, the number of Korean firms' investment in U.S. wholesale trade is 106 and total amount of investment in the same industry is some $56 million. Among 106 cases, 46 observa-tions are deleted due to the lack of available data. Remaining 60 observations are consisted of two types of firm: 34 is a listed company and 26 a registered one on Korea Securities Supervisory Board. Therefore, additional 60 observations for regressing choice-based sampling estimator are collected based on the ratio of original sample.

[**Table 2**] The Determinants of Korean Firms' Direct Investment in U.S. Wholesale Trade

Dependent Variable
Korean Firms' Direct Investment in U.S. (0 or 1 dummy)
Logit model, Choice-based sampling analysis

Independent Variable	(1)
Constant	− 0.5071
	(0.21)
LEX	0.5938
	(1.22)
LSPD	− 1.2110**
	(1.90)
LASR	2.1009*
	(1.75)
LTA	1.1277*
	(1.79)
LRND	− 1.9273**
	(2.07)
# of observation	120

Absolute t-value in parentheses.
These values are asymptotically normal.
**, * indicate significant at the 0.05, and 0.10 level respectively.

sistent, and asymtotically efficient if the logit model is used.[14] The definition of variables along with source notes are presented in table 1 in the APPENDIX 1.

LEX is employed as a proxy for the amount of intra-firm trade between the Korean parent and the U.S. subsidiary.[15] LSPD is measured as operating expenses of U.S. manufacturers' sales branches and offices at four-digit industry level. LASR is measured as a Korean firm's sales and general administrative expenses divided by total sales of the firm. LTA is employed as firm size and is measured as the sum of current assets, properties, plants and equipment, and other assets. LRND is measured as the sum of the number of scientists and engineers as a percentage of total employment at the U.S. four-digit level. Korean firm level data are converted in terms of dollar value using the exchange rate data in International Financial Statistics. Finally, all of independent variables are defined in terms of the logarithms to wash out the opportunity cost of capital services.

The results are reported in table 2 in the APPENDIX 1. The coefficient of LEX

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[14]See Cosslett (1981) for the choice-based sampling estimator, pp. 51-111.

[15]In 1984, Korea exported 36 percent of its total export to the U.S.. In the previous years, the percentage was higher than that. Thus, the U.S. is the biggest customer for Korean firms. What Korean firms established their sales subsidiaries in the U.S. means that the firms' exports are the most important among their total exports over the world. Therefore, we presume that the export volume of the Korean firm is highly correlated with intra-firm trade.

is of the expected sign but is not significantly from zero. Since we can not obtain intra-firm trade volume, the result is less efficient. Even though the coefficient of LEX is not significant, we get an interesting implication from the fact that the coefficient of LEX is positive. Though it captures the information asymmetry problem in the principal-agent setting, it is consistent with our intuition that export and direct investment are complements at least in manufacturer-distributor relationships across national boundaries. Therefore, the empirical implication is that whether export and direct investment are complements or substitues should be based on theoretical setting.

The coefficient of LSPD is of the expected sign and is significantly different from zero at the 0.05 level. It would imply that the higher the expected costs for service production are the less the likelihood the parent manufacturer establishes the down-stream entity in a foreign country. This reflects cost minimization. When the manufacturer establishes its own sales subsidiary in the domestic market, it seriously considers the cost for service production. In the case where the manufacturer sets up the down-stream entity abroad, consideration of cost is very natural since it intends to minimize cost in adapting to the foreign economic environment.

The coefficient of LTA is of the expected sign and is significantly different from zero at the 0.10 level. The existence of the contracting difficulties between the two independent firms is supported by the significance of LTA. When the costs of contracting between separately owned firms is expected to be high, integration is an efficient response. Contracting difficulties tend to stimulate a parent manufacturer to integrate the overseas sales subsidiary into its operations. In addition, the significance of LTA variable supports the general contention that the larger firm size is, the easier the firm gets market information and financial resources for investment.

We argued that direct investment in the U.S. would be positively related to the monitoring costs which are a function of advertising expenses of the the manufacturer. The coefficient of LASR is of the expected sign and is significantly different from zero at the 0.10 level. Thus, Korean firms' direct investments in U.S. wholesale subsidiaries are positively related to monitoring costs associated with the agent's opportunism. The Korean manufacturer may attempt to acquire the U.S. agent to avoid high monitoring costs when advertising expenses create appropriable rents that the U.S. agent could capture at the expense of the manufacturer. Thus, the moral harzard problem is well supported by the significance of LASR.

We presumed that Korean firms export less R & D intensive goods to the U.S.. The significance of the LRND in table 2 indicates that Korean manufacturers who export less R & D intensive goods to the U.S. would have a strong propensity to establish wholesale subsidiaries in the U.S. to promote exports and related activities.

Overall, there exists some evidence to support the contention that manufacturing firms or industries which potentially face significant principal-agent problems establish sales subsidiaries across national boundaries.

IV. SUMMARY AND CONCLUSIONS

The paper develops a simple model that can be used to examine Korean manufacturers' direct investment in U.S. sales subsidiaries by focusing on the principal-agent problem as the primary cause of foreign direct investment. Some quantitative evidence is presented to support the hypothesis that the principal-agent problem partially explains the pattern of Korean firms' direct investment in U.S. wholesale trade. The costs that arise from the asymmetric information and the monitoring problem are shown to be positively and significantly related to Korean firms' direct investment in U.S. wholesale trade.

The manufacturer loses expected profits when private information (e.g., productivity parameter in the distribution sector or final price) is used strategically by the distributor. Expected gains through vertical integration will be proportional to the amount of intra-firm trade. In addition, the principal might pay higher monitoring costs whenever advertising or good-will creates the appropriable economic rents. Through the installation of new monitoring mechanisms, the principal can eliminate the monitoring costs it would otherwise pay. Moreover, high expected costs for the production of services abroad deter the establishment of a sales subsidiary in overseas markets. Furthermore, the contention that the existence of contracting difficulties between the domestic manufacturer and the foreign independent distributor would be a reason to establish the down-stream entity abroad was supported.

The existing literature on the multinational corporation suffers from an underemphasis on dynamics. The transition between alternative institutions should be explained. This paper makes a contribution to an understanding of the transition from exporting to the establishment of a sales subsidiary abroad, or the shift from one institutional arrangement to another. The transaction cost approach to FDI has the advantage that it can explain the dynamic course of development of the firm over time, as well as the prevalence of direct investment at a given time. Nonetheless, a major shortcoming in the current literature, which came about by focusing on the transaction cost approach as the primary cause of FDI, is the fact that the argument is description and that there is little evidence regarding its significance. This study contributes to making the transaction cost approach operational.

This paper also makes a more general contribution to the empirical literature on FDI. Most of the empirical studies on FDI have used highly aggregated data. Therefore, the interpretation of empirical results has been very ambiguous and discretional. This study makes use of firm level data in a systematic manner even though 4-digit level data are used for some variables when firm level data are unavailable. In addition, the paper makes a contribution to the empirical literature on the principal-agent problem.

Most of the empirical studies on direct investment have examined the performance of U.S. multinational corporations. Relatively few researchers have examined direct investment activity of foreign firms in the U.S., At least in part, this study is helpful in explaining what motivates foreigners to invest in the U.S.. Since the model and empirical work deals with the pattern of FDI in the U.S. by industrializing countries with low cost labor advantages in production, the pattern of investment explained here is likely to be relevant in understanding future FDI in the U.S. from newly industrialized and LDC sources in general.

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