H

OPERATING FLEXIBILITY OF MULTINATIONAL CORPORATIONS AND DETERMINANTS OF EXCESS MARKET VALUES OVER DOMESTIC FIRMS.

by

CHRISTOS PANTZALIS

A dissertation submitted to the Graduate Faculty in Business in partial fulfillment of the requirements for the degree of Doctor of Philosophy, The City University of New York.

1995

UMI Number: 9605645

UMI
300 North Zeeb Road
Ann Arbor, MI 48103

This manuscript has been read and accepted by the Graduate Faculty in Business in satisfaction of the dissertation requirement for the degree of Doctor of Philosophy.

May 23, 1995

Date

Chair of Examining Committee

May 30, 1995

Date

Executive Officer

Dr. Kishore Tandon

Dr. Linda Allen

Dr. Gewrae Kim

Supervisory Committee

The City University of New York

Abstract

OPERATING FLEXIBILITY OF MULTINATIONAL CORPORATIONS AND DETERMINANTS OF EXCESS MARKET VALUES OVER DOMESTIC FIRMS

by

Christos Pantzalis

Advisor: Professor Stavros B. Thomadakis

In this paper the conceptual and mathematical framework of real options is used as the centerpiece for the depiction of operating flexibility. A foundation for doing empirical work is built by formulating a theoretical model which compares multinational firms' (MNCs) market values with those firms constrained within national boundaries. The empirical results show that MNCs not only have higher market values, but also that the factors determining market values are different in MNCs. The tests provided here prove that multinationality variables offer additional explanation over and above the usual structural variables (e.g. R&D or advertising intensity).

The returns to multinationality are estimated as the value of "operating flexibility"; the value of a portfolio of real options enabling the MNC to optimally adjust production decisions in response to external international perturbations. Empirical measures of the return to multinationality, then, require a precise specification of the extensiveness of the MNC's transnational network to measure the degree of multinationality. This precise, empirically grounded definition of multinationality has been absent from the academic literature to date. This paper addresses this omission by utilizing a switching regression methodology to endogenize the subsidiary network-structure specification. This research shows that the determination of the value of operating flexibility has nonlinear determinants and that distinct "regimes" of multinationality can be empirically pinpointed. We find that two characteristics of the transnational network: "width" (number of foreign countries in which the MNC has operations) and "depth" (the concentration of foreign subsidiaries in few countries) are significant in explaining the value of operating flexibility. In particular we find that the returns to multinationality are maximized for firms with networks that have "width", but not "depth". The role of market intangibles such as R&D and advertising on MNC market valuation is shown to depend on the flexibility regime.

ACKNOWLEDGEMENTS

I am greatly indebted to my dissertation committee, Stavros Thomadakis (Chair), Linda Allen and Kishore Tandon for guidance. I wish to acknowledge the helpful comments of the Doctoral Consortium participants at the Financial Management Association meetings in October 1993, where part of this paper was presented. I also wish to thank John Pantzalis, Francis Kim, and Rosalie Lyons for their encouragement and patience throughout the years of my graduate studies.

Finally, I thank my parents Evangelos and Afroditi Pantzalis for giving me the motivation to become a scholar, as well as the material and mental support necessary to complete my graduate studies.

TABLE OF CONTENTS

TABLE OF CONTENTS-continued

LIST OF TABLES

LIST OF TABLES-continued

LIST OF TABLES-continued

LIST OF TABLES-continued

I. INTRODUCTION

I.1 Purpose of the study

The purpose of this study is to shed some light on the determinants of any excess market value of a multinational corporation (MNC) over the value of its domestic competitors and to examine the origins of the advantages that the MNCs may enjoy. The methodology initially assumes a restrictive world of perfect markets characterized by international parity conditions as a starting point in the quest for reasons behind the very existence of MNCs. I will relax each of the restrictive assumptions consecutively and show the effects on the MNC's value. The model employs a market value theoretical framework to the analysis of the returns to multinationality, where domestic and international future growth opportunities are presented as real options. In addition to that this thesis includes an empirical examination of how investors assess multinationality's effects on market values, and whether there exist multinationality "regimes" under which MNCs enjoy different levels of operating flexibility.

I will begin by introducing the reader to the various theories that have evolved around the MNCs and then I will devote some space to describing studies of the "environment of the MNC", i.e. studies of the international parity relationships and of international markets' segmentation. Section I will close with a review of the literature on operating flexibility, (OF).

OF is the key concept in this study. By OF one understands the ability of an MNC to arbitrage in the real and/or financial markets by shifting factors of production across borders and by transferring resources within a transnational network that includes a combination of production, research, marketing and financial units. OF is in effect many intangible assets of an MNC put under one "umbrella". OF summarizes the advantages of the MNC over a domestic competitor. The MNC can use intrafirm (internal) markets across nations while domestic companies cannot due to prohibitively high costs of setting up a transnational network. In effect, as Rugman and Dunning (1985) note, MNCs have "greater degrees of freedom than a uninational firm confined to one country". Section II includes the model and its variations that evolve as one keeps relaxing the initial assumptions. Section II also includes the theoretical implications and the empirical hypotheses implied by the model. Section III contains the empirical test methodology, data description and the test results. Finally, in section IV the reader can find a summary of the study's purpose and findings, as well as suggestions for further research.

I.2.1 Theories of the Multinational corporation (MNC)

The theory of the MNC originates with Hymer (1960, published in 1976). Hymer's theory is based on market structure considerations stressing industry specific factors to explain foreign direct investment (FDI). Hymer claimed that the MNC is based on "impurities of the market" that would not arise in competitive markets and went ahead to conclude the disruptive effects of MNCs on markets. Kindleberger (1963, 68, 69) builds on Hymer's views and stated that FDI originates from imperfect competition and barriers to entry as in Bain (1956). Dunning (1973) used a combination of the theories of international trade and location to answer the question of "why international production?".

Meanwhile H.Johnson (1968, 70) introduced the concept of FDI consigning abroad not only tangible assets like capital, but also intangible assets like know-how. Dunning's eclectic model (1977) intended to answer the "why", "where" and "how" of international involvement. The eclectic approach says that MNC's foreign assets are determined by the extent of the MNC's ownership (firm-specific competitive advantage), location-specific and internalization advantages. The eclectic theory is a combination of other theories since it is trying to address 3 different questions at the same time. "Why" can be explained by the industrial organization theory by introducing ownership advantages (O). "Where" can be answered by the location theory. Location advantages (L) are considered. "How" refers to the choice of the mode of the international operations, i.e licensing, exporting, overseas production etc. In Dunning's later versions of the eclectic theory ownership advantages are identified to be either arising from proprietary ownership of specific assets (O_a) or from reduced costs because of the common governance (control) of these assets in different countries (O_t).

The concept of internalization originates in Coase's work (1937) where firms are contrasted with markets. McMannus (1972) pointed out the role of the MNC in coordinating resources and productive activities across national borders, thereby representing an alternative to the market, a more efficient operating mode. Buckley and Casson (1976), in their theory of the MNC stated that a firm's decision to become multinational is to decide whether to internalize (or replace) markets across national boundaries. This decision will be a function of the relative costs and benefits of such internalization. According to Buckley and Casson the growth of the MNC will depend on the expected benefits and costs. The MNC in its strive for greater market power and ability to control and operate an international system of input and production flows will incur the costs of the coordination process. Rugman (1980, 82) views the internalization process as a response to market external failure and claims that the internalization approach provides an integrated theory of FDI by MNCs. Casson (1987) claims that a combination of O-advantages (ownership-specific) and L-advantages (location specific) is sufficient to explain MNC's activities. Rugman disagrees with Dunning's attempt to synthesize two different approaches, the Hymer-Kindleberger market power- based approach and the internalization approach.

Kindleberger (1984) correctly points out that most of the important developments in the MNCs' literature can be found in Hymer's thesis (1960). However, the emphasis of recent studies has shifted away from market power economies toward economies associated with efficiency improvement. This part of the literature has its roots in O.Williamson's (1975) markets and hierarchies approach which attempts to compare the properties of different organizational modes and their relative efficiency characteristics. Economic activity can be organized in a variety of ways of which the market is only one. Whether a market mode or an internal mode will be chosen depends on the comparison of the efficiency properties of the modes. Market failure in this context is not based on Pareto optimality but on relative efficiency, which can be assessed by examining the transactions costs of organizing the particular economic activity[1]. Casson (1990) states that "it is a strength of the internalization theory that it is embedded within the general transactions costs approach. This approach provides a unified perspective on topics as diverse as marketing strategy, organization structure and corporate interactions with the state". From Casson's point of view the MNC is a special type of multiplant firm; the internalization of tangible intermediate product flows leads to vertical integration and the internalization of intangible asset flows, like know-how, leads to both horizontal and vertical integration.

The internalization theory's implication is that the value of the intangible assets is positively related to the degree of multinationality. Morck and Yeoung (1991) tested empirically the relationship between market value and multinationality (measured by the number of subsidiaries) and found support for the internalization theory. Their results indicate that multinationality contributes to value only in the presence of such intangibles like R&D and advertising. The multinationality variable was found to have a slightly statistically insignificant negative effect on market value. The evidence of Morck and Yeoung (1991) is not consistent with the other listed theories on FDI and MNCs (agency theory, capital markets' imperfections theory, location theory).

Empirical evidence also suggests that MNC's are bigger, have higher accounting profits, R&D expenses and advertising expenses (Vaupel(1971),

---

[1]Transactions costs include costs of bringing buyers and sellers together in a market, negotiating costs, contracting costs and costs of supervising contractual terms.

Dunning(1973), Vernon (1971)). It has also been shown that there exists a positive relationship between multinationality and proxies for intangibles like R&D, advertising and number of engineers and scientists as a percentage of the total firm employees (Horst(1972), Caves(1974), Buckley and Casson(1976), Wolf(1977) and Dunning(1980)). The empirical evidence suggests that MNCs are firms with high market values and that MNCs either possess intangibles that other companies do not or that their common intangibles are more valuable in the case of the MNCs.

All of the above studies are consistent with, or are variations of the internalization theory. According to it, the MNC has intangibles that allow the firm to overcome the adversities of doing business abroad. The intangibles are a function of the proprietary information ("know how") that is reflected in production skills, marketing skills etc. Some of these intangibles behave like public goods[2] and the failure of the marketplace to price them creates the opportunity for the MNC. MNCs operate across national jurisdictions and use the timing and patterns of inter-affiliate transfers to their advantage. This activity may be restricted for domestic companies by virtue of, for example, exchange controls and/or increased tax liabilities. Under these circumstances MNCs benefit from internalizing these transactions.

I.2.2 FDI Theories and multinationality[3]

There are several theories linking multinationality with foreign direct investment (FDI). The major ones are briefly discussed below:

---

[2]The characteristic of "public good" applies to those assets that can be supplied to additional production facilities at no or at very low cost.

[3]This section draws from Morck and Young (1990).

a) Capital markets imperfections theory.

FDI is the result of arbitrage activity on part of the MNC, which acting as an arbitrageur of capital, transfers equity capital from low-return countries to high-return countries. Aliber (1970, 83) argues that there exist substantial differences among countries real and nominal interest rates and that nominal rates are poor predictors of future exchange rates. He believes that MNCs internalize exchange risk at lower costs than portfolio managers.

According to the capital markets' imperfection theory, investors are not able to diversify internationally, as a result of segmented capital markets, emanating from informational asymmetries or capital flow restrictions. This theory implies that the market value of MNCs is higher than that of domestic companies because they can offer the domestic investor a degree of diversification that the domestic company could not achieve. Empirical research seems to contradict this view.

b) Internalization and appropriability theory

This theory argues that MNCs create their own internal markets for intermediate products eg foreign exchange management, personnel management, marketing skills, production skills e.t.c and thus increase their value. According to the appropriability theory the reason for this is imperfect information in the marketplace.

c) Agency theory of FDI

The management of the MNC may solve an optimization problem that is very different than firm value maximization. This is particularly a problem for large widely held corporations, like the MNCs. Managers of MNCs may often favor FDI that reduces firm risk and adds to their prestige and personal value in the managerial job market. Thus the implication of this theory for MNC value is that value decreases as agency problems arise.

d) Trade and location theory

FDI and plant location is determined by locational advantages and failure in the trade of proprietary knowledge (Buckley and Casson (1976)). According to other combinations of the location theory and the internalization theory, FDI is motivated by the difficulties of appropriating rents from the trade and licensing of proprietary knowledge (Magee (1977)).

B.Kogut (1983) points out that studies of foreign direct investment emphasize national factors and market imperfections and generally neglect the advantage of a coordinated multinational network that only MNCs possess. In Kogut (1983) FDI is viewed as a sequential process and the distinction is made between the initial expansion and the subsequent incremental investments.

I.3 International parity conditions and market integration

In a world of certainty, international parity conditions will hold if financial markets and goods markets are perfect and if there exists only a single consumption good[4]. Interest rate parity (IRP) is an arbitrage relationship and as long as financial markets are perfect it will hold. When all markets are perfect, purchasing power parity (PPP) will hold also and so will the law of one price (LOP). If markets are imperfect then parity conditions will not hold. In the case of perfect markets, no

[4]see SolniK (1978).

differences in tastes, and pure monetary (inflation) uncertainty-generated exchange risk the parity conditions will still hold[5]. In the case of taste differentials real exchange risk exists. Exchange rate movements are then the results of changes in the real values of national consumption baskets. Roll and Solnik (1976) and Roll (1977) have examined the case of perfect capital markets with differential tastes. A.Shapiro (1983) examined the empirical and theoretical content of PPP in efficient markets and concluded that PPP deviations are not large enough, persistent and predictable for individuals or governments to exploit them. Shapiro notes also that deviations from PPP per se are not a signal for profitable arbitrage opportunities. He concedes that what is important are deviations from the LOP for the specific factors of production used in the manufacturing process. In reality the LOP is systematically violated as shown in Isard (1977).

The existence of imperfections in goods markets is well documented. The market is imperfect if there exist government restrictions on free trade, investor preferences toward domestic assets, differential taxes and/or transactions costs. With respect to the capital markets most of the empirical evidence supports the market segmentation hypothesis (e,g. Jorion and Schwartz (1986), Guletkin,Guletkin,Penati (1989), Cho,Eun and Senbet (1986), Errunza and Losq (1985)).

The evidence of partial integration in the capital markets and imperfections in the real markets should have an impact on the way investors value MNCs and comparative domestic firms, because opportunities due to international market

[5] see Grauer, Litzenberger and Stehle (1976)

imperfections should be more easily exploitable by the MNCs, especially those MNCs that maintain a subsidiary network that maximizes their potential operating flexibility.

I.4 MNC and operating flexibility

The great currency volatility of the current period and its greater proportionate effect on firms' cash flows and profits, given global competition, increase the importance of effective foreign exchange management both in terms of limiting risks and in terms of providing information for tactical and strategic choices, i.e. evaluating business options. The use of financial management to offset exchange exposures and to exploit distortions in both the real and the financial markets requires a smooth resolution of the possible agency problems through a high degree of global coordination in combination with centralization of decision making within the firm.

The MNC's operating flexibility (OF) is the ability of the MNC to adjust operations within its transnational network so as to maximize its value; i.e OF is the ability to shift factors of production and to transfer resources across national borders[6]. Since this characteristic is unique to MNCs, OF can also be understood as "the" intangible asset. OF effectiveness is determined by the degree to which the MNC is able to devise a strategic response to operating exposures. Thus far, in the literature of FDI and multinationality the OF advantage that a multinational network provides has not been explicitly recognized as a major intangible asset for MNCs.

According to Mello et.al. (1992) the benefit of operating flexibility arises from raising the expected cash flows, in addition to a reduction in the variance of the cash

---

[6]OF is described in Kogut (1985).

flows. The latter is the only benefit that can be achieved by financial hedging. Mello et al (92) recognize that OF lowers the contingent cost structure of the MNC and can be understood as a movement outward to a new production possibility frontier. Financial hedging does not add to value but allows the managers to choose the optimal policy, so it can be viewed as a movement from the interior to the frontier.

Kogut (1983) in his criticism of Hirsch (1976) points out the absence of uniquely international factors in his model and that Hirsch's discussion of economies of joint production does not include a variable that captures the cost savings that arise from the OF of the MNC. Further indirect evidence of the importance of the OF to the firm's value is presented by D.Shapiro (1983) who found empirical support for the hypotheses that foreign subsidiaries have advantages over domestic firms in overcoming both barriers to entry and barriers to exit. Foreign firms are therefore more mobile than their domestic counterparts. Shapiro also found that the mobility of foreign firms was highest in industries with high barriers to entry.

II. MULTINATIONALS AND OPERATING FLEXIBILITY

II.1 The value of the operating flexibility (OF)

The emergence of the MNCs may be credited to three types of incentives[7]: circumventing or minimizing taxes and controls, monopoly advantages and efficiency improvement. The OF of the MNC's global network allows the MNC to capitalize on all three, by providing the MNC with a string of real options that are not available to

[7]See Teece (1981).

the domestic competitors.

It is well known that in today's "globalized" markets no company is perfectly immune to foreign exchange risk, that is, unexpected shifts of exchange rates that affect not only nominal prices but also real values. Shifts of exchange rates impact the value of MNCs, domestic exporting firms and even purely domestic firms that sell in the domestic markets only, but use foreign-priced inputs in their production process. Even if the domestic firms were using only domestically priced inputs, their products will generally compete with foreign goods. Thus a change in the exchange rate would also affect domestic firms' values.

The responsiveness of operating profits to shifts in exchange rates is as described in Flood and Lessard (1986) comprised of two effects: financial exposure (i.e. sensitivity to nominal exchange rates) and operating exposure (i.e. sensitivity to real exchange rates). Operating exposure is the most important component because it cannot be simply hedged away by using the financial markets. The reason is that it depends on real exchange rates changes and foreign currency hedges utilize nominal rates. Therefore the market structure of the industry the firm is operating in is more important in explaining the firm's operating exposure than merely changes in nominal exchange rates. It is obvious that operating exposure is a long term exposure. Financial instruments for hedging long term exchange risks are generally unavailable and the usual hedging techniques are imperfect. Thus, a firm is often facing real changes in relative prices which are difficult and expensive to hedge using the capital markets. This motivates non-traded techniques for hedging.The firm must develop its own internal operating strategies (i.e. OF) to hedge such risks. Lessard argues that to analyze the effects of operating exposure on the firm's value, the usual accounting measures or even off-balance sheet items won't do. For this task one should rather focus more on the operations of production, marketing, R&D etc, and how they affect the firm's competitiveness.

The MNCs can use their OF to manage operating exposure by engaging in "real hedging" in addition to financial hedging[8]. MNCs are not restricted to financial policies. Deviations from the international parity conditions may enable those firms that engage in hedging activities to increase their market value. Real markets imperfections that cause deviations from the PPP and LOP relationships make an international network of operations more valuable since MNCs are in a position to take quick, inexpensive measures to cope with their operating exposure. MNCs own a portfolio of strategic choices and they assign weights to the different elements of the portfolio depending on the circumstances and the strengths and weaknesses of the firm.

A MNC can for example utilize its OF by adjusting its market coverage of export markets and of percentages of sales in different countries. This allows MNCs to exploit PPP deviations due to differences in consumption tastes between countries, i.e. when there exists real exchange rate risk. It can increase inter-subsidiary business volume and approach a truly "global" production, marketing and managerial style that will enable it to exploit international opportunities.

---

[8]Financial hedging is valuable when there exist incomplete capital markets. The MNC, by internalizing financial decisions spans state contingencies.

In this thesis I will observe the firm as a single operating unit in a competitive environment and try to describe the effects of OF on its market value under different scenarios. I believe that this will be a contribution since in previous research internationalization (multinationality) was the by-product of the search for minimum cost markets or the internalization of markets, while here the international network of the MNC is introduced as a uniquely international factor, that contributes to any excess value of the MNC over the average domestic firm in the industry. The rents from ownership and operation of a global operating network, i.e. the OF, is a uniquely international attribute, since MNCs are the only companies capable of arbitraging across national borders in a number of ways, such as bypassing institutional restrictions, capturing information externalities (learning cost externalities) in the process of engaging in international business, and saving on transactions costs through an efficient mix of inputs in manufacturing and marketing.

As suggested in Kogut (1983) I will view the MNC as a company that holds a string of real options on contingent "international" outcomes. Kogut mentions for example the option to choose where to source for a particular input or the option to choose in which country to declare its profits. I will consider the global network of the MNC as a sunk cost and treat sequential investment as incremental. This will enable an easier comparison of market value components of the domestic and the MNC. The MNC will be evaluated by the valuation of real options which depend on international factors like relative exchange rates, foreign interest rates, political risk etc. The more uncertain these factors are, the more valuable become the options to the MNC. In other words the higher the variability of the environment the higher the value of the OF. Then the value of the MNC is increased relative to the domestic firm by the incremental value of these options, since these options are only available and exercisable by the MNC and cannot be traded by individual investors.

The difference in market value between an MNC and a domestic company, the MNC's excess market value, is described by the OF that the MNC possesses. In general, the value of the OF is positive if:

a) the OF helps circumvent taxes and government controls, b) the OF poses barriers to entry to competitors or c) the OF improves efficiency by helping organizing activities in a less costly manner than the external markets.

If a) contributes to excess value then the MNC's global network should include a tax-haven and/or an investment company affiliate and/or subsidiaries in countries with high government controls, i.e in segmented markets areas. The excess value explanations provided by b) and c) above are somewhat overlapping[9].

When there exist deviations from perfect competition (i.e. an oligopolistic market structure) the MNC's excess value can be traced to either economies of scale in production, R&D, marketing and distribution, absolute cost advantages (eg. transfer prices) or product differentiation advantages. The international network allows the MNC to transfer specific assets that are unique to them, within the firm at

---

[9]The market failure and market imperfections classifications of sources of excess market value presented here separately, could alternatively be combined as in Kindleberger (1969) who following the monopoly power paradigm distinguishes the following -all inclusive- types of markets imperfections: goods markets, factor markets imperfections, internal and external economies of scale, and government imposed market disruptions.

a lower cost, across borders. These particular assets are not easy to be acquired by the other (domestic) firms because there exist barriers to entry to those assets' markets. This allows the MNC to exercise monopoly power at home and to exploit its advantage abroad. In this view OF is an ownership-specific advantage.

In the case of market failure[10] the MNC's value increases when markets are internalized. In this framework the value of the OF is derived from the gains that accrue to the MNC when it completes intermediate products' markets. The MNC's network is the tool that enables MNCs to create its own efficient internal markets. This efficiency improvement is enjoyed solely by the MNC, which therefore should be valued higher than a domestic firm. The MNC's international network includes many linkages among its units giving the MNC more degrees of freedom when it attempts to efficiently internalize markets for intermediate products, proprietary and non-proprietary know-how and international capital markets.

II.2 The model

The effects of OF on market value will be studied within a market value theoretical framework with the use of real options to describe such intangibles as the present value of domestic and foreign future growth opportunities and the value of OF[11].

---

[10]Market failure is the situation where certain business activities are difficult to organize because the set of markets required to perform them is incomplete, i.e. when there exist unpriced flows of intermediate products between activities.

[11]The use of real options in this model may raise many questions and I admit that a number of assumptions are required, but I maintain that this model is mainly a means to mathematically formulate and visualize relationships that lead to hypotheses to be tested.

The incremental value of the MNC is defined as the excess value of the MNC over the equivalent domestic firms. In my model the incremental value is the value of the operating flexibility, V(OF), which in the case of market failure, could conceptually be decomposed into two parts, the value of the finance hedge option and the value of the real hedge option. I will examine the MNC's excess market value first theoretically starting by assuming that all parity relations hold and then by progressively allowing for deviations. Then I will empirically test the latter case (deviations from parities). I will also touch the issue of economies of scale generated excess value within the framework of the MNC's OF.

II.2.1 The perfect markets case and some deviations

One way to go about establishing links between multinationality and MNC's excess value is to examine whether there would still be reasons for MNCs to exist if there were no imperfections and/or inefficiencies in financial or real markets.

The most restrictive case is when all markets are perfect, integrated and thus all parity conditions (PPP, IRP, and international Fisher effect) hold.

The assumptions

are:

(A1) There exists a two-country world (countries a and b).

(A2) Financial Markets are perfect[12].

(A3) Product markets are perfect.

---

[12]Perfect markets imply that, markets are frictionless (no transactions costs and taxes, all assets are perfectly divisible and marketable, and there are no constraining regulations), markets are informationally efficient (i.e. information is costless for all), and everybody is a rational expected utility maximizer.

(A4) There are no taste differences (common consumption basket)

(A5) There exist two types of companies, domestic (A or B) and multinational (M). All firms are operating in the same industry. M-type firms have production facilities in both countries a and b, while the domestic types can produce only in their respective countries, but can export. There exist projects of type a (country a project) and b (country b project) available to all firms.

(A6) Markets in country a and b are perfectly competitive, i.e. there are no economies of scale or scope.

The market value of any firm is the sum of its tangible and intangible assets, or as in Myers(1977) the sum of the PV(assets in place) and PV(growth opportunities). Analytically:

$$V_A = PV(AIP)_A + C_{A1} + C_{A2}$$

$$V_B = PV(AIP)_B + C_{B1} + C_{B2}$$

$$V_M = PV(AIP)_M + C_{MA1} + C_{MB1} + C_{MA2} + C_{MB2}$$

where:

$PV(AIP)_A$: present value of assets in place of domestic firm A

$PV(AIP)_B$: present value of assets in place of domestic firm B

$PV(AIP)_M$: present value of assets in place of MNC

$C_{A1} = C(Xa_A, K^a{}_A, t)$: value of domestic (a) future growth opportunities for firm A. This is proxied by the value of an option on the present value of a domestic project's payoff ($X^a{}_A$) with exercise price equal to the initial investment required for the project ($K^a{}_A$).

$C_{A2} = C(X^b{}_A, K^b{}_A, t)$: value of foreign (b), i.e exporting, future growth opportunities for firm A. This is proxied by the value of an option on the present value of the exporting project's payoffs ($X^b{}_A$) with exercise price equal to the initial investment ($K^b{}_A$).

$C_{B1} = C(X^b{}_B, K^b{}_B, t)$: like C_{A1} but for domestic firm B.

$C_{B2} = C(X^a{}_B, K^a{}_B, t)$: like C_{A2} but for domestic firm B.

$C_{MA1} = C(X^a{}_M, K^a{}_M, t)$: like C_{A1} but for MNC, i.e this option is a proxy for future domestic growth opportunities for the MNC's subsidiary in country a.

$C_{MA2} = C(X^b{}_{Me}, K^b{}_{Me}, t)$: like C_{A2} but for MNC, i.e. this option is a proxy for future exporting growth opportunities for the MNC's subsidiary in country a. The subscript e denotes exports.

$C_{MB1} = C(X^b{}_M, K^b{}_M, t)$: like C_{MA1} but for MNC's subsidiary in b.

$C_{MB2} = C(X^a{}_{Me}, K^a{}_{Me}, t)$: like C_{MA2} but for MNC's subsidiary in b.

For simplicity assume that the equivalent exercise prices are equal for domestic firms and MNCs when expressed in a reference currency, i.e $K^a{}_A = K^a{}_M$, $K^b{}_B = K^b{}_M$, $K^b{}_A = K^b{}_{Me}$, $K^a{}_B = K^a{}_{Me}$.

Also, for simplicity assume that: (i) t (the time to maturity of the real option) is equal for all firms' options; in other words this is a one period model, and (ii) $PV(AIP)_A + PV(AIP)_B = PV(AIP)_M$.

The incremental value of the MNC is :

$$V(OF)_M = V_M - (V_A + V_B) \qquad (1)$$

The incremental value of the MNC is equal to the value of the operating flexibility.

V(OF) can be conceptually decomposed in different ways (see discussion on P.15). If all parity conditions hold, as a consequence of (A2), (A3) and (A4), then the value of the financing hedge option is zero since with perfect financial markets there exist enough securities to span the international capital markets. Any international diversification by the MNC would not add to its value because the same degree of diversification can be achieved by an individual investor (in either country a or b). Similarly, with the above assumptions PPP and LOP (law of one price) will hold. Thus, all future growth opportunities should be worth the same for both domestic firms and the MNC and the incremental market value of the MNC from these intangibles (measured by Tobin's q) is zero in this case. OF has no value in a world of perfect markets.

Let us relax now (A6), and see the effects on excess market value of the existence of economies of scale[13] and scope[14] in the industry. If there are no transactions costs, as implied by (A3) and (A4), then any opportunities for growth through scale economies are open to both the MNC and domestic exporting firms. Similarly, if there are economies of scope to be captured, they may be captured by domestic firms as well, by using market contracts in a world without transactions

---

[13] Economies of scale exist when there are declining marginal costs of output (MC), which implies declining average costs (AC), which in turn implies the following subadditivity relationship of the cost function:

$$C(y^M) < C(y^A) + C(y^B) \quad \text{and} \quad y^A + y^B = y^M$$

y^i is the quantity of output produced by firm i. The degree of the scale economies at some production level y is AC(y)/MC(y)

[14] When there exist economies of scope in the production of product A and B, then $C(y^A,y^B) < C(y^A,0) + C(0,y^B)$

costs[15].

Thus, in a perfectly integrated world with imperfect competition (economies of scale/scope), deviations in Tobin's q values between domestic exporters and MNCs should be random, i.e. the investors in the market do not assess any value to the OF of the MNCs.

Let us now relax (A2) by introducing market segmentation. If financial markets are segmented then the type of financing (domestic/foreign debt or equity) may increase the value of a project to an unrestricted firm (MNC)[16]. Therefore the value of OF increases when financial markets are inefficient due to segmentation. If we relax (A3), we also have to introduce some form of market segmentation[17]; that implies that LOP is violated for payoffs of the two countries' future growth opportunities.

For example consider the following scenario: There exist projects that are contingent to international events, exogenous to the firms.The outcomes of these events will determine whether the projects will be undertaken in country a or in country b. The probability that such a project will be undertaken in a is p. (1-p) is the

---

[15]While economies of scope explain joint production, they do not explain why joint production must be organized within a single multiproduct enterprise (Teece, 1980, 82).

[16]See Thomadakis and Usmen (1988).They conclude that in a mildly segmented world, where covered IRP holds for unrestricted investors only (IRP does not hold round trip), issuance of foreign debt contracts may create value. The value created will depend upon the relationship between the future exchange rates, state prices and cash flows of the project.

[17]There are many reasons for the existence of inefficiencies in product (real) markets that cause segmentation: government intervention and controls, political risk, tax law differences, tariffs and quotas, transportation costs and the nontradeable nature of some goods that inhibits international arbitrage activity. All the above are consistent with differential transactions costs that cause the parity condition to fail.

probability that it will be undertaken in b. For the MNC these types of projects are certain since the MNCs are simultaneously firms of type A and B. Such a project would be, for example, the manufacturing and selling of footballs to be used exclusively in World Cup soccer games. Suppose that this project is traditionally being awarded to World Cup host country companies. Then, such a project is conditional on the decision on which one of the two runner-up candidate countries (countries a and b) will be chosen to host the World Cup games. For a detailed exposition look in Appendix A.

The market values can be written now as

$$V_A = PV(AIP)_A + C_{A1} + C_{A2} + (p * C_{A3})$$

$$V_B = PV(AIP)_B + C_{B1} + C_{B2} + ((1\text{-}p) * C_{B3})$$

$$V_M = PV(AIP)_M + C_{MA1} + C_{MB1} + C_{MA2} + C_{MB2} + MAX$$

where:

$C_{A3} = C(X^{a+}{}_A, K^{a+}{}_A, t)$: value of future growth opportunities from international event-contingent project to be carried out in country a.

p : probability that international event-contingent project will be carried out in country a.

$C_{B3} = (X^{b+}{}_B, K^{b+}{}_B, t)$: like C_{A3} but for domestic firm B.

1-p : probability that international event-contingent project will be carried out in country b.

$MAX = C(X^{a+}{}_M, X^{b+}{}_M, K^{+}{}_M, t)$: value of future growth opportunities from international event-contingent projects for MNC. This will be proxied by a call option on the maximum of two project payoffs, one from an a-based and one from a b-based input mix.

The MAX option is the main component of the firm's V(OF) (see equation (1)). As mentioned in Section I.4, OF shifts the production possibilities frontier outward, i.e it increases the set of available projects, because international (dual) links between the product markets are enjoyed only by the MNCs.

For simplicity, like before, I assume that the equivalent exercise prices are equal for domestic firms and MNCs when expressed in a reference currency, i.e $K^a_A = K^a_M$, $K^b_B = K^b_M$, $K^b_A = K^b_{Me}$, $K^a_B = K^a_{Me}$, $K^{a+}_A = K^{b+}_B = K^+_M$.

The question is as to whether the value of a real market hedge component is positive since there do not exist any financial securities to hedge fluctuations in real relative prices. I will examine this below.

Assuming equal exercise prices equation (1) can be written as :

$$V(OF)_M = MAX - [p^*C_{A3} + (1-p)^*C_{B3}] \qquad (3)$$

The other components disappear because of the assumption of PPP holding, for example

$X^a_A = X^b_B = e * X^{b*}_B$, where

X^a_A and X^b_B are expressed in country-a currency, X^{b*}_B is the present value of a domestic project in country-b currency and e is the exchange rate defined as the ratio of country-a currency over country-b currency.

The value of the MAX option has been shown by Stultz (1982) to be

$$MAX = C(X^{a+}_M, K^+_M, t) + C(X^{b+}_M, K^+_M, t) - MIN \qquad (4)$$

where MIN is a call option on the minimum of $X^{a+}{}_M$ and $X^{b+}{}_M$ with exercise price $K^+{}_M$ and time to maturity t.

If PPP (LOP) holds for all tradeable commodities in every event then $IV_M = 0$, as long as there do not exist any economies of scale/scope and other cost advantages, like transactions costs' differentials.

It is possible though, that for the mutually exclusive set of the international event-contingent projects, for which the market is segmented the LOP (law of one price) does not hold because the MNC can choose a mix of inputs that minimizes the second term of (2), i.e in general for the MNC the input mix will not be simply the sum of the domestic firms' mix[18] because of eg. economies of scale or scope. For example, if there were cost savings associated with organizing an advertising campaign in the market for the mutually exclusive projects, then the MNC would be the only firm to reap them. The reason is that domestic firms who are restricted in the domestic markets face higher transactions costs if they attempt to emulate the MNC through contractual relationships using the markets. On the other hand the MNC may cheaply internalize the advertising function of its marketing operations and enjoy the advantages of being more cost-efficient.

When there are economies of scope a multiproduct firm can emerge. With this in mind one has to look at the MNC as a special case of a multiproduct firm. Economies of scope provide neither a necessary nor a sufficient condition for cost

[18] One can draw a parallel here between the taste differences that cause the absolute PPP version to collapse and the technology differences that prevail here causing the MNC, which is the only firm that can produce in both countries, to view the payoffs of the mutually exclusive projects as unequal.

savings to be achieved[19]. The point is that the origin of the scope economies displayed in the cost function is crucial. Economies of scope arise from a shared, jointly organized input, which may be imperfectly divisible or which may be a public input[20]. When markets for these inputs are inefficient then internalization is called for and the MNC benefits from economies of scope. Such inputs are proprietary and know-how and indivisible specialized assets which yield scale economies, in the presence of transactional difficulties.

Summarizing, I note that for MNCs the relative version of the PPP, i.e $Xa^{+}_{M}*a=e*X^{b+}_{M}{}^{*}$, may still hold but the V(OF) will be positive, because LOP for some inputs will fail when there are economies of scale/scope or transactions costs inefficiencies and the markets are segmented. 'a' in the relative PPP version is the relative price in currency of country a of country b's mutually exclusive project payoff per country a's mutually exclusive project payoff at any time t.

$$a(t)=[R^{b+}_{M}(t)\text{-SUM}\{w_{jBM}*i_{aj}(t)\}]/[R^{a+}_{M}(t)\text{-SUM}\{w^{j}_{BM}*i_{aj}(t)\}]$$

If PPP holds for each mutually exclusive project from a domestic point of view only, ie if we assume that the two domestic firms possess the same technology with respect to the inputs[21],then $C_{A3} = C_{B3} = C_3$ and equation (2) becomes

$$IV_M = C(X^{a+}_{M}) + C(X^{b+}_{M}) - [MIN + C_3] \qquad (5)$$

---

[19] see Teece (1981) for a detailed discussion.

[20] A public input is being acquired for use in some project, but is costlessly available for other projects after that.

[21] Of course, this will not be the case in general, but this assumption does not alter the result, it only makes it more mathematically tractable.

From Stulz (1982) we know that,

$$\min\{C(X^{a+}{}_M), C(X^{b+}{}_M)\} > \mathrm{MIN}(X^{a+}{}_M, X^{b+}{}_M\} \qquad (6)$$

It is also true that the maximum of the two call options will be at least as high as the value of C_3. It follows that even under fairly restrictive conditions (relative PPP) the V(OF) may be valuable and thus the MNC's value is higher than that of the equivalent domestic firms, i.e. OF is valuable. The sign of V(OF) depends on whether the MAX option's value is large enough to overcome C_3. While this is shown in this model where agency and administrative costs are ignored, in reality the magnitude of V(OF) is an empirical question.

The extension to a multi-country setting would essentially yield the same results. In the multi-country, multi-commodity model the domestic companies will hold an option on a portfolio of strategic choices (projects) while the MNC will hold a portfolio of options of strategic choices (projects). As in Merton (1973), the value of the portfolio of options is greater than the value of the option on the portfolio. Thus again we end up with the result that in a world where not all parity conditions hold $V_M > V_A + V_B$. A corollary of this is that the MNC's value will increase as the degree of OF that the international network provides becomes higher.

II.2.2 Comparative statics

Of particular interest for my analysis is the MAX option, that determines ultimately the value of OF. Below, I will derive the comparative statics used to examine how the underlying parameters affect the value of this option.

First, using Stulz(1982), I will derive a formula for the option's value. For this part of the study I will drop many of the subscripts used before and I will generally work with the following symbols:

$X(t)$: value of domestic project in domestic currency

$X^*(t)$: value of foreign project in domestic currency

$X^*_f(t)$: value of foreign project in foreign currency

Of course then $X^*(t) = e(t) * X^*_f(t)$

$e(t)$ is the ratio of domestic over foreign currency.

The dynamics are:

$de/e = \mu'_e dt + \sigma_e dz_e$

I should note that μ'_e is not a risk-adjusted rate of return.

We can write : $de/e = (\mu_e - r^*)dt + \sigma_e dz_e$, where μ_e is the risk adjusted rate of return and r^* is the foreign risk free rate.

$$dX/X = (\mu - \delta)dt + \sigma dz \tag{7}$$

$$dX^*_f/X^*_f = (\mu_f - \delta_f)dt + \sigma_f dz_f \tag{8}$$

To find the dynamics of the foreign payoff in domestic currency:

$$dX^*/X^* = d(eX^*_f)/eX^*_f = de/e + dX^*_f/X^*_f + [de/e]*[dX^*_f/X^*_f]$$

$$= [\mu_e + \mu_f - (\delta_f + r^*)]dt + \sigma_e dz_e + \sigma_f dz_f + \rho_e f \sigma_e \sigma_f dt \tag{9}$$

Define $\sigma_*^2 dt = \Sigma_i \Sigma_j \sigma_i \sigma_j \rho_{ij} dt \qquad i=e,f$ and $j=e,f$

$$= \Sigma_i \text{COV}(\sigma_i dz_i ; \Sigma_j \sigma_j dz_j)$$

$$= \Sigma_i \text{COV}(\sigma_i dz_i ; \sigma_* dz_*) = \Sigma_i \sigma_i \sigma_* \rho_{i*} dt$$

$$=> \sigma_* = \Sigma_i \rho_{i*} \sigma_i \tag{10}$$

Thus (9) can be written as

$$dX^*/X^* = (\mu_e + \mu_f - (\delta_f + r^* + \gamma))dt + \sigma_* dz_* \quad (11)$$

where $\gamma = 0.5*[\Sigma_i \sigma_i^2 - \sigma_*^2]$

With $\mu_* = \mu_e + \mu_f$ and $\delta_* = \delta_f + r^* + \gamma$

$$=> \quad dX^*/X^* = (\mu_* - \delta_*)dt + \sigma_* dz_* \quad (12)$$

Using equation (3) and Ito's Lemma we can value the MIN option first. For the sake of abbreviation in the following analysis I will denote the MIN option as L.

$$dL = (dL/dX)dX + (dL/dX^*)dX^* + 0.5[(d^2L/dX^2)dX^2 + (d^2L/dX^{*2})dX^*2$$

$$+ 2(d^2L/dXdX^*)dXdX^*]dt + dL/dt =$$

$$= L_X dX + L_{X*}dX^* + L_t dt + 0.5[L_{XX}X2\sigma^2 + L_{X*X*}X^*2\sigma_*^2 + 2L_{XX*}\rho_{XX*}\sigma\sigma_*]dt$$

(13)

At this point the following additional assumptions are required to proceed: X and X^* satisfy the stochastic equations (7) and (12) (ρ_{XX*} constant through time) and r (the instantaneous riskless rate of interest) is constant through time.

Define the following:

x : fraction of wealth invested in domestic project

y : fraction of wealth invested in foreign project

(1-x-y) : fraction of wealth invested in safe asset

Using the self-financing portfolio technique we can write for dL/L:

$$dL/L = x(dX + X\,dt)/X + y(dX^* + X^*\delta^*dt)/X^* + (1-x-y)rdt \quad (14)$$

Set (13)=(14) => $L_X X = xL$ and $L_{X*}X^* = yL$

Next, eliminate the stochastic terms in (14) and divide through by dt to get:

$$L_t + L_X X(r-\delta) + L_{X^*}X^*(r-\delta^*) + 0.5[L_{XX}X^2\sigma^2 + L_{X^*X^*}X^{*2}\sigma_*^2 +$$

$$+ 2\, L_{XX^*}XX^*\rho_{XX^*}\sigma\sigma_*] - Lr = 0 \qquad (15)$$

The portfolio, whose value is equal to the option on the minimum of X and X^*, $L(X,X^*,t)$ satisfies differential equation (15), and also satisfies the following boundary conditions:

$$L(X,X^*,0) = \max\{\min(X,X^*)-K\ ;\ 0\} \qquad (16)$$

(16) describes the payoff of the option when $t=0$ (at maturity).

$$L(0,X^*,t) = 0 \qquad (17)$$

$$L(X,0,t) = 0 \qquad (18)$$

A look at (15) reveals that the option's (L) value does not depend on the instantaneous expected rate of return of either X or X^*. That means that L is independent of the investors' attitude towards risk. I can thus assume without loss of generality that all investors are risk-neutral and apply the risk neutral valuation method:

$L_{t=0} = e^{-rt}E_{t=0}(H(T,\ldots))$, where $H(T,\ldots)$ is the payoff at maturity and r is the riskless rate. Stulz(82) derives the formula for this european type option. In his article the two assets, on whose minimum the option is written on, are financial assets without payouts. In this study's model the two assets are real assets that do not behave like financial assets. That is the reason of the use of adjustment factors (convenience yields) and $_*$ to price the option on the minimum of the payoffs of a domestic and a foreign project.

The closed form solution for the value of this option is:

$L = MIN(X,X^*,K,t) =$

$= XN\{\gamma_1 + \sigma t^{0.5} ; [\ln(X^*/X) - 0.5\sigma_M{}^2 t^{0.5}]/\sigma_M t^{0.5} ; [\rho_{XX}{}^*\sigma_* - \sigma]/\sigma_M\}e^{-\delta t} +$

$X^*N\{\gamma_2 + \sigma_* t^{0.5} ; [\ln(X^*/X) - 0.5\sigma_M{}^2 t^{0.5}]/\sigma_M t^{0.5} ; [\rho_{XX^*}\sigma - \sigma_*]/\sigma_M\}e^{-\delta^* t} -$

$- Ke^{-rt}N\{\gamma_1 ; \gamma_2 ; \rho_{XX^*}\}$ (19)

where,

$N\{a_1 ; a_2 ; a_3\}$ is the bivariate standard normal cumulative distribution with upper limits of integration a_1 and a_2 and coefficient of correlation a_3, and

$\gamma_1 = [\ln(X/K) + (r - \delta - 0.5\sigma^2)t]/\sigma t^{0.5}$

$\gamma_2 = \{\ln(X^*/K) + (r - \delta_* - 0.5\sigma_*{}^2)t]/\sigma_* t^{0.5}$

$\sigma_M{}^2 = \sigma^2 + \sigma_*{}^2 - 2\rho_{XX}{}^*\sigma\sigma_*$

In accordance with Merton's (73) distribution-free results the following relationships hold:

$dL/dX > 0 \quad ; \quad dL/dX^* > 0 \quad \text{and} \quad dL/dK < 0$

In order to study the effects of σ^2 , $\sigma_*{}^2$ and ρ_{XX^*} on the option's value I will take the special case where K=0. In this case

$MIN = L(X,X^*,0,t) = X - E(X,X^*,1,t\}$ (20)

, where option E(...) is the option to exchange asset X^* for asset X at maturity. Such an option was described and priced by Margabe (1978). Using Margabe's results it follows that

$L(X,X^*,0,t) = X - XN\{d_1\} + X^*N\{d_2\}$ (21)

with $d_1 = [\ln(X/X^*) + 0.5\sigma^2 t]/\sigma t^{0.5}$ and $d_2 = d_1 - \sigma t^{0.5}$

Thus, I can find the comparative statics as

$dL/d\sigma^2 \;{}^{>}{}_{<}\; 0$ and $dL/d\rho_{XX^*} > 0$ everywhere for $-1 < \rho_{XX^*} < +1$

Now, that I have priced the MIN option and found the comparative statics for it, I can easily derive the comparative statics for the MAX option using (3) :

$dMAX/dX > 0$; $dMAX/dX^{*} > 0$; $dMAX/dK < 0$;

$dMAX/d\sigma^{2} \gtrless 0$; $dMAX/d\sigma_{*}^{2} \gtrless 0$; $dMAX/d\rho_{XX^{*}} < 0$

The last relationship ($dMAX/d\rho_{XX^{*}} < 0$) implies that the value of the MNC will increase with decreasing correlation coefficient of payoffs from its domestic and foreign projects. In a multi-country, multi-industry world, this relationship implies that the MNC's value will increase as the number of the MNC's imperfectly correlated projects that can be "swapped" increases. In such a world OF becomes more valuable when the MNC has many products in industries with low industry-profitability correlation coefficients and(or) if the MNC has many projects with cash flows that have a low correlation coefficient with exchange rates.

II.3 The value of OF when parity conditions do not hold.

The model shows that, when there is market failure (inefficiency) V(OF) may be positive. On the other hand V(OF), as described earlier (section II.1), can be conceptually decomposed into the financing hedge option and the real hedge option. Deviations from the different international parity relationships affect each component differently. The IRP is mainly an arbitrage relationship, failure of which would imply that the financial markets are segmented and/or inefficient. The PPP and LOP rely on the assumptions of homothetic preferences,perfect goods markets and perfect financial markets, while the international Fisherian relationship requires all of the above mentioned assumptions. The model shows that LOP violations are a source of OF. In this section I will examine the effects of parity deviations on the MNC's incremental value. This discussion will provide the reader with more insight about the OF value and it will be the basis for the empirical part of the study.

II.3.1 The effects on the financing hedge option.

Starting with the IRP (interest rate parity), one can immediately say that when IRP does not hold, then value of the financing hedge option component of OF is positive. This will be true though for all companies if the IRP does not hold due to financial markets inefficiency in an integrated financial system because domestic companies would be unrestricted from trading abroad, just as the MNCs are. Then the effect on the incremental value of the MNC will be nullified. On the other hand if the IRP is violated because of financial markets segmentation, then the MNC has an edge because of its ability to engage in arbitrage activity across the segmented markets. In Thomadakis and Usmen (1991) it is shown that in a segmented financial markets environment firms from home countries that restrict their nationals from holding foreign securities may increase their value through debt financing. If restrictions on trade in the financial markets extend not only to individuals but also to firms then the advantage of the MNC is indisputable.

As a next step I will restate the fact that PPP deviations have no direct effect on the financing hedge option but only on the real hedge option (see II.3.2). Thus, the effect of deviations from the international Fisherian relationship (IFR) remain to be examined. IFR breakdown may be due to imperfect financial markets or PPP violations. That means that PPP violations, e.g due to nontradeability of some assets may still boost the financing hedge option through the IFR effect. But the Fisherian relationship is not an arbitrage relationship but just a general equilibrium condition, that is equivalent to IRP when the forward rates are equal to the expected future spot rates, ie when there do not exist forward risk premiums. Thus violations of the IFR will not necessarily affect positively the financing hedge option.

II.3.2 Effects on the real hedge option.

PPP (LOP) violations present a definite opportunity for MNCs (as described in II.2.1), when imperfections in the factors market due to the nontradeability of some inputs boost the OF value. The same is true when imperfections are introduced to the goods market. On the other hand IRP and IFR violations do not directly affect the real hedge option of the MNC.

II.4 Hypotheses for empirical testing

In the previous chapter we used a simple model to identify some of the characteristics of the OF of MNCs. The value of OF is boosted in the presence of uncertainty, i.e. in today's volatile global markets the MNCs, by setting up an appropriate international network will increase their OF's value and thus their excess market value over domestic companies.

The opinions about the appropriate way to approach the MNC (market power/monopoly vs. market failure/inefficiency) differ, when one is concerned with explaining FDI. Both views may very well lead to the same conclusions when one examines effects on excess market values[22]. In fact every market failure that gives the MNC the chance to improve efficiency, i.e. cut costs, by internalizing markets, ultimately becomes the origin of some monopoly power advantage to the MNC. In the end, every internalization advantage becomes an "ownership" advantage[23]. The aim here is only to determine the parameters of market values, and not to examine how investors make up their minds about OF. Whether investors view OF as a tool of monopoly power exercise or as a means of reaping internalization advantages, is not going to be addressed. An event study may be more appropriate in examining this issue.

The model implies that the main force behind OF value is market segmentation. Both financial and goods market segmentation seem to be working in the advantage of MNCs who can use their OF to increase their value over that of the equivalent domestic firm.

In the empirical part of this study I will test the following hypotheses:

(H1) $V_M > V_{dom}$ or $V(OF) > 0$.

The notion of the MNC being more valuable than its domestic counterparts is central in the attempt to link the excess value to the operating flexibility. A firm that possesses a valuable intangible like the OF that arises from the operation of an international network should have a higher Tobin's q (or EVS) than a similar domestic firm.

---

[22]This section draws on the analysis of Buckley (1990).

[23] O' in Dunning's eclectic approach.

(H2) $dV(OF)/dFIN > 0$, where $V(OF) = V_M - E(V_{dom})$

This is the main hypothesis to be tested. V(OF) increases when the international network has a high degree of flexibility (FIN).

H2 can be described as the combined effect of the following three sub-hypotheses:

(H2.1) $dOF/d\rho_{XX^*} < 0$

H2.1 states that firms with a number of projects in different countries whose payoffs are negatively correlated should have a higher Tobin's q than other firms whose international project payoffs are positively correlated. In other words IV_M (or V(OF)) increases if the MNC has products in industries with low industry profitability correlation coefficients and (or) if the MNC has many projects with cash flows that have a low correlation coefficient with exchange rates.

(H2.2) V(OF) is higher for those MNCs who have subsidiaries in countries whose financial markets are segmented. A higher than normal debt/equity ratio for those firms is positively associated with V(OF), since as discussed earlier with segmented markets debt financing can be value enhancing.

(H2.3) V(OF) increases when the international network includes a subsidiary in a tax haven or an investment firm subsidiary.

III. EMPIRICAL METHODOLOGY AND TESTS

III.1 Methodology and tests' outline

In the previous section I presented a theoretical model that describes the MNC's operating flexibility and provides a measure of its value. The model helps identify the conditions that have to exist in order for OF to have positive value. The hypotheses to be tested are that MNCs have higher market values than comparable DOMs and that the magnitude of those excess market values is related to the MNC's network flexibility[24]. In this chapter I empirically test hypothesis (H1). That is, I examine the relationship between market value and intangible assets for both MNCs and DOMs.

The model in the previous chapters implies that there exists a direct link between multinationality and OF. A typical MNC has a network of operations in various product markets with both domestic and international links. Every link between product markets is a potential synergy source. A flexible network is a network that provides the optimum amount of links where potential synergies may be exploited. Thus a high number of links is desirable; however one should note that the larger and more complicated networks (ie those with many inter-product links) also generate the highest transactions and agency costs. A flexible network has just enough links to enable adjustments to absorb external shocks and exploit opportunities to a maximum net of costs. In addition to the number of links, another factor of the MNC's flexibility is the distribution of the links among the parent country and the foreign countries in the network. The nature of the links, namely whether they are market (links between two product markets provided by sales force, retailing, market

---

[24]The hypotheses outlined in the previous section are not tested in their entirety as presented there. Hypothesis (H.1), i.e. $V(OF)>0$ or $V_M>V_{Dom}$, will be tested directly, but (H2.1) and (H2.2) cannot be tested due to the lack of the appropriate data. Furthermore the hypothesis that the value of OF is positively related to the degree of flexibility provided by the international network of the MNC, (H.2), is a joint hypothesis test: joint test of (1) validity of specification of the network's flexibility, and (2) explanatory power of the specification of OF for EVS.

research, promotion etc) or technological links[25] (eg. links through R&D, labor, plant and equipment etc), coupled with the links distribution should also have an effect on OF. These effects may not be detectable in a linear model for the pooled sample, but I expect to illustrate their existence by separating the sample of the MNCs in groups of firms that constitute different "flexibility regimes".

Clearly, the network's flexibility is a function of several multinationality parameters, but not all of them are positively related to OF in a straight forward manner. Therefore, instead of a direct test of (H2), a different test will be employed, where the existence of flexibility regimes will be estimated using a switching regression model. A flexibility regime is a type of organizational structure (or operational mode) that the MNC decides to maintain. Firms belonging to a certain regime display similar characteristics with respect to certain multinationality variables. If such regimes are shown to be prevalent,and if MNC's excess market values vary significantly among different regimes, then I would have indirectly shown that the degree of flexibility of the international network as specified empirically is a determinant of higher excess market value over comparable domestic firms.

In the following sections I will:

a) Examine the relationship between market value and market power and control variables for domestic firms (DOMs) and multinationals (MNCs) separately and compare the findings for the two groups in order to provide a parallel to the existing literature.

---

[25]see Galbraith and Kay (1986)

b) Examine the link between different measures of multinationality and market value, and

c) Provide a measure of the MNC's operating flexibility, investigate the existence of regimes under which the level of OF varies, and finally, examine the multinationality variables' effect on OF within each regime.

The issue of multinationality and performance has been examined by a number of empirical studies. The major flaw of these studies lies in the all-or-nothing definition of multinationality. Previous research does not evaluate the relationship between the <u>degree</u> of the network's flexibility and the market value of MNCs. As a result market value of MNCs has been related to superior intangibles, like R&D and advertising intensity, and not to the MNC's network. Thus, previous studies support the notion that the market value created through internalization decisions within an international network is observable only through the market power variables in a cross-sectional sample of firms.

Moreover, studies either assume a linear relationship between performance and multinationality or specify an overly restrictive form of a nonlinear relationship. It is no wonder that most of the previous studies fail to find a consistently significant relationship between multinationality measures and market value. Indeed, some of the papers in the area include hints that there may not exist such a linear relationship after all[26]. Intuitively it is hardly surprising that the more "multinational" the firm, the greater the constraints on its management due to various difficulties entailed in the

[26]see Morck and Young (1991), Siddhartan and Lall (1982) among others.

operation of a large international network. For example one may think of the hardships in finding and training managers for a wide variety of markets and cultural environments, the inefficiencies that arise from the attempt to centralize control of a widespread organization, and the agency problems and costs that increase with the degree of multinationality, all of which have a negative effect on market value. Thus, given agency costs that are exarcebated by international operations, the relationship between firm value and investment in intangibles is likely to be nonlinear. Rather than prespecifying a functional form (eg. quadratic), I endogenize the functional form using a switching regression approach.

Efficiency gains and OF can be achieved in the presence of "market" intangibles, such as those reflected in R&D and advertising expenditures ,as well as in the presence of "non-market" MNC intangibles (i.e. the international network's flexibility, OF). The relationship between the "market" and the "non-market" intangibles is fairly complex, but it may become more tractable if one examines separate groups of MNCs that consist of firms that have similar degrees of investments in market intangibles (i.e. R&D- and advertising-intensive firms). Investment in a particular multinational network structure can be viewed as a means to more efficiently exploit "market" intangibles (measured by R&D- and advertising-intensity). For example, one can think of a domestic producer of an intermediate product that is being acquired by a vertically integrated MNC. Within the MNC network it may be optimal for this new subsidiary to replace part of advertising intensity with intrafirm sales creation efforts. An example of complementarity between network structure and market power intangibles is the effect of the network's structure of a horizontally integrated MNC on the R&D expenditures of a particular unit. Since R&D related intangibles are of technological nature and not country-specific, their transfer through internal markets across countries is easier and thus the optimal level of R&D may be achieved with smaller investments in R&D per $ of sales. Based on this, it should be true that maintaining the same level of R&D intensity has a greater effect on sales when a company joins an internationally widespread network. Thus, the MNC has greater degrees of freedom than a comparable DOM. It can raise its market value using a combination of "market intangibles" (eg R&D, advertising) as well as multinational intangibles (eg the WIDTH, DEPTH, CON2 variables of the multinational network to be elaborated later on in this chapter). In the next sections I focus on this potential tradeoff and define my proxies for the MNC network.

In section III.3.1 I focus on the functional form of the non-linear relationship between market value and intangible market variables for both MNC and DOM firms. I therefore extend previous studies by endogenizing the form of the nonlinear relationship. I find that there are both size- and intangibles-related nonlinearities. The relationship is then reexamined for the MNC sample after adding the network variables to the original set of independent variables. The dependent variables are market value (EVS) and V(OF). OF implies a difference in market values between an MNC and its average domestic competitor. In section III.3.2.1 I empirically examine the effect of market intangibles and size ont the returns to multinationality. Finally, the effects of the MNC subsidiary network on the returns to multinationality are examined in section III.3.2.2.

As was shown in Chapter II the difference in market values between an MNC and a DOM competitor (V(OF)), is the appropriate tool for capturing the effect of internalization decisions on market values. Internalizing markets in key inputs may represent a barrier to entry, thereby strengthening the MNC relative to domestic competitors in the industry. The effectiveness of those decisions is reflected in the MNC's network structure that provides the strategic terrain within which management will implement its policies. Certain MNC will allow internalization opportunities to be exploited more efficiently than others. Therefore, intuitively, the magnitude of the MNC's value of operating flexibility should be more directly related to the network's structure than is the MNC's absolute market value. Thus in addition to market value, the tests will be performed using V(OF) as dependent variable.

The variables used in this study are:

Market power and control variables:

EVS: Relative excess valuation of each firm[27]. This market value measure can be viewed as the market value analog to the return on sales.

ADV: Advertising intensity for each firm. ADV is measured by the ratio of advertising expenditures to sales for the year 1991. ADV is a proxy for

---

[27]EVS was developed by Thomadakis (1977). EVS and Tobin's q are shown to be highly correlated (see Hirshey and Wichern (1984)), although they treat tangible assets differently. It should be noted though, that both of these market value measures are subject to accounting measurement errors and accounting bias.

consumer goodwill[28].

RD: R&D intensity. RD is measured by the ratio of R&D expenditures to sales for 19991. RD is a proxy for technical expertise[29].

TA: Size measure for each firm. The size measure employed here is the log of Total Assets for 1991[30].

GS: Measure of future growth opportunities for each firm. Measured as the geometric average of the sales revenues for the last five years.

LTD: Leverage measure for each firm. LTD is the Long Term Debt - to - Total Assets ratio. This variable is supposed to control for any variation in market value due to differences in capital structure across my sample.

Following Morck&Yeoung(1991), Kim&Lyn(1990), Chauvin&Hirshey(1994) e.t.c., I employ the following model for the market value for the DOM firms:

$$EVS_D = a_0 + a_1{*}TA_D + a_2{*}LTD_D + a_3{*}RD_D + a_4{*}ADV_D + a_5{*}GS_D$$

For the MNCs it is postulated that in addition to the above variables, the variables that describe the international network (multinationality variables) may be a source of

---

[28]Advertising is a proxy for marketing ability. Economies associated with the latter are easiest to achieve when there are synergies among market links, such as retailing , sales force, market research, promotion etc. The marketing information is country specific and thus it is less easily transferable from country to country unless if there exist similarities in consumer behavior in the two countries.

[29]The technological information associated with R&D is firm specific in nature and thus more easily transferable than product and /or country specific information as for example marketing information. As Chauvin & Hirschey (1994) point out advertising and R&D expenses represent investments in alternative means of product differentiation.

[30]Alternatively one could use Sales Revenue as a size measure.

value. Thus the model for the MNC sample is:

$EVS_M = a_0 + a_1*TA_M + a_2*LTD_M + a_3*RD_M + a_4*ADV_M + a_5*GS_M +$

$SUM(a_i*M_i)$, where M_i are the multinationality variables[31].

III.2 Data Sources.

The sample of the MNCs for this study is drawn from National Register's "Directory of International Affiliations/1992" and "Directory of Affiliations/1992" that provide information on foreign and US affiliations of firms operating in the United States for the year 1991. Only firms with at least one majority owned (over 50%) affiliate are included in the MNC sample. The number of foreign countries where the MNC operates as well as the number of subsidiaries inside and outside the MNC's parent country are counted for each MNC. Finally, the number of the financial subsidiaries and the existence of operations located in tax haven countries is also accounted for. Financial data for all manufacturing firms (SIC codes 1 to 41) for 1991 were taken from Standard & Poor's "Compustat Industrial Tapes". The intersection of the two data sets includes 1192 firms, of which 626 are MNCs[32]. The remaining firms are labeled DOM. Although many of them are indeed exporting firms, they are distinguished from MNCs by the fact that all of their subsidiaries operate in the US. The firms in my sample are distributed among 120 3-digit SIC industries.

[31]The multinationality variables are described in section III.3.2.

[32]An MNC is defined here as a firm with at least one foreign subsidiary.

III.3 Findings

III.3.1 A Comparison of MNCs and DOMs.

Before the effect of the M_i is analyzed it is appropriate to examine whether there exists evidence that the set of the conventional variables (TA, LTD, ADV, RD, GS) is not adequate in describing market values, when one compares MNCs and DOMs. Thus far, multinationality has been treated in the literature as a zero-one proposition, with little emphasis on the importance of the MNC's network. An attempt to better describe MNC's OF as a function of many multinationality parameters would only be appropriate if a direct comparison of MNCs and DOMs based only on the five conventional explanatory variables was shown to be insufficient.

The descriptive statistics for the whole sample and for the two subsamples (MNCs, DOMs) are in Table #1. The MNC sample has a higher mean for EVS, TA, ADV, and GS while the DOM's sample has a higher mean for LTD and RD[33]. Table #2 provides z-statistics for the means difference test. It is remarkable that all means are significantly different from each other, at the 0.1 level or better. Thus the average MNC is larger, less leveraged, less R&D intensive, has more growth opportunities and is more advertising intensive than the average DOM.

This is an indication that MNCs and DOMs are different , and that these "conventional" variables that are commonly used in market value studies may have a different effect on EVS in the two subsamples.

[33]Note that the availability of some variables, especially RD and ADV, varies between the two subsamples; the limited availability of RD and ADV resulted in a smaller DOM regression sample compared to the MNCs.

Table #3 gives the results of a stepwise regression procedure that maximizes R^2. The dependent variable is EVS. The sequence of the variables entered into the model with a significance level of at least 50% and the R^2 of the model at every variable-addition step are reported. For the combined sample ADV is the first variable to enter the model followed by RD, TA, LTD and GS. When one observes the two subsamples though, the picture is strikingly different. For the MNCs the sequence is ADV, LTD, TA, RD and GS while for the DOMs it is RD, GS, TA, with LTD and ADV not entering the model at all. This implies that a) variables have different impact on market value for the two groups, and/or b) there exist non-linearities in the relationship between market value and some variables. To examine the first possibility look at Table #4 A that includes the results of the regression of EVS on the 5 conventional explanatory variables. The signs of the variables are consistent with expectations and evidence from previous studies. MNCs' market values increase with size, advertising intensity, R&D intensity and to a lesser extend with sales growth. Leverage has a negative effect on market value for MNCs and an insignificant effect for DOMs. This may be due to the fact that MNCs being larger and with access to more capital markets, should on the average display a more stable capital structure[34]. A significant increase in leverage might be a signal of the MNC using up its "credit reservoirs" and of increased agency costs, thus having a negative effect on market value. In addition to that, MNCs are firms with a high proportion of real options in their asset structure. That implies that agency cost of debt is higher and therefore

[34]Note that the LTD variable has lower variance for the MNC sample than for the DOM sample.

leverage levels are lower. It is peculiar that ADV is not significant for DOMs. Panel B of Table #4 shows the result of a regression using the whole sample and a dummy variable (DUM=1 for MNCs and DUM=0 for DOMs) as well as the terms DUM*TA, DUM*LTD, DUM*RD, DUM*ADV, and DUM*GS. This procedure is followed to test the significance of the difference of parameter coefficients for the two subsamples' regressions. The regression model is :

$$EVS_i = a_0 + a_1{*}TA_i + a_2{*}LTD_i + a_3{*}RD_i + a_4{*}AD_i + a_5{*}GS_i + a_6{*}DUM + a_7{*}DUM_i{*}TA_i + a_8{*}DUM_i{*}LTD_i + a_9{*}DUM_i{*}RD_i + a_{10}{*}DUM_i{*}ADV_i + a_{11}{*}DUM_i{*}GS_i\ .$$

The results of this regression are shown in Table #4 B. LTD and RD have significantly lower and AD higher coefficients in the MNC regression. The coefficients for TA and GS are not significantly different among MNCs and DOMs. Leverage and market intangibles (R&D and advertising intensities) seem to affect market values of MNCs and DOM in different ways.

The results thus far suggest that there exist structural differences in the market value - control variables relationship. The existence of non-linearities is examined through the use of the Switching Regression Technique[35] (SRT) with one or two switching variables. The aim is to determine whether there exist differences among regimes defined around some critical cut-off points of the switch variables determined by SRT, i.e. whether pooling observations together reduces the model's explanatory power and

[35]see Goldfeld & Quandt (1973), for an analysis of the estimation of structural shifts by switching regressions.

distorts the effects of individual variables on EVS.

Which variable(s) from the model will be chosen as switch variables depends on the following two considerations: First, ideally the switch variable should be one that has a pretty uniform effect on market value for both the MNC and the DOM pooled samples.In the regression results of Table #4 B the coefficient of DUM*TA is insignificant which implies that size effects should be of approximately the same nature in both samples. Of course, this can easily be verified or disputed by use of an SR model with TA as a switch variable. Secondly, the switch variables chosen should be somehow related to MNC network characteristics. As mentioned before, the effectiveness of "market" intangibles (R&D and Advertising) may vary with different MNC network structures described by multinationality variables. The advantage of chosing market intangibles variables such as RD and ADV as switch variables, is that the results could conceptually be related to the result of a SR model with multinationality variables as switch variables.

The switch variable chosen first was TA. The cut-off points were determined by comparing the log likelihood value from the pooled sample (L_0) with the maximum log likelihood function (L_1) from the SRT model. The likelihood ratio statistic ($-2\log(L_0/L_1)$) is asymptotically chi-squared distributed.

Table # 5 A shows the means and variances for the variables of the two groups determined from the SRT model with one switch variable (TA) for both the MNC and the DOM firms. For both MNC and DOM we thus have Type I ($TA <= TA^*$, small) and Type II ($TA > TA^*$, large) firms. The critical values from the SRT are $TA_D^* = 6.6$

and $TA_M^*=4.9$ respectively[36]. On the average, large MNCs (Type II) have significantly higher market values and sales growth, while the level of investments in intangibles (R&D, advertising) and the debt ratio does not appear to be significantly different between MNCs of type I and II (Table # 5 B). The average small DOM has lower debt ratio and more advertising expenses per dollar of sales than the average large DOM. There does not seem to be a significant difference in market values means among the two DOM types. The size effect on the market values is present only in the MNCs' sample.

Table # 5 C includes the results from the regressions on EVS for Types I and II, for both MNCs and DOMs. Signs for LTD,ADV, GS for both DOMs and MNCs of type I are consistent with previous studies. But different regimes display different relationships not picked up by other studies that do not employ this methodology. For the two Type II groups (large firms) we observe striking differences in coefficient significance and signs while for both Type I groups (small firms) the parameters enter the model in a similar manner. For large MNCs the greater the leverage ratio, the greater the agency costs of debt, thereby reducing EVS. If one aspect of OF is the MNC's access to an external financing network via equity stakes, then LTD should decrease as EVS increases. Also, the greater the investments in intangibles, the higher is EVS. For large DOMs advertising is positively associated with EVS, but RD intensity has a negative effect on market value. Size is also negatively related to

[36]For this procedure TA was entered into the model as TA*10, in order to create finer steps for the iteration process used to find the maximum log-likelihood function. The log-likelihood ratio test resulted in the acceptance (at the 0.001 level) of the null hypothesis that there exist two size-related regimes.

market value, implying the existence of agency costs related to sizes that exceed a threshold; one can interpret R&D expenditures in this case as a proxy for agency costs. For large DOMs, increasing R&D intensity has the adverse effect on market value. To the contrary R&D's effect on market value is positive (as is advertising's effect) for large MNCs. However, the comparison of the regression results for the two "large" types should not be overstated since the DOM Type II sample is small (N=11).

Thus, at least for the large companies the relationship is structurally different between MNCs and DOMs[37]. This pattern is different than the one implied from the results of the pooled samples (Tables #2, #4 A), where all variables were significantly different in means for the MNC and DOM samples. Also there exists a difference in the switch point values for the DOM and the MNC samples. That means that for a small increase in size, say, by means of an acquisition, the effect on an MNC's market value will be larger. Thus, if one fails to recognize a "size" effect a comparison of DOMs vs. MNCs may be misleading.

The switching regression technique continues to search for additional cut-off points until they are shown to be insignificant. Therefore the above procedure was repeated using two cut-off points (TA*,TA**), that define three regimes (types of firms). Type I includes firms with $TA<TA^{*}$,ie small firms. Type II includes firms with $TA^{*}<TA<TA^{**}$, ie medium-sized firms,and Type III includes firms with $TA>TA^{**}$

[37]It should be noted here that the log likelihood ratio statistic was significant at the 0.001 level, thus we accept the hypothesis that there are two size-related regimes.

(large firms).The intuition behind such a breakdown is that if there are extra costs associated with size after some critical value then we would observe market values that increase from Type I to Type II and then decrease from Type II to Type III. The pair of switch points (TA^{*},TA^{**}) is significant at the 0.001 level. The cut-off points are : (TA^{*}=3.6,TA^{**}=6.6) for DOMs, and (TA^{*}=4.9,TA^{**}=9.3) for MNCs. For DOMs the high switch point is the same as the switch from the initial SR and for the MNCs the low switch is the same as before. Consequently, the "large" DOM group and the "small" MNC group are the same as the equivalent groups from the initial SR model with one switch. It is evident the MNC cut-off points are quite apart from the DOM ones, another indication that after the treatment for nonlinearities MNCs and DOMs are even more distinct from each other.

The results from the SR model with two switch points, TA^{*} and TA^{**}, are consistent with the non-monotonic relationship between EVS and size for MNCs. As the MNC's assets increase the EVS increases (statistically significant difference in EVS means for MNC Types I and II), but after a certain asset value is reached, the entrenchment hypothesis and the resulting agency costs reduce EVS. Table # 6 A shows the composition of the DOM and MNC subsamples. Mean and variance is reported for each variable. Table # 6 B reports z-statistics for the means-difference significance test applied on the means of the three subsamples (I, II, III.) for DOMs and MNCs respectively. The comparison of means for DOM types among themselves yields significant results only for ADV. The larger DOMs are on the average more advertising intensive. A similar comparison of MNC types among themselves shows that market values for types II and III (medium and large MNCs)are on the average higher than market values of small MNCs (Type I). Interestingly the market value of the medium sized MNCs is larger than that of the large MNCs. This as mentioned before, is consistent with the notion that the largest MNCs face additional costs that effectively hamper performance. Investor's seem to discount market values for large MNCs to adjust for that fact. The rest of the variables provide few significant mean difference comparisons (GS is lowest for I compared to II and III).

The results of the regressions of TA, LTD, RD, ADV, and GS on EVS for the three DOM types are shown on Table #6 C. TA has a positive effect on EVS for small DOMs and a negative for large ones. LTD is insignificant for types I and II and positively related to EVS for type III DOMs. RD has a positive effect on market value for small and medium domestic firms and a negative one for large DOMs. This implies once again that high R&D expenditures per dollar of sales in the presence of size related inefficiencies and agency problems, may be viewed as a proxy for agency costs. ADV is positively related to market value only for large DOMs, which implies that advertising will only be effective, after a certain size has been reached. This fact combined with the observation from Table # 6 B where mean ADV was lowest for large DOMs and highest for small ones, is quite interesting; large DOMs are less ADV intensive but have the highest advertising effectiveness on market value compared with medium sized or small DOMs. GS was found to have a positive and significant effect for small and large DOMs.

For the three MNC types the regressions from the SR model yield the following results: Type I MNC's market values are related to RD and GS. Type II EVS is related to TA, RD, ADV and negatively related to LTD, while large (III) MNC's market values are related to ADV only. ADV and RD have similar effects on market values for MNCs and DOMs, with only a few differences in the degree of significance. On the other hand, TA, LTD, and GS's effect is very different among MNCs and DOMs. The above described results indicate that the market value-control variables relationship is structurally different among MNC and DOM types.

Chauvin and Hirshey (1994) point out that R&D and advertising expenditures are two different kinds of investments in intangibles, whose effectiveness across size and industries varies. R&D and advertising spending tend to be concentrated in different industries and only few industries display significant expenditures in both R&D and advertising. Chauvin and Hirshey (1994) also report that there seem to exist thresholds of R&D or advertising expenditures levels that should be reached before a firm can effectively compete in the market. Their findings motivated my next choice of switch variables, RD and ADV. Using RD and ADV as switch variables the SRT procedure determined the cut-off points (RD^*,ADV^*) as (0.006,0.027) for the DOM sample and (0.011,0.019) for the MNC sample[38]. The cut-off point was significant at the 0.01 level for both the MNCs and the DOMs. RD^* is lower for DOMs and AD^* is lower for MNCs. A lower switch implies that high levels of effectiveness can be achieved at earlier stages of an expansion. This is true for DOMs in the case of RD

[38]In Tables 7 A,B and C, the cut-off points are denoted (6,27) and (11,19)for DOMs and MNCs respectively because for the SRT procedure both RD and ADV were factored by 1000.

effectiveness and for MNCs in the case of AD effectiveness.

The four types of firms created through this procedure are:

Type I : RD $<=$ RD* and ADV $<=$ ADV* . Firms that display low investments in both forms of market intangibles.

Type II : RD $<=$ RD* and ADV $>$ ADV* . Advertising intensive firms.

Type III : RD $>$ RD* and ADV $<=$ ADV* . R&D intensive firms.

Type IV : RD $>$ RD* and ADV $>$ ADV* . Firms that display high levels of investments in both forms of market intangibles.

Table # 7 A summarizes the composition of the four groups of DOMs and MNCs determined from the switching regression model with (RD*,ADV*) as cut-off points. Mean difference significance tests are reported in Table # 7 B. For types with low levels of "market" intangibles, specifically types I and II where R&D intensity is low, non-market intangibles are more valuable (substitution effect) and EVS is significantly higher for MNCs than for DOMs. Where markets exists, i.e. where there are high levels of market intangibles, EVS is not significantly different , since the multinational real options of the MNC are not as valuable. Among firms with low R&D intensity (types I and II) MNCs have on the average higher market values, larger size and more R&D expenditures per dollar of sales than DOMs of the same type. In fact, every MNC type is on the average larger and more R&D intensive than the corresponding DOM type. Additionally type IV MNCs have significantly higher debt ratios than type IV DOMs. Type IV firms are firms whose asset structure includes a large proportion of "real options", as implied by large investments in R&D

and advertising. Such asset structures require a lower debt ratio, since agency costs of debt for them are higher[39]. Indeed, type IV DOMs display a significantly lower debt ratio than the other three DOM types. Also among MNC types, type I has a significantly higher debt ratio than II, III and IV. The above result confirms the effect of the "real options" portion of the asset structure on debt ratios.

For the MNCs we observe significantly lower market values for Type I firms, while it also seems that ADV has a greater impact on market value than RD. Mean EVS is significantly higher for MNC types II and IV (advertising intensive regimes) than for types I and III (R&D intensive regimes). There is no significant difference in means among the four types for TA for either MNCs or DOMs. Type IV MNCs have significantly higher growth rates than Type I and II MNCs. The comparison of MNCs vs. DOMs indicates that MNCs of types III and IV have higher EVS than all DOMs except for DOMs of Type IV. Furthermore all MNC types have larger size than DOMs and generally lower leverage. Differences in growth rates' means for DOMs were mostly insignificant. Table # 7 C reports the result of the regressions of the five conventional variables on market value (EVS) for the four DOM types and the four MNC types respectively. This classification where the samples are split into "market" intangible regimes is less illuminating for DOMs than for MNCs, another indication that there could be a substitution effect between "market" and "non-market" intangibles. For DOMs size, leverage and advertising intensity have no effect on EVS

[39]see K.C.Lee and C.Y.Kwok (1988) for a discussion.

for all types[40]. R&D intensity and growth are positively related to EVS for DOMs of type III (high RD, low AD -firms).

For the MNCs size has a positive effect on market value, except when RD is high and AD low (III), while leverage is significantly negatively related to EVS whenever RD is low (II and IV). This is consistent with the notion that high R&D levels increase the agency cost of debt for MNCs, thus depressing market values. Advertising intensity has a positive effect on market value only if both RD and AD are high (IV).

The results reported so far indicate that there exist differences between MNCs and DOMs, in the relationship between market value and conventional variables. Furthermore I have shown that there are nonlinearities with respect to size for both DOMs and MNCs and other nonlinearities likely to be the result of a potential tradeoff between market intangibles (external to the MNC) and intrafirm intangibles (MNC network). The results seem to justify concerns about the adequacy of the above conventionally used variables in describing OF. Therefore the M_i variables (multinationality variables) are introduced into the model for the MNCs.

III.3.2 Effects of multinationality variables on market value measures.

III.3.2.1 The returns to multinationality for different size-related regimes.

The next step in the testing procedure involves adding the M_i (multinationality) variables and reestimating the relationship between market value, measured by EVS91, and the explanatory variables. Following is a list of the international network

[40]The small size of the II and IV types' samples is a concern for the validity of this statement.

variables:

NC: The log of the number of foreign countries where the MNC has subsidiaries

NSO: The log of the number of foreign subsidiaries of each MNC.

WIDTH: "Width" is measured as the ratio of the number of foreign subsidiaries to total number of subsidiaries for each MNC[41].

DEPTH: "Depth" is measured as the ratio of the number of foreign subsidiaries over the number of foreign countries for each MNC[42].

TH: Tax haven dummy variable, that takes the value of 1 for those MNCs that have a subsidiary in a tax haven country and zero for those MNCs who do not[43].

NFS: A dummy variable indicating whether the firm owns any financial subsidiaries (NFS=1), or not (NFS=0).

CON2: This is a concentration measure for the international component of each MNC's network. It is measured as the ratio of the sum of the

[41]WIDTH provides a measure of the size of the international component of the network relative to the domestic (parent-country) component. Alternatively, WIDTH can provide a rough measure of the distribution of the potential synergy links between the parent country and the rest of the network. The larger the WIDTH, the more country- and product- specific information economies should contribute to market value.

[42]DEPTH is a measure of the network's average size per foreign country. Alternatively one can think of DEPTH as a measure of the average number of links per foreign country. The larger DEPTH is, the more flexible the MNC is in terms of transferring technological know how within each country, thus reducing the necessity for many international technological links.

[43]Of course the definition of tax havens is not a clear-cut issue but the subsidiaries recognized as being located in tax havens in this study are the most obvious cases, like for example an insurance company in the Cayman Islands or a financial subsidiary in the Netherland Antilles etc.

subsidiaries in the "top[44]" two countries of the network divided by the total number of foreign subsidiaries.

From the list of the M_i's only a few combinations can be used, in order to minimize multicollinearity problems. The size measure (TA), which is highly correlated with all the M_is, is dropped for the following tests and the M_i variables separated to yield two altenative reduced forms of the model:

a) $EVS_M = a_0 + a_1*LTD_M + a_2*RD_M + a_3*AD_M + a_4*GS_M + a_5*NSO_M + a_6*NFS_M$, and

b) $EVS_M = b_0 + b_1*LTD_M + b_2*RD_M + b_3*AD_M + b_4*GS_M + b_5*WIDTH_M + b_6*DEPTH_M + b_7*NFS_M$, for all MNCs M.

In order to maintain consistency with the previous sections I began using the SR with size (TA) as the switch variable and determined the cut-off point to be $TA^*=5$. This cut-off point is significant at the 0.001 level (like all the other cut-off points reported hereafter) and almost identical to the one obtained from the SR model using the five conventional variables alone ($TA^*=4.9$, see Table # 5 A). In this manner I separate MNCs into a "small" (Type I: $TA<=TA^*$) and a "large" group (Type II: $TA>TA^*$). The descriptive statistics for the two groups are given in Table # 8 A. A comparison of the means of the variables for the two groups yields that "small" MNCs are more concentrated, have smaller number of foreign subsidiaries and countries they operate in, lower growth of sales and lower market values than the

[44]"Top" is calculated in terms of number of subsidiaries. CON2 gives us a clearer picture of the MNC network's international component. The percentage of the MNC's foreign subsidiaries that are located in the top two countries ,is vital in describing flexibility.

"large" MNCs (see Table # 8 B). "Large" MNCs have more "width" and less "depth", which motivates the two variable switch (NC, CON2) to be performed later. The regressions results for the two size -related regimes are given in Table # 8 C: the effect of the market intangibles (RD and ADV) as well as that of leverage (LTD) on market value is insignificant for "small" MNCs. GS (growth) is significantly positively related to EVS91. On the other hand, "large" MNCs display a significant positive effect of ADV, NSO and WIDTH on market value; LTD has a significant negative effect. The results, when compared to those from the regressions without the multinationality variables (from Table # 5 C) imply that for "large" MNCs R&D intensity's effectiveness is substituted by such network variables like NSO and WIDTH. For "small" MNCs R&D's effect on market value is insignificant.

The model is reestimated by SR around two cut-off points with size again as the switch variable. The SR resulted in $TA^{*}=5$ and $TA^{**}=9.5$[45]. What was effectively achieved by adding one more cut-off point was to split the group of the MNCs with larger sizes into two while the "small" group remained virtually the same. In this way the pooled sample is now broken down into three groups of MNCs: "small" (Type I: $TA<=TA^{*}$), "mid-sized", (Type II: $TA^{*}<TA<=TA^{**}$), and "large", (Type III: $TA>A^{**}$) MNCs. Descriptive statistics for the three groups are provided in Table # 9 A and the z-statistics for the difference significance test among group means for all variables are included in Table # 9 B. The latter table provides a strong indication

[45]Again the cut-off points are fairly close to the ones from Table # 6 A, where without the M_i's the SR resulted in $TA^{*}=4.9$ and $TA^{**}=9.3$.

that the network structure of the three groups is significantly different from each other since most of the z-statistics for the multinationality variables are significant at least at the 10% significance level. Interestingly, there do not appear to be any significant differences among group means for the control and the "market" intangibles variables. The behavior of EVS is non-monotonic (increasing from I to II, and decreasing from II to III) with "mid-sized" MNCs having on the average higher market values from all other types and the pooled sample. "Width" (NC) is highest for "large" firms, while "depth" (CON2) is highest for "small" firms. This justifies the use of NC and CON2 as switch variables in the next SR.

The regression results for the three types of MNCs are in Table # 9 C. For "mid-sized" MNCs (Type II) both NSO and WIDTH have positive and significant coefficients, implying that adding foreign subsidiaries to a medium sized organization adds to the firm's market value. For large MNCs (Type III), only WIDTH is positively related to EVS. "Small" MNCs' values are not affected by the multinationality variables at all. Instead it is sales growth that drives market values. The results of the regressions that include the multinationality variables, thus far do not include a case where GS and a multinational variable are simultaneously significant. In general the control variables' effect on market value is similar to the one implied by the original model without the multinationality variables (see Table # 6 C). It is notable that once again the network variables NSO and WIDTH seem to substitute for R&D intensity's effectiveness (for "mid-sized" MNCs, II). Since R&D-related advantages are rooted in technological information which is firm-specific and easily transferable within the firm's network from one country to another, a flexible network structure may substitute for part of the R&D effort by enabling the firm to maintain the same effectiveness with less costly R&D levels. The evidence here is that investors recognize that and assign extra explanatory power to the variables that describe the international component of the network (NC and WIDTH), thus supressing the effectiveness of the RD variable on EVS91 for "mid-sized" MNCs.

Thus far the addition of the network variables into the relationship has added to the explanatory power of the model and highlighted the substitution effect between investment investment in R&D and large international network components. What the network variables (M_is) did not do though, was to change the nature of the size-related regimes when one examines market values, i.e. the cut-off points are almost identical as before the addition of the M_is in the relationship.

Thus far I had examined the determinants of MNC market values. Now a comparison of MNCs' market values with those of domestic firms is employed in order to obtain a measure of operating flexibility for the MNCs. The value of the operating flexibility (V(OF)) is proxied here by the variable DEVS91, which is the excess market value that each MNC enjoys over its average domestic competitor. The V(OF) measure was constructed empirically as follows: for every MNC I computed the difference between its EVS and the average EVS value of all domestic firms in the MNC's 3-digit primary SIC-codes. If there exist advantages to being an MNC relative to a similar DOM, then DEVS91 should on the average be positive and significantly different from zero. Also the magnitude of the V(OF) and its relationship with the conventional and network variables will be examined by following the methodology used in the previous sections.

The previous tests were be repeated with DEVS91 as dependent variable in place of EVS91, i.e. the two empirical regression models become:

c) $DEVS_M = a_0 + a_1{*}LTD_M + a_2{*}RD_M + a_3{*}ADV_M + a_4{*}GS_M + a_5{*}NSO_M + a_6{*}NFS_M$, and

d) $DEVS_M = b_0 + b_1{*}LTD_M + b_2{*}RD_M + b_3{*}ADV_M + b_4{*}GS_M + b_5{*}WIDTH_M + b_6{*}DEPTH_M + b_7{*}NFS_M$, for all MNCs M.

Using firm size (TA), as my switch variable and the SR resulted in the cut-off point $TA^*=5$, which is the same as the one from the SR model with EVS91 as the dependent variable. As a result the descriptive statistics and the z-statistics for the means differences of the independent variables (Tables # 10 A and B) are similar to the ones in Tables # 8 A and B. As in the earlier results, V(OF) is highest for "large" MNCs, implying that large networks are more flexible. A difference between the results from Table # 8 C and those of 10 C, is that for "large" (Type II) MNCs R&D intensity is negatively related to DEVS91, i.e. V(OF), while previously its effect on EVS91 was insignificant. Increasing R&D intensity for large multinationals lowers OF. R&D advantages are easily transferable (relative to advertising-related advantage) across borders, therefore intensive R&D is somewhat redunant for MNCs with a comprehensive multinational network. Consequently increasing R&D intensity implies more agency problems and reduces the value added of OF.

The next step in the SR procedure resulted in the pair of critical values ($TA^*=5$,

TA^{**}=9.5), which are again the same as before (see Table # 9). Once again the only difference is the way RD enters the relationship for the group of the "mid-sized" (Type II) MNCs (Table # 11 C). The group of the "mid-sized" MNCs displays the highest mean value of operating flexibility (Table # 12 B), while the other two types, i.e. the "small" and the "large" ones have negative DEVS91 means. Intuitively, V(OF) increases when a typical MNC expands from being "small" and becomes "medium-sized". If the expansion countinues past the critical point (TA^{**}) and the MNC becomes "large", then the MNC's flexibility value declines significantly.

The empirical results of this section support the notion of the importance of the network variables to the explanatory power of the model used to describe MNCs' valuations by investors. It is also true that the relationship described by the model using the pooled sample may be misleading, because after endogenizing the relationship's functional form through use of the SR model one can see that the significance and sometimes the sign of the coefficients are different. It has been shown that there are different regimes, that are either size-related, or most importantly, network structure-related. Performance as well as the effect of the variables on market value varies among the different regimes. MNC valuation depends on "width" and "depth" of the network and and on market intangibles such as R&D and advertising.

III.3.2.2 The returns to multinationality for different network structure-related regimes.

It has been postulated that market value is a function of the degree of flexibility that the international network of the MNC provides. However there doesn't exist a simple direct measure of the degree of the network's flexibility. The network's flexibility is rather a function of several multinationality variables and the form of this function is unknown. Rather than assuming a restrictive functional form, I will choose a pair of multinationality variables that best describe the two different dimensions of the network, and let the SR provide the number and size of the different network-structure regimes, defined around some critical values of the switch variables determined by the SR. The two dimensions of the network that I will describe with the use of the switch variables are, a) the "width" of the network, i.e. the extent of the international component[46] of the network, measured by NC, and b) the "depth" of the network, i.e. the degree of diverification (or concentration) of operations within the international component of the network, measured by CON2. The "width" (NC) is a measure of the number of international operational links among different product markets that the network provides. The other dimension, "depth" (CON2), measures how spread out or concentrated (extensive/comprehensive) those links are.

The evidence from Table 7 is that there exist market value regimes associated with the combination of the degrees of investment in market intangibles (RD and ADV) that MNCs maintain. Additionally in Tables 8 and 9 there is indirect evidence that network variables are sometimes substitutes for investments in market intangibles. Hence the choice of two network variables (NC and CON2) as switch variables in the

[46]International component stands for all operations of the MNC outside the parent country.

SR model. Assuming that these two variables adequately describe the "width" and the "depth" dimension of the MNC network, I let the SR define four network structures, that the MNCs may maintain, around the cut-off point. The SR resulted in the critical values ($NC^*=10$, $CON2^*=0.25$) for the cut-off point that maximizes the SR model's log-likelihood function. The four types of MNCs are:

Type I: $NC <= NC^*$ and $CON2 <= CON2^*$; these are MNCs with operations in less than 11 foreign countries and a concentration ratio of foreign subsidiaries in the two largest[47] foreign countries of less than 25%. These MNCs have a network with a small and sparse international component; in other words these ar low-"width" and low-"depth" MNCs.   Type II: $NC <= NC^*$ and $CON2 > CON2^*$; these are MNCs with a small and concentrated international component, i.e. low-"width" and high-"depth" MNCs.

Type III: $NC > NC^*$ and $CON2 <= CON2^*$; these are MNCs with a large and sparse international network, i.e. high-"width" and low-"depth" MNCs.

Type IV: $NC > NC^*$ and $CON2 > CON2^*$; these are MNCs with a large and concentrated international network, i.e. high-"width" and high-"depth" MNCs.

Descriptive statistics for the four types of firms are given in Table # 12 A, and the z-statistics of the means' differences among groups are contained in Table # 12 B. Type III firms have significantly higher market values than all other three groups and than the pooled sample on the average. Thus, market values are maximized for "wide", "not-deep" networks. This is consistent with the model of an MNC as a portfolio of

[47]Largest in terms of number of subsidiaries owned by the parent company within the country

real options across countries. If an MNC maintains a "wide" and "deep" network then EVS decreases significantly, since agency problems accumulate. Once a MNC has reached the optimum level of MNC-intangibles ("width" and "depth") then it makes a decision on the optimum level of market intangibles (R&D and advertising intensity) to achieve its interior optimum that maximizes market value. This complementarity between the market- and the MNC-intangibles seems to be most efficiently exploited by Type III ("wide" and "not-deep") MNCs. Those firms, in addition to higher market values also have higher levels of market intangibles (RD, ADV) and larger WIDTH, NSO and NFS on the average.

The coefficient estimates from the SR model for each type are given on Table # 12 C. LTD is negatively related to MNC types II and III and has no effect on market values for types I and IV. ADV is positively related to EVS91 for all types, except type I, while RD's coefficient is significant only for type IV firms. GS's coefficient is significant only for low-"width" and low"depth" firms (Type I). NSO's effect is positive when the network is "not-wide" and "deep" (Type II) and negative when it is "wide" and "deep" (Type IV). This is consistent with increasing market values when the international component of a small, concentrated network is expanding. Once the network has been expanded internationally beyond some critical value, then the addition of more foreign subsidiaries results in decreasing market values due to extra agency costs. WIDTH and NFS have a significant effect on EVS91 only for MNCs with small and concentrated networks (Type II). For Types I and III (low-"depth") MNCs none of the international variables were significant. The regression results for Type I should be interpreted with caution though, because of the very small sample size.

The most interesting case is presented in Tables # 13 A, B and C where, using V(OF), i.e. DEVS91, as dependent variable, I examined the existence of operating flexibility regimes related to network structure. The SR procedure resulted in the cut-off point ($NC^*=10$, $CON2^*=0.25$)[48]. The MNCs with "wide" and "not-deep" international networks (Type III) display the highest average flexibility values than all other types and than the pooled sample. The other variables' mean differences among groups are similar to the ones from the SR on EVS91 with NC and CON2 as switch variables, since the cut-off point is the same. This is evident when one compares Tables # 12 B and # 13 B. What is more interesting though is that the results from the regressions for the four groups are substantially different when the dependent variable is DEVS91 (see Table # 13 C) instead of EVS91 (see Table # 12 C). The market intangibles and the MNC intangibles affect V(OF) in somewhat different way; for example, note that RD which was always positively related to EVS91, has a negative effect on DEVS91 for Types II and III. WIDTH has a positive effect on flexibility for MNCs with small and concentrated (Type II), and large and spread-out

---

[48]Here, once again the cut-off point is identical to the one from the SR model with EVS91 as the dependent variable. The four regimes are now:
Type I: $NC <= NC^*$ and $CON2 <= CON2^*$; these MNCs have a network with a small and spread-out international component; in other words these ar low-"width" and low-"depth" MNCs.
Type II: $NC <= NC^*$ and $CON2 > CON2^*$; these are MNCs with a small and concentrated international component, i.e. low-"width" and high-"depth" MNCs.
Type III: $NC > NC^*$ and $CON2 <= CON2^*$; these are MNCs with a large and spread out international network, i.e. high-"width" and low-"depth" MNCs.
Type IV: $NC > NC^*$ and $CON2 > CON2^*$; these are MNCs with a large and concentrated international network, i.e. high-"width" and high-"depth" MNCs.

(Type III), networks. It has a negative effect on DEVS91 for Type I MNCs[49]. Thus the effects of RD and WIDTH are of opposite signs for all groups except for group IV. NSO's effect on DEVS91 is positive for "not-wide" and "deep" MNCs (Type II) and negative for "wide" and "deep" ones (Type IV). This implies that adding subsidiaries to a concentrated network can be either an advantage relative to the average domestic firm (if "width" is low) or a disadvantage (if "width" is high), depending on the size of the network's international component ("width"). Having a financial subsidiary in the international network is only adding to the flexibility's value in the case of Type II firms, whose foreign operations are fairly limited and concentrated in few countries. GS's coefficient is significant only for MNCs with low "width" (Types I and II). For those firms sales growth is an advantage because it may be associated with the prospect of expanding foreign operations. For firms with already high "width" (Types III and IV) such prospects cannot exist because expansion of the network's international component has exceeded the critical value (NC^*). Therefore the effect of GS on DEVS for Types III and IV is insignificant.

The empirical evidence presented implies that investors do recognize the existence of operating flexibility regimes, both size-related and network structure-related. The non-linearity of the relationship has been demonstrated and the effect of the market intangibles and the MNC intangibles on flexibility has been highlighted. The cut-off points between the regimes are identical to the equivalent market value

[49]The Type I sample is actually too small (N=9) to for the regression results to be seriously considered as reliable.

regimes constructed previously, which indicates that higher market value is associated with higher value of operating flexibility.

IV. CONCLUSION

IV.1 Contribution and summary of findings.

This paper contributes to the existing literature by providing a theoretical model that outlines the conditions for the existence of excess market valuation of MNCs over comparable domestic firms. A measure of the MNCs ' operating flexibility is obtained using real options theory and a closed form solution of the flexibility option's value is calculated. In addition, this paper contains a thorough comparison of domestic and multinational industrial companies, empirically verifying structural differences between the two groups. These structural differences can be classified into two categories: market intangibles-related and MNC intangibles-related. A commonly used proxy for these structural differences, asset size, is shown to have increased explanatory power if a non-linear, endogeneously determined functional form is estimated by means of a Switching of Regressions regimes (SR) approach. A substitution effect between market intangibles (R&D intensity) and MNC intangibles (multinationality variables) is detected in the process, which motivated the use of a pair of multinationality variables in the SR model. The tests establish the existence of size -related, market intangibles-related and network structure-related market value regimes. Adding multinationality variables to the conventional market value model improves explanatory power, but does not change the composition of the regimes significantly. Medium sized MNCs with wide, spread-out international subsidiary networks are enjoying a market valuation premium over the other MNC types.

A direct comparison of the MNCs' market value with that of their average domestic competitors is employed to obtain a market value based measure of the value of operating flexibility of the MNCs. Using this flexibility measure as a dependent variable in the model the SR procedure is repeated yielding identical size-related and network structure-related regimes in support of the notion that MNC advantages are evident in market values. Once again, the MNCs with the "wide" and "spread-out" foreign subsidiary networks have significantly higher values of operating flexibility than MNC of any other type and than the pooled sample. The effect of the multinationality variables on flexibility value is different than that on market value. The multinationality variables seem to have more explanatory power when used to determine the value of OF rather than the MNC's market value. This is consistent with the internalization theory.

IV.2 Topics for future research.

This piece of work will hopefully generate interest because it could be complemented or extended in various ways. For example a logical next step would be to examine the stability of the results at different points in time by using a times series study of the stability of the composition of the different market value and operating flexibility regimes.

Another possible extention is to examine whether investors are able to recognize the movement of an MNC from one regime to another after an acquisition or after selling off part of its subsidiary network. Does the market price information related to the movement from one regime to another? This can be answered by use of an event study around acquisition or merger announcements.

The methodology presented here can be used in addressing a variety of problems, like the question of the ability to adjust to environment changes that affect all firms across the board. The model and the empirical evidence here suggest that those firms that possess the most flexible network structures should be the ones that fare the best when there are changes in the rules of the game. An event study around important international events could provide some more insight into this matter.

Finally it would be interesting to test whether the degree of operating flexibility provided by the MNC's foreign subsidiary network affects the market valuation of earnings or the return performance of MNCs vis a vis their domestic counterparts.

TABLE # 1

Descriptive statistics for all variables[1]

(A) All Firms:

Variable	N	Mean	Variance	Q3	Median	Q1
EVS91[2]	1042	0.3837	0.4778	0.5573	0.1841	-0.009
TA[3]	1097	5.9119	4.2279	7.2991	5.8404	4.5661
LTD[4]	1095	0.2105	0.0338	0.3118	0.1844	0.0613
RD[5]	693	0.0587	0.0431	0.0514	0.0199	0.0069
ADV[6]	856	0.0159	0.0009	0.0188	0.0002	1.8E-06
GS[7]	998	0.1006	0.0372	0.1825	0.0965	-0.001

(B) Domestic Firms (DOMs):

EVS91	455	0.2828	0.4355	0.4734	0.1267	-0.079
TA	497	4.8162	3.0984	6.0574	4.7947	3.5907
LTD	497	0.2378	0.0498	0.3781	0.2091	0.3313
RD	234	0.1024	0.1222	0.0527	0.0151	0.0043
ADV	360	0.0112	0.0067	0.0137	0.0002	3.3E-06
GS	421	0.0838	0.0553	0.2020	0.0714	-0.050

[1] In Panels (A) and (B) only the conventional variables are included. MNC-variables in Panel (C).

[2] EVS91 = (Market Value - Book Value of Assets)/Sales . Excess valuation schedule.

[3] TA = log(Total Assets) .

[4] LTD = (Long Term Debt)/(Total Debt) . Long term debt ratio.

[5] RD = (R&D Expenditures)/Sales . R&D intensity.

[6] ADV = (Advertising Expenditures)/Sales . Advertising intensity.

[7] GS = $(Sales91/Sales88)^{0.25}$. 4-year geometric rate of growth in sales.

TABLE # 1 (continued)
Descriptive statistics for all variables[8]

(C) Multinational Firms (MNCs):

Variable	N	Mean	Variance	Q3	Median	Q1
EVS91[9]	587	0.4619	0.4974	0.6417	0.2271	0.0352
TA[10]	600	6.8194	3.3493	8.0728	6.6845	5.5233
LTD[11]	598	0.1878	0.0194	0.2674	0.1771	0.0785
RD[12]	459	0.0364	0.0015	0.0492	0.0232	0.0081
ADV[13]	496	0.0193	0.0012	0.0242	0.0002	1.1E-06
GS[14]	577	0.1129	0.0237	0.1805	0.1087	0.0278
NSO[15]	626	1.8717	1.6008	2.7877	1.7918	0.6931
NC[16]	626	1.5403	1.2095	2.3979	1.3863	0.6931
WIDTH[17]	626	0.5783	0.0651	0.8	0.6009	0.375

[8] In Panels (A) and (B) only the conventional variables are included. MNC-variables in Panel (C).

[9] EVS91 = (Market Value - Book Value of Assets)/Sales . Excess valuation schedule.

[10] TA = log(Total Assets)

[11] LTD = (Long Term Debt)/(Total Debt) . Long term debt ratio.

[12] RD = (R&D Expenditures)/Sales . R&D intensity.

[13] ADV = (Advertising Expenditures)/Sales . Advertising intensity.

[14] GS = $(\text{Sales91}/\text{Sales88})^{0.25}$. 4-year geometric rate of growth in sales.

[15] NSO = log(Number of foreign subsidiaries) .

[16] NC = log(Number of foreign countries) .

[17] WIDTH = (Number of foreign Subsidiaries)/(Total number of subsidiaries) .

TABLE # 1 (continued)
Descriptive statistics for all variables[18]

(C) Multinational Firms (MNCs) - cont'd:

Variable	N	Mean	Variance	Q3	Median	Q1
DEPTH[19]	626	1.6109	2.5613	1.6704	1.6667	1
CON2[20]	626	0.6107	0.1066	1	0.5555	0.3097
NFS[21]	626	0.2539	0.1898	1	0	0
TH[22]	626	0.0974	0.0881	0	0	0
DEVS91[23]	522	0.1470	0.4373	0.3649	0.0201	-0.2196

[18] In Panels (A) and (B) only the conventional variables are included. MNC-variables in Panel (C).

[19] DEPTH = NSO/NC . Average number of subsidiaries per foreign country.

[20] CON2 = Concentration ratio of subsidiaries in the two largest foreign countries.

[21] NFS = Dummy variable that takes the value 1 if the subsidiary network of the MNC includes a financial subsidiary, and 0 otherwise.

[22] TH = Dummy variable that takes the value of 1 if the MNC has a financial subsidiary in a tax-haven country, and 0 otherwise.

[23] $DEVS91_i = EVS91_i$ - (Average EVS for all DOMs in MNC i's three-digit SIC industry) . Value of operating flexibility, V(OF).

TABLE # 2

Test of signifficance in means' difference (MNC - DOM).
z - statistics.

Variables	z-value
EVS91	4.216***
TA	18.43***
LTD	-4.34***
RD	-2.88**
ADV	1.767*
GS	2.214**

* : significant at 10% level
** : significant at 5% level
***: significant at 1% level

TABLE # 3

Results of a forward stepwise regression procedure.
Dependent variable : EVS91

(A) All firms:

	TA	LTD	RD	ADV	GS
Enter #	3	4	2	1	5
R^2-value	0.1645	0.1801	0.1262	0.0794	0.1908

(B) Domestic firms (DOMs):

	TA	LTD	RD	ADV	GS
Enter #	3	---	1	---	2
R^2-value	0.2406	---	0.1612	---	0.2093

(C) Multinational Firms (MNCs):

	TA	LTD	RD	ADV	GS
Enter #	3	2	4	1	5
R^2-value	0.1835	0.1519	0.1934	0.1133	0.1953

TABLE # 4

(A) Regression results for the conventional model.

$$EVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS$$

All firms:

	Intercept	TA	LTD	RD	ADV	GS
Coeffic.	-0.1601	0.0706	-0.5788	3.3005	4.9926	0.5147
T-value	-1.56	5.06***	-3.04***	4.19***	5.88***	2.57**

d.f= 499; R^2 = 0.1908; adjusted-R^2 = 0.1827

Domestic firms (DOMs):

	Intercept	TA	LTD	RD	ADV	GS
Coeffic.	-0.2802	0.074	-0.119	6.466	0.477	0.6872
T-value	-1.83*	2.45**	-0.51	4.94***	0.29	2.82**

d.f= 136; R^2 = 0.2427; adjusted-R^2 = 0.2149

Multinational firms (MNCs):

	Intercept	TA	LTD	RD	ADV	GS
Coeffic.	-0.0523	0.0715	-1.0059	2.0544	6.2454	0.2649
T-value	-0.34	3.69***	-3.71***	2.14**	6.26***	0.929

d.f= 357; R^2 = 0.1953; adjusted-R^2 = 0.1841

*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
d.f : degrees of freedom.

EVS91 = (Market Value - Book Value of Assets)/Sales .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .

TABLE # 4 (continued)

(B) Regression results for the model examining the differential effectiveness of conventional variables on market values between the MNCs and the DOMs.

$$EVS91 = a_0 + a_1TA + a_2LTD + a_3RD + a_4ADV + a_5GS + a_6DUM + a_7TA*DUM + a_8LTD*DUM + a_9RD*DUM + a_{10}ADV*DUM + a_{11}GS*DUM$$

Independ. variables	Coefficient	T-value
Intercept	-0.2802	-1.51
TA	0.0704	2.02**
LTD	-0.1197	-0.42
RD	6.4665	4.08***
ADV	0.477	0.25
GS	0.6872	2.33**
DUM	0.2279	0.97
TA*DUM	-0.0025	-0.06
LTD*DUM	-0.8862	-2.32**
RD*DUM	-4.4121	-2.42**
ADV*DUM	5.7683	2.68**
GS*DUM	-0.4223	-1.06

R^2	0.2214
adjusted R^2	0.2041
d.f.	493

*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
d.f : degrees of freedom.
DUM = Dummy variable that takes the value of 1 if the firm is a multinational and 0 if the firm is domestic.

TABLE # 5 A

Descriptive statistics for the two types of firms obtained as the solution of the switching regression with one cut-off point (TA^*).

Domestic firms (DOMs), TA^*=66

Type I: N=130

	EVS91	TA[1]	LTD	RD	ADV	GS
Mean	0.242	41.753	0.193	0.024	0.014	0.11
Var.	0.333	177.7	0.037	0.001	0.0009	0.035

Type II: N=12

	EVS91	TA[1]	LTD	RD	ADV	GS
Mean	0.463	73.296	0.348	0.03	0.004	0.079
Var.	0.694	45.03	0.083	0.002	0.0001	0.004

Multinational firms (MNCs), TA^*=49

Type I: N=49

	EVS91	TA[1]	LTD	RD	ADV	GS
Mean	0.068	41.36	0.171	0.038	0.018	0.032
Var.	0.067	49.966	0.023	0.002	0.001	0.015

Type II: N=314

	EVS91	TA[1]	LTD	RD	ADV	GS
Mean	0.561	73.66	0.184	0.036	0.022	0.089
Var.	0.619	251.97	0.018	0.001	0.001	0.014

Type I : firms with TA <= TA^* .
Type II: firms with TA > TA^* .

EVS91 = (Market Value - Book Value of Assets)/Sales .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .

[1] : Variable TA is factored by 100 (i.e. TA=100*TA) .

TABLE # 5 B

Means difference significane test among multinationals (MNCs) and domestic firms (DOMs) for Types I and II respectively.

z - statistics

	EVS91	TA[1]	LTD	RD	ADV	GS
MNC(I)-MNC(II)	-8.532*	-23.93*	-0.566	0.302	-0.824	-3.04*
DOM(I)-DOM(II)	-0.899	-13.94*	-1.826*	-0.454	2.56*	1.263

* denotes significance at the 10%-level or better.

Type I : firms with TA <= TA* .
Type II: firms with TA > TA* .
TA* = 66 for the DOM sample. TA* = 49 for the MNC sample.

EVS91 = (Market Value - Book Value of Assets)/Sales .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .

[1] : Variable TA is factored by 100 (i.e. TA=100*TA)

TABLE # 5 C

Coefficient estimates from switching regression model with one switching cut-off point. Switch variable is TA.

$$EVS91 = a_0 + a_1{*}TA + a_2{*}LTD + a_3{*}RD + a_4{*}ADV + a_5{*}GS$$

Domestic firms (DOMs), $TA^*=66$

Type I: N=129; R^2=0.1824

	Inter.	TA[1]	LTD	RD	ADV	GS
Coeff.	-0.184	0.007	-0.135	5.553	-0.193	0.408
T-value	-1.04	1.82^{*}	-0.53	3.81^{***}	-0.12	2.09^{**}

Type II: N=11; R^2=0.985

	Inter.	TA[1]	LTD	RD	ADV	GS
Coeff.	2.135	-0.03	0.469	-16.36	81.165	3.948
T-value	3.84^{***}	-3.49^{***}	2.52^{**}	-5.83^{***}	12.1^{***}	4.51^{***}

Multinational firms (MNCs), $TA^*=49$

Type I: N=48; R^2=0.1785

	Inter.	TA[1]	LTD	RD	ADV	GS
Coeff.	-0.277	0.006	0.07	1.484	-0.28	0.534
T-value	-1.22	1.22	0.29	1.96^{*}	-0.26	1.77^{*}

Type II: N=313; R^2=0.1998

	Inter.	TA[1]	LTD	RD	ADV	GS
Coeff.	0.327	0.003	-1.215	1.978	7.003	0.513
T-value	1.61	1.01	-3.89^{***}	1.73^{*}	6.45^{***}	1.49

Type I : firms with $TA \le TA^*$. Type II: firms with $TA > TA^*$.

*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
EVS91 = (Market Value - Book Value of Assets)/Sales .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
[1] : Variable TA is factored by 100 (i.e. TA=100*TA) .

TABLE # 6 A

Descriptive statistics for the two types of firms obtained as the solution of the switching regression with two cut-off points (TA^*,TA^{**}).

Domestic firms (DOMs); $TA^*=36$,$TA^{**}=66$

Type I: N=44

	EVS91	TA[1]	LTD	RD	ADV	GS
Mean	0.142	26.878	0.135	0.029	0.02	0.116
Var.	0.151	54.93	0.024	0.001	0.0009	0.122

Type II: N=86

	EVS91	TA[1]	LTD	RD	ADV	GS
Mean	0.294	49.363	0.223	0.021	0.011	0.106
Var.	0.421	68.78	0.041	0.001	0.0008	0.032

Type III: N=12

	EVS91	TA[1]	LTD	RD	ADV	GS
Mean	0.463	73.296	0.348	0.03	0.004	0.079
Var.	0.694	45.03	0.083	0.002	0.0001	0.004

Type I : firms with $TA \le TA^*$.
Type II: firms with $TA > TA^*$.

EVS91 = (Market Value - Book Value of Assets)/Sales .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .

[1] : Variable TA is factored by 100 (i.e. TA=100*TA) .

TABLE # 6 A (continued)

Descriptive statistics for the two types of firms obtained as the solution of the switching regression with two cut-off points (TA*,TA**).

Multinational firms (MNCs); TA*=49, TA**=93

Type I: N=49

	EVS91	TA[1]	LTD	RD	ADV	GS
Mean	0.068	41.36	0.171	0.038	0.018	0.032
Var.	0.067	49.966	0.023	0.002	0.001	0.015

Type II: N=217

	EVS91	TA[1]	LTD	RD	ADV	GS
Mean	0.594	67.79	0.183	0.036	0.022	0.088
Var.	0.671	149.3	0.019	0.001	0.001	0.015

Type III: N=37

	EVS91	TA[1]	LTD	RD	ADV	GS
Mean	0.309	102.6	0.196	0.036	0.02	0.101
Var.	0.163	70.43	0.009	0.0008	0.0008	0.003

Type I : firms with TA <= TA* .
Type II: firms with TA > TA* .

EVS91 = (Market Value - Book Value of Assets)/Sales .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .

[1] : Variable TA is factored by 100 (i.e. TA=100*TA) .

<u>**TABLE # 6 B**</u>

Means difference significane test among multinationals (MNCs) and domestic firms (DOMs) for Types I, II and III respectively.

z - statistics

<u>Domestic firms (DOMs)</u>:

	<u>EVS91</u>	<u>TA[1]</u>	<u>LTD</u>	<u>RD</u>	<u>ADV</u>	<u>GS</u>
DOM(I)-DOM(II)	-1.666*	-15.71*	-2.752*	1.365	1.649*	0.178
DOM(I)-DOM(II)	-1.297	-20.77*	-0.807	-0.073	2.982*	0.304
DOM(II)-DOM(III)	-0.675	-11.22*	-0.474	0.674	1.667*	0.226

<u>Multinational firms (MNCs)</u>:

	<u>EVS91</u>	<u>TA[1]</u>	<u>LTD</u>	<u>RD</u>	<u>ADV</u>	<u>GS</u>
MNC(I)-MNC(II)	-8.544*	-21.17*	-0.517	0.3	-0.82	-2.95*
MNC(I)-MNC(II)	-3.172*	-35.82*	-0.937	0.253	-0.31	-3.51*
MNC(II)-MNC(III)	3.449*	-22.27*	-0.736	0.0	0.398	-1.12

* denotes significance at the 10%-level or better.

Type I : firms with TA <= TA* .
Type II: firms with TA > TA* .
TA*=36,TA**=66 for the DOM sample. TA*=49,TA**=93 for the MNC sample.

EVS91 = (Market Value - Book Value of Assets)/Sales .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .

[1] : Variable TA is factored by 100 (i.e. TA=100*TA)

TABLE # 6 C

Coefficient estimates from switching regression model with one switching cut-off point.
Switch variable is TA.

$$EVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS$$

Domestic firms (DOMs): $TA^{*}=36, TA^{**}=66$

Type I: d.f=43; $R^2=0.1416$

	Inter.	TA[1]	LTD	RD	ADV	GS
Coeff.	-0.184	0.007	-0.135	5.553	-0.193	0.408
T-value	-1.04	1.82*	-0.53	3.81***	-0.12	2.09**

Type II: N=85; $R^2=0.2343$

	Inter.	TA[1]	LTD	RD	ADV	GS
Coeff.	-0.305	0.008	-0.218	7.519	0.688	0.604
T-value	-0.72	1.05	-0.66	3.97***	0.305	1.57

Type III: N=11; $R^2=0.9851$

	Inter.	TA[1]	LTD	RD	ADV	GS
Coeff.	2.135	-0.03	0.469	-16.36	81.165	3.948
T-value	3.84***	-3.49***	2.52**	-5.83***	12.1***	4.51***

Type I: $TA <= TA^{*}$. Type II: $TA^{*} < TA <= TA^{**}$. Type III: $TA > TA^{**}$.

*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.

EVS91 = (Market Value - Book Value of Assets)/Sales .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .

[1] : Variable TA is factored by 100 (i.e. TA=100*TA) .

TABLE # 6 C (continued)

Coefficient estimates from switching regression model with one switching cut-off point. Switch variable is TA.

$$EVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS$$

Multinational firms (MNCs): $TA^{*}=49$, $TA^{**}=93$

Type I: N=48; $R^2=0.1785$

	Inter.	TA[1]	LTD	RD	ADV	GS
Coeff.	-0.277	0.006	0.07	1.484	-0.28	0.534
T-value	-1.22	1.22	0.29	1.96*	-0.26	1.77*

Type II: N=276; $R^2=0.2416$

	Inter.	TA[1]	LTD	RD	ADV	GS
Coeff.	-0.293	0.012	-1.311	2.254	6.833	0.491
T-value	-1.13	3.43***	-4.02***	1.88*	5.96***	1.39

Type III: N=36; $R^2=0.2421$

	Inter.	TA[1]	LTD	RD	ADV	GS
Coeff.	0.803	-0.006	0.103	-3.623	4.011	1.659
T-value	0.92	-0.81	0.13	-1.49	1.74*	1.19

Type I: $TA <= TA^{*}$. Type II: $TA^{*} < TA <= TA^{**}$. Type III: $TA > TA^{**}$.

*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.

EVS91 = (Market Value - Book Value of Assets)/Sales .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .

[1] : Variable TA is factored by 100 (i.e. TA=100*TA) .

TABLE # 7 A

Descriptive statistics for the two types of firms obtained as
the solution of the switching regression with two cut-off points (RD*,ADV*).

Domestic firms (DOMs): RD*=6[1],ADV*=27[1]

Type I: N=39

	EVS91	TA[2]	LTD	RD	ADV	GS
Mean	0.09	4.57	0.253	1.09	3.161	0.055
Var.	0.05	2.272	0.053	3.231	53.628	0.03

Type II: N=9

	EVS91	TA[2]	LTD	RD	ADV	GS
Mean	-0.0009	4.077	0.236	0.838	77.06	0.117
Var.	0.423	1.189	0.032	2.125	3472.82	0.167

Type III: N=84

	EVS91	TA[1]	LTD	RD	ADV	GS
Mean	0.339	4.519	0.199	34.239	5.336	0.112
Var.	0.415	2.368	0.039	1420.58	56.18	0.041

Type IV: N=10

	EVS91	TA[1]	LTD	RD	ADV	GS
Mean	0.511	3.684	0.057	51.196	64.967	0.268
Var.	0.942	4.725	0.008	2282.4	1033.7	0.352

Type I : RD <= RD* and ADV <= ADV* ; Type II : RD <= RD* and ADV > ADV* .
Type III : RD > RD* and ADV <= ADV* ; Type IV : RD > RD* and ADV > ADV* .

[1] : Variables RD and ADV are factored by 1000 (i.e. RD=RD*1000, ADV=1000*ADV) .

[2] : Variable TA is factored by 100 (i.e. TA=100*TA) .

TABLE # 7 A (continued)

Descriptive statistics for the two types of firms obtained as the solution of the switching regression with two cut-off points (RD^*,ADV^*).

Multinational firms (MNCs); $RD^*=11^1$,$ADV^*=19^1$

Type I: N=75

	EVS91	TA[2]	LTD	RD	ADV	GS
Mean	0.195	6.606	0.228	4.703	2.888	0.062
Var.	0.098	3.606	0.028	12.039	31.016	0.021

Type II: N=35

	EVS91	TA[2]	LTD	RD	ADV	GS
Mean	0.769	6.928	0.171	4.785	56.156	0.07
Var.	0.576	3.65	0.014	10.724	1226.1	0.007

Type III: N=176

	EVS91	TA[1]	LTD	RD	ADV	GS
Mean	0.41	6.993	0.175	49.35	4.039	0.082
Var.	0.378	3.337	0.017	1699.9	37.132	0.013

Type IV: N=77

	EVS91	TA[1]	LTD	RD	ADV	GS
Mean	0.852	7.101	0.16	51.611	61.303	0.103
Var.	1.234	3.541	0.013	1133.8	2536.4	0.015

Type I : $RD \le RD^*$ and $ADV \le ADV^*$; Type II : $RD \le RD^*$ and $ADV > ADV^*$.
Type III : $RD > RD^*$ and $ADV \le ADV^*$; Type IV : $RD > RD^*$ and $ADV > ADV^*$.

[1] : Variables RD and ADV are factored by 1000 (i.e. RD=RD*1000, ADV=1000*ADV) .

[2] : Variable TA is factored by 100 (i.e. TA=100*TA) .

TABLE # 7 B

Means difference significane test among multinationals (MNCs) and domestic firms (DOMs) for Types I, II, III and IV respectively.

z - statistics

Domestic firms (DOMs):

	EVS91	TA[1]	LTD	RD[2]	ADV[2]	GS
DOM(I)-DOM(II)	0.4137	1.1299	0.2425	0.4462	-3.755*	-0.446
DOM(I)-DOM(III)	-3.157*	0.1734	1.2646	-8.041*	-1.521	-1.608
DOM(I)-DOM(IV)	-1.362	1.2161	4.2183*	-3.316*	-6.039*	-1.123
DOM(II)-DOM(III)	-1.491	-1.104	0.5836	-8.066*	3.6481*	0.0362
DOM(II)-DOM(IV)	-1.362	0.5054	2.7123*	-3.332*	0.5467	-0.651
DOM(III)-DOM(IV)	-0.543	1.1801	3.9936*	-1.083	-5.846*	-0.826

Multinational firms (MNCs):

	EVS91	TA[1]	LTD	RD	ADV	GS
MNC(I)-MNC(II)	-4.307*	-0.823	2.049*	-0.12	-8.947*	-0.365
MNC(I)-MNC(III)	-3.658*	-1.495	2.445*	-14.25*	-1.456	-1.063
MNC(I)-MNC(IV)	-4.99*	-1.614	2.92*	-12.16*	-10.11*	-1.88*
MNC(II)-MNC(III)	2.6319*	0.1852	-0.179	-14.12*	8.7791*	-0.725
MNC(II)-MNC(IV)	-0.4605	-0.446	0.4612	-12.08*	-0.624	-1.66*
MNC(III)-MNC(IV)	-3.279*	-0.423	0.9207	-0.458	-9.945*	-1.281

* denotes significance at the 10%-level or better.

Type I : RD <= RD* AND ADV <= ADV* . Type II : RD <= RD* AND ADV > ADV* .
Type III : RD > RD* AND ADV <= ADV* . Type IV : RD > RD* AND ADV > ADV* .

RD*=6,ADV*=27 for the DOM sample. RD*=11,ADV*=19 for the MNC sample.

[1] : Variable TA is factored by 100 (i.e. TA=100*TA) .

[2] : Variables RD and ADV are factored by 100) (i.e. RD=1000*RD and ADV=1000*ADV) .

TABLE # 7 C

Coefficient estimates from switching regression model with one switching cut-off point. Switch variables are RD and ADV.

$$EVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS$$

Domestic firms (DOMs); $RD^*=6, ADV^*=27$

Type I: d.f=33; $R^2=0.808$

	Inter.	TA	LTD	RD	ADV	GS
Coeff.	0.137	-0.009	0.168	5.553	-0.007	0.197
T-value	1.11	-0.34	0.95	-1.26	-1.34	0.78

Type II: d.f.=3; $R^2=0.2607$

	Inter.	TA	LTD	RD	ADV	GS
Coeff.	-1.4	0.213	1.204	-0.14	0.004	0.259
T-value	-0.97	0.69	0.53	-0.61	0.74	0.13

Type III: d.f.=78; $R^2=0.9933$

	Inter.	TA	LTD	RD	ADV	GS
Coeff.	-0.01	0.061	-0.374	0.005	-0.011	0.983
T-value	-0.42	1.31	-1.045	2.97**	-1.22	2.99**

Type IV: d.f.=4; $R^2=0.4387$

	Inter.	TA	LTD	RD	ADV	GS
Coeff.	-1.638	0.344	0.791	0.007	0.007	0.121
T-value	-1.31	2.15*	0.21	1.01	0.59	0.24

Type I: $RD <= RD^*$; $ADV <= ADV^*$. Type II: $RD <= RD^*$; $ADV > ADV^*$
Type III: $RD > RD^*$; $ADV <= ADV^*$. Type IV: $RD > RD^*$; $ADV > ADV^*$
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.

EVS91 = (Market Value - Book Value of Assets)/Sales .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .

TABLE # 7 C (continued)

Coefficient estimates from switching regression model with one switching cut-off point. Switch variables are RD and ADV.

$$EVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS$$

Multinational firms (MNCs): $RD^*=11, ADV^*=19$

Type I: d.f=69; $R^2=0.0903$

	Inter.	TA	LTD	RD	ADV	GS
Coeff.	-0.038	0.04	-0.308	0.008	0.003	-0.15
T-value	-0.26	1.97*	-1.38	0.774	0.512	-0.56

Type II: d.f.=29; $R^2=0.4136$

	Inter.	TA	LTD	RD	ADV	GS
Coeff.	0.062	0.118	-2.66	-0.005	0.003	2.911
T-value	0.15	1.74*	-2.66**	-0.13	0.87	2.13**

Type III: d.f.=170; $R^2=0.0547$

	Inter.	TA	LTD	RD	ADV	GS
Coeff.	0.175	0.025	-0.383	0.001	-0.011	0.973
T-value	0.82	0.99	-1.057	0.82	-0.18	2.33**

Type IV: d.f.=71; $R^2=0.2631$

	Inter.	TA	LTD	RD	ADV	GS
Coeff.	-0.073	0.147	-3.331	0.002	0.005	0.093
T-value	-0.14	2.38**	-3.22**	0.42	2.33**	0.1

Type I: $RD <= RD^*$; $ADV <= ADV^*$. Type II: $RD <= RD^*$; $ADV > ADV^*$
Type III: $RD > RD^*$; $ADV <= ADV^*$. Type IV: $RD > RD^*$; $ADV > ADV^*$
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.

EVS91 = (Market Value - Book Value of Assets)/Sales .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .

TABLE # 8 A

Descriptive statistics for the pooled sample and the two types of MNCs obtained as the solution of the switching regression with one cut-off point ($TA^{*}=5$).

Type I: N=53

	EVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	TH	CON2
Me	0.073	4.194	0.17	0.039	0.017	0.036	3.038	3.623	0.549	1.257	0.057	0	0.797
Var	0.071	0.504	0.023	0.014	0.001	0.014	7.883	10.2	0.053	0.226	0.054	0	0.073

Type II: N=310

	EVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	TH	CON2
Me	0.566	7.398	0.185	0.036	0.022	0.089	11.74	21.84	0.65	1.66	0.319	0.1	0.48
Var	0.623	2.473	0.018	0.001	0.001	0.014	135.3	1042	0.058	2.142	0.218	0.1	0.008

All MNCs: N=363

	EVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	TH	CON2
Me	0.494	6.93	0.182	0.036	0.021	0.081	10.47	19.18	0.635	1.601	0.281	0.1	0.526
Var	0.572	3.467	0.019	0.001	0.001	0.014	126.1	932.4	0.058	1.881	0.203	0.1	0.098

Type I : firms with $TA \le TA^{*}$.
Type II: firms with $TA > TA^{*}$.

TABLE # 8 B

Means difference significane tests among multinationals (MNCs) of Types I, II, and the pooled sample respectively.

z - statistics

	EVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	CON2
I-II	-2.60*	-8.36*	-0.396	0.311	-0.579	-1.64*	-3.14*	-2.39*	-1.55	-1.14	-2.28*	4.02*
I-ALL	-2.49*	-6.55*	-0.328	0.325	-0.49	-1.47	-2.99*	-2.33*	-1.4	-1.12	-2.16*	3.48*
II-ALL	0.421	1.125	0.097	0.0	0.14	0.299	0.5	0.384	0.276	0.189	0.373	0.653

* denotes significance at the 10%-level or better.

Type I : firms with TA <= TA* .
Type II: firms with TA > TA* .
TA*=5 .

EVS91 = (Market Value - Book Value of Assets)/Sales .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 8 C

Coefficient estimates from switching regression model with one switching cut-off point.
Switch variable is TA. (TA^*=5).

a) $EVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*NSO + a_7*NFS$

b) $EVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*WIDTH + a_7*DEPTH + a_8*NFS$

Type I: N=52; Model a): R^2=0.1343; Model b): R^2=0.1656;

a)	Inter.	LTD	RD	ADV	GS	NSO	NFS
Coeff.	0.02	-0.058	0.994	-0.364	0.652	0.001	0.11
T-value	0.258	-0.233	1.275	-0.311	2.05**	0.018	0.678

b)	Inter.	LTD	RD	ADV	GS	WIDTH	DEPTH	NFS
Coeff.	-0.123	-0.121	0.883	-0.909	0.671	0.195	0.045	0.169
T-value	-0.903	-0.477	1.138	-0.732	2.12**	1.143	0.547	1.008

Type I : firms with TA <= TA^* . Type II: firms with TA > TA^* .
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
EVS91 = (Market Value - Book Value of Assets)/Sales .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 8 C (continued)

Coefficient estimates from switching regression model with one switching cut-off point. Switch variable is TA. ($TA^*=5$).

a) $EVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*NSO + a_7*NFS$

b) $EVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*WIDTH + a_7*DEPTH + a_8*NFS$

Type II: N=309; Model a):R^2=0.2120; Model b): R^2=0.2169;

a)	Inter.	LTD	RD	ADV	GS	NSO	NFS
Coeff.	0.349	-1.23	1.802	6.796	0.458	0.08	-0.002
T-value	2.98^{**}	-3.91^{**}	1.556	6.22^{***}	1.332	2.23^{**}	-0.019

b)	Inter.	LTD	RD	ADV	GS	WIDTH	DEPTH	NFS
Coeff.	0.256	-0.126	1.311	6.769	0.493	0.462	-0.012	0.079
T-value	1.83^{**}	-4.0^{***}	1.1	6.07^{***}	1.441	2.63^{***}	-0.43	0.893

Type I : firms with TA <= TA^* . Type II: firms with TA > TA^* .
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
EVS91 = (Market Value - Book Value of Assets)/Sales .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 9 A

Descriptive statistics for the pooled sample and the three types of MNCs obtained as the solution of the switching regression with one cut-off point ($TA^{*}=5, TA^{**}=9.5$).

Type I: N=53

	EVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	TH	CON2
Me	0.073	4.194	0.17	0.039	0.017	0.036	3.038	3.623	0.549	1.257	0.057	0	0.797
Var	0.071	0.504	0.023	0.014	0.001	0.014	7.883	10.2	0.053	0.226	0.054	0	0.073

Type II: N=279

	EVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	TH	CON2
Me	0.596	7.06	0.182	0.036	0.022	0.088	10.66	17.73	0.647	1.492	0.272	0.1	0.49
Var	0.666	1.536	0.019	0.001	0.001	0.015	101.6	592.8	0.06	0.559	0.199	0.1	0.09

Type I : firms with $TA \leq TA^{*}$.
Type II: firms with $TA > TA^{*}$.

EVS91 = (Market Value - Book Value of Assets)/Sales .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy . TH= Tax haven dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 9 A (continued)

Descriptive statistics for the pooled sample and the three types of MNCs obtained as the solution of the switching regression with one cut-off point (TA^{*}=5,TA^{**}=9.5).

Type III: N=31

	EVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	TH	CON2
Me	0.301	10.44	0.211	0.031	0.023	0.096	21.42	58.8	0.667	3.172	0.742	0.3	0.389
Var	0.166	0.649	0.007	0.001	0.001	0.003	344.9	3670	0.037	14.26	0.198	0.2	0.051

All MNCs: N=363

	EVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	TH	CON2
Me	0.494	6.93	0.182	0.036	0.021	0.081	10.47	19.18	0.635	1.601	0.281	0.1	0.526
Var	0.572	3.467	0.019	0.001	0.001	0.014	126.1	932.4	0.058	1.881	0.203	0.1	0.098

Type I : firms with TA <= TA^{*} .
Type II: firms with TA > TA^{*} .

EVS91 = (Market Value - Book Value of Assets)/Sales .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy . TH= Tax haven dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 9 B

Means difference significane test among multinationals (MNCs) of Types I, II, III, and the pooled sample respectively.

z - statistics

	EVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	CON2
I-II	-2.67*	-9.31*	-0.31	0.311	-0.579	-1.57	-3.17*	-2.45*	-1.49	-1.25	-1.96*	3.84*
I-III	-2.37*	-31.0*	-1.48	0.982	-0.764	-2.98*	-4.52*	-4.17*	-2.44*	-2.32*	-6.70*	6.61*
I-ALL	-7.79*	-19.8*	-0.54	0.471	-0.860	-2.59*	-10.5*	-9.36*	-2.53*	-3.54*	-5.64*	6.68*
II-III	2.91*	-17.7*	-1.45	0.881	-0.147	0.571	-2.63*	-3.09*	-0.67	-2.04*	-4.67*	1.93*
II-ALL	1.62*	1.059	0.0	0.0	0.397	0.728	0.231	-0.67	0.619	-1.29	-0.25	-1.48
III-ALL	-2.32*	20.1*	1.74*	-1.06	0.354	1.289	3.23*	3.60*	1.141	2.30*	5.53*	-3.13*

* denotes significance at the 10%-level or better.
Type I : $TA <= TA^*$; Type II : $TA^* < TA <= TA^{**}$; Type III : $TA > TA^{**}$.
$TA^*=5$ and $TA^{**}=9.5$.

EVS91 = (Market Value - Book Value of Assets)/Sales .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 9 C

Coefficient estimates from switching regression model with two switching cut-off point.
Switch variable is TA. (TA^{*}=5,TA^{**}=9.5).

a) $EVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*NSO + a_7*NFS$

b) $EVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*WIDTH + a_7*DEPTH + a_8*NFS$

Type I: N=52; Model a):R^2=0.1343; Model b): R^2=0.1656;

a)	Inter.	LTD	RD	ADV	GS	NSO	NFS
Coeff.	0.02	-0.058	0.994	-0.364	0.652	0.001	0.11
T-value	0.258	-0.233	1.275	-0.311	2.05**	0.018	0.678

b)	Inter.	LTD	RD	ADV	GS	WIDTH	DEPTH	NFS
Coeff.	-0.123	-0.121	0.883	-0.909	0.671	0.195	0.045	0.169
T-value	-0.903	-0.477	1.138	-0.732	2.12**	1.143	0.547	1.008

Type I : TA <= TA^{*} ; Type II : TA^{*} < TA <= TA^{**} ; Type III: TA > TA^{**} .
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
EVS91 = (Market Value - Book Value of Assets)/Sales .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 9 C (continued)

Coefficient estimates from switching regression model with one switching cut-off point.
Switch variable is TA. ($TA^*=5$).

a) $EVS91 = a_0 + a_1{*}TA + a_2{*}LTD + a_3{*}RD + a_4{*}ADV + a_5{*}GS + a_6{*}NSO + a_7{*}NFS$

b) $EVS91 = a_0 + a_1{*}TA + a_2{*}LTD + a_3{*}RD + a_4{*}ADV + a_5{*}GS + a_6{*}WIDTH + a_7{*}DEPTH + a_8{*}NFS$

Type II: N=278; Model a):R^2=0.2388; Model b): R^2=0.2309;

a)	Inter.	LTD	RD	ADV	GS	NSO	NFS
Coeff.	0.281	-1.28	1.708	6.806	0.424	0.127	0.054
T-value	2.28**	-3.91***	1.409	5.93***	1.199	3.21**	0.542

b)	Inter.	LTD	RD	ADV	GS	WIDTH	DEPTH	NFS
Coeff.	0.19	-1.292	1.55	6.768	0.487	0.456	0.043	0.129
T-value	1.201	-3.91***	1.231	5.79***	1.373	2.38***	0.701	1.29

Type I : TA <= TA^* ; Type II : TA^* < TA <= TA^{**} ; Type III: TA > TA^{**} .
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
EVS91 = (Market Value - Book Value of Assets)/Sales .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 9 C (continued)

**Coefficient estimates from switching regression model with one switching cut-off point.
Switch variable is TA. (TA^{*}=5).**

a) $EVS91 = a_0 + a_1{*}TA + a_2{*}LTD + a_3{*}RD + a_4{*}ADV + a_5{*}GS + a_6{*}NSO + a_7{*}NFS$

b) $EVS91 = a_0 + a_1{*}TA + a_2{*}LTD + a_3{*}RD + a_4{*}ADV + a_5{*}GS + a_6{*}WIDTH + a_7{*}DEPTH + a_8{*}NFS$

Type III: N=30; Model a):R^2=0.3857; Model b): R^2=0.4681;

a)	Inter.	LTD	RD	ADV	GS	NSO	NFS
Coeff.	-0.056	0.823	-6.403	3.101	2.568	0.009	0.044
T-value	-0.127	0.863	-2.28^{**}	1.237	1.86^{*}	0.106	0.259

b)	Inter.	LTD	RD	ADV	GS	WIDTH	DEPTH	NFS
Coeff.	0.258	-0.126	1.311	6.645	0.493	0.462	-0.012	0.079
T-value	1.83^{*}	-4.0^{***}	1.1	6.08^{***}	1.441	2.63^{***}	-0.43	0.893

Type I : TA <= TA^{*} ; Type II : TA^{*} < TA <= TA^{**} ; Type III: TA > TA^{**} .
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
EVS91 = (Market Value - Book Value of Assets)/Sales .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 10 A

Descriptive statistics for the pooled sample and the two types of MNCs obtained as the solution of the switching regression with one cut-off point (TA^*=5).

Type I: N=47

	DEVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	TH	CON2
Me	-0.173	4.162	0.153	0.04	0.018	0.037	3.17	3.681	0.563	1.231	0.042	0	0.78
Var	0.104	0.539	0.017	0.003	0.001	0.015	8.623	10.57	0.052	0.215	0.042	0	0.077

Type II: N=273

	DEVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	TH	CON2
Me	0.288	7.396	0.181	0.037	0.021	0.094	11.65	21.65	0.652	1.672	0.311	0.1	0.48
Var	0.551	2.381	0.018	0.001	0.001	0.014	136.8	1062	0.058	2.365	0.215	0.1	0.089

All MNCs: N=320

	DEVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	TH	CON2
Me	0.169	6.92	0.177	0.037	0.021	0.085	10.4	19.01	0.639	1.607	0.272	0.1	0.526
Var	0.504	3.43	0.018	0.001	0.001	0.015	126.9	947.6	0.058	2.072	0.198	0.1	0.098

Type I : firms with TA <= TA^* .
Type II: firms with TA > TA^* .

TABLE # 10 B

Means difference significane test among multinationals (MNCs) of Types I, II, and the pooled sample respectively.

z - statistics

	DEVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	CON2
I-II	-2.54*	-8.53*	-0.758	0.275	-0.342	-1.72*	-3.03*	-2.33*	-1.35	-1.19	-2.37*	3.69*
I-ALL	-2.11*	-6.59*	-0.687	0.284	-0.361	-1.49	-2.89*	-2.28*	-1.22	-1.17	-2.26*	3.19*
II-ALL	1.99*	3.41*	0.362	0.0	0.0	0.908	1.313	1.008	0.655	0.528	1.039	-1.8*

* denotes significance at the 10%-level or better.

Type I : firms with TA <= TA* .
Type II: firms with TA > TA* .
TA*=5 .

DEVS91 = EVS - (Average EVS of all DOMs in the same 3-digit SIC industry) .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 10 C

Coefficient estimates from switching regression model with one switching cut-off point.
Switch variable is TA. ($TA^*=5$).

a) $DEVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*NSO + a_7*NFS$

b) $DEVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*WIDTH + a_7*DEPTH + a_8*NFS$

Type I: N=46; Model a):$R^2=0.0678$; Model b): $R^2=0.074$;

a)	Inter.	LTD	RD	ADV	GS	NSO	NFS
Coeff.	-0.159	-0.253	0.817	0.612	0.427	-0.032	-0.071
T-value	-1.562	-0.633	0.814	-0.4	1.031	-0.493	-0.284

b)	Inter.	LTD	RD	ADV	GS	WIDTH	DEPTH	NFS
Coeff.	-0.229	-0.376	0.637	0.0001	0.461	0.108	0.066	-0.026
T-value	-1.575	-0.906	0.627	0.0	1.094	0.445	0.547	-0.099

Type I : firms with TA <= TA^* . Type II: firms with TA > TA^* .
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
DEVS91 = EVS - (Average EVS for DOMs in the same 3-digit SIC industry) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 10 C (continued)

Coefficient estimates from switching regression model with one switching cut-off point. Switch variable is TA. (TA^*=5).

$$\text{a) } DEVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*NSO + a_7*NFS$$

$$\text{b) } DEVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*WIDTH + a_7*DEPTH + a_8*NFS$$

Type II: N=272; Model a): R^2=0.1203; Model b): R^2=0.1413;

a)	Inter.	LTD	RD	ADV	GS	NSO	NFS
Coeff.	0.291	-1.25	-1.504	4.29	0.659	0.02	0.055
T-value	2.36**	-3.78**	-1.271	3.79***	1.82*	0.534	0.565

b)	Inter.	LTD	RD	ADV	GS	WIDTH	DEPTH	NFS
Coeff.	0.131	-1.293	-2.316	4.028	0.661	0.449	-0.036	0.116
T-value	0.881	-3.93***	-1.91*	3.59***	1.85*	2.43***	-1.27	1.219

Type I : firms with TA <= TA^* . Type II: firms with TA > TA^* .
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
DEVS91 = EVS - (Average EVS for DOMs in the same 3-digit SIC industry) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 11 A

Descriptive statistics for the pooled sample and the three types of MNCs obtained as the solution of the switching regression with one cut-off point (TA^{*}=5,TA^{**}=9.5).

Type I: N=47

	DEVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	TH	CON2
Me	-0.173	4.162	0.153	0.04	0.018	0.037	3.17	3.681	0.563	1.231	0.042	0	0.78
Var	0.104	0.539	0.017	0.003	0.001	0.015	8.623	10.57	0.052	0.215	0.042	0	0.077

Type II: N=247

	DEVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	TH	CON2
Me	0.255	7.08	0.177	0.038	0.021	0.094	10.66	17.89	0.651	1.506	0.267	0.1	0.49
Var	0.579	1.517	0.019	0.002	0.002	0.016	102.6	625.4	0.06	0.61	0.199	0.1	0.09

Type I : TA <= TA^{*} ; Type II: TA^{*} < TA <= TA^{*} ; Type III: TA > TA^{**} .

DEVS91 = EVS - (Average EVS for DOMs in the same 3-digit SIC industry) .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy . TH= Tax haven dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 11 A (continued)

Descriptive statistics for the pooled sample and the three types of MNCs obtained as the solution of the switching regression with one cut-off point (TA^{*}=5,TA^{**}=9.5).

Type III: N=26

	DEVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	TH	CON2
Me	-0.027	10.396	0.218	0.027	0.023	0.091	21	57.31	0.657	3.246	0.731	0.3	0.395
Var	0.221	0.635	0.008	0.001	0.001	0.003	378.6	3937	0.041	16.89	0.204	0.2	0.055

All MNCs: N=320

	DEVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	TH	CON2
Me	0.169	6.92	0.177	0.037	0.021	0.085	10.47	19.01	0.639	1.607	0.272	0.1	0.526
Var	0.504	3.43	0.018	0.001	0.001	0.015	126.9	947.6	0.058	2.072	0.198	0.1	0.098

Type I : TA <= TA^{*} ; Type II: TA^{*} < TA <= TA^{*} ; Type III: TA > TA^{**} .

DEVS91 = EVS - (Average EVS for DOMs in the same 3-digit SIC industry) .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy . TH= Tax haven dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 11 B

Means difference significane test among multinationals (MNCs) of Types I, II, III, and the pooled sample respectively.

z - statistics

	DEVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	CON2
I-II	-2.31*	-9.43*	-0.63	0.15	-0.26	-1.64	-3.09*	-2.40*	-1.32	-1.40	-2.06*	3.56*
I-III	-1.29	-30.53*	-2.39*	1.39	-0.58	-2.51*	-4.18*	-3.91*	-1.70*	-2.24*	-6.69*	5.90*
I-ALL	-5.56*	-18.52*	-1.17	0.37	-0.61	-2.51*	9.49*	-8.59*	-2.18*	-3.58*	-5.91*	5.76*
II-III	2.49*	-17.38*	-1.92*	1.95*	-0.26	0.21	-2.41*	-2.86*	-0.19	-1.94*	-4.53*	1.74*
II-ALL	1.37	1.23	0.0	0.29	0.0	0.85	0.29	-0.47	0.58	-1.07	-0.13	-1.39
III-ALL	-1.95*	18.54*	2.15*	-2.11*	0.29	0.47	2.74*	3.08*	0.43	2.02*	4.98*	-2.66*

* denotes significance at the 10%-level or better.
Type I : $TA \leq TA^{*}$; Type II : $TA^{*} < TA \leq TA^{**}$; Type III : $TA > TA^{**}$.
$TA^{*}=5$ and $TA^{**}=9.5$.

DEVS91 = EVS - (Average EVS for all DOMs in tha same 3-digit SIC industry) .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 11 C

Coefficient estimates from switching regression model with two switching cut-off point.
Switch variable is TA. (TA^*=5,TA^{**}=9.5).

a) $DEVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*NSO + a_7*NFS$
b) $DEVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*WIDTH + a_7*DEPTH + a_8*NFS$

Type I: N=46; Model a):R^2=0.0678; Model b): R^2=0.0743;

a)	Inter.	LTD	RD	ADV	GS	NSO	NFS
Coeff.	-0.159	-0.253	0.817	0.612	0.309	-0.032	-0.071
T-value	-1.562	-0.633	0.814	0.4	1.031	-0.493	-0.284

b)	Inter.	LTD	RD	ADV	GS	WIDTH	DEPTH	NFS
Coeff.	-0.299	-0.376	0.637	0.0001	0.461	0.108	0.066	-0.026
T-value	-1.575	-0.906	0.627	0.0	1.094	0.445	0.547	-0.099

Type I : TA <= TA^* ; Type II : TA^* < TA <= TA^{**} ; Type III: TA > TA^{**} .
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
DEVS91 = EVS - (Average EVS for all DOMs in the same 3-digit SIC industry) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 11 C (continued)

Coefficient estimates from switching regression model with one switching cut-off point. Switch variable is TA. (TA^{*}=5,TA=9.5).

a) $DEVS91 = a_0 + a_1{*}TA + a_2{*}LTD + a_3{*}RD + a_4{*}ADV + a_5{*}GS + a_6{*}NSO + a_7{*}NFS$

b) $DEVS91 = a_0 + a_1{*}TA + a_2{*}LTD + a_3{*}RD + a_4{*}ADV + a_5{*}GS + a_6{*}WIDTH + a_7{*}DEPTH + a_8{*}NFS$

Type II: N=246; Model a):R^2=0.1409; Model b): R^2=0.1548;

a)	Inter.	LTD	RD	ADV	GS	NSO	NFS
Coeff.	0.235	-1.308	-2.001	4.408	0.625	0.064	0.113
T-value	1.83*	-3.79***	-1.619	3.72***	1.685	1.566	1.075

b)	Inter.	LTD	RD	ADV	GS	WIDTH	DEPTH	NFS
Coeff.	0.235	-1.349	-2.625	4.12	0.637	0.505	-0.024	0.176
T-value	1.83*	-3.93***	2.07**	3.46***	1.73*	2.51**	-0.394	1.68*

Type I : TA <= TA^{*} ; Type II : TA^{*} < TA <= TA^{**} ; Type III: TA > TA^{**} .
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
DEVS91 = EVS - (Average EVS for all DOMs in the same 3-digit SIC industry) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 11 C (continued)

Coefficient estimates from switching regression model with one switching cut-off point.
Switch variable is TA. (TA^{*}=5,TA=9.5).

$$\text{a) } DEVS91 = a_0 + a_1{*}TA + a_2{*}LTD + a_3{*}RD + a_4{*}ADV + a_5{*}GS + a_6{*}NSO + a_7{*}NFS$$

$$\text{b) } DEVS91 = a_0 + a_1{*}TA + a_2{*}LTD + a_3{*}RD + a_4{*}ADV + a_5{*}GS + a_6{*}WIDTH + a_7{*}DEPTH + a_8{*}NFS$$

Type III: N=25; Model a):R^2=0.2151; Model b): R^2=0.2271;

a)	Inter.	LTD	RD	ADV	GS	NSO	NFS
Coeff.	-0.235	0.941	-0.282	0.673	3.479	0.08	-0.048
T-value	-0.359	0.701	-0.065	0.189	1.78*	-0.674	-0.189

b)	Inter.	LTD	RD	ADV	GS	WIDTH	DEPTH	NFS
Coeff.	-1.081	1.89	0.947	-0.646	4.234	0.463	0.004	-0.103
T-value	-1.571	1.381	0.206	-0.184	2.08*	0.844	0.163	-0.4

Type I : TA <= TA^{*} ; Type II : TA^{*} < TA <= TA^{**} ; Type III: TA > TA^{**} .
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
DEVS91 = EVs - (Average EVs for all DOMs in the same 3-digit SIC industry) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 12 A

Descriptive statistics for the four types of MNCs obtained as the solution of the switching regression with one cut-off point (NC^{*}=10,$CON2^{**}$=0.25).

Type I: N=10

	EVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	CON2
Me	0.448	6.456	0.138	0.049	0.021	0.133	8.3	8.3	0.701	1.0	0.3	0.219
Var	0.161	2.289	0.008	0.002	0.001	0.005	4.233	4.332	0.016	0.0	0.233	0.001

Type II: N=222

	EVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	CON2
Me	0.368	6.152	0.18	0.032	0.018	0.069	4.049	6.126	0.539	1.499	0.185	0.706
Var	0.419	2.567	0.02	0.002	0.001	0.019	7.151	46.07	0.056	2.446	0.151	0.069

Type I : $NC \le NC^{*}$ and $CON2 \le CON2^{*}$; Type II : $NC \le NC^{*}$ and $CON2 > CON2^{*}$.
Type III : $NC > NC^{*}$ and $CON2 \le CON2^{*}$; Type IV : $NC > NC^{*}$ and $CON2 \le CON2^{*}$.

EVS91 = (Market Value - Book Value of Assets)/Sales .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 12 A (continued)

Descriptive statistics for the four types of MNCs obtained as the solution of the switching regression with one cut-off point (NC*=10,CON2*=0.25).

Type III: N=81

	EVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	CON2
Me	0.858	8.21	0.164	0.051	0.031	0.097	24.70	43.74	0.818	1.611	0.432	0.177
Var	0.973	2.061	0.014	0.002	0.002	0.006	177.8	1741	0.019	0.737	0.248	0.002

Type IV: N=50

	EVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	CON2
Me	0.472	8.405	0.229	0.03	0.018	0.10	16.34	39.54	0.753	2.161	0.46	0.353
Var	0.434	2.535	0.022	0.001	0.001	0.007	50.68	1621	0.029	1.216	0.253	0.007

Type I : NC <= NC* and CON2 <= CON2* ; Type II : NC <= NC* and CON2 > CON2* .
Type III : NC > NC* and CON2 <= CON2* ; Type IV : NC > NC* and CON2 <= CON2* .

EVS91 = (Market Value - Book Value of Assets)/Sales .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 12 B

Means difference significane test among multinationals (MNCs) of Types I, II, III, IV, and the pooled sample respectively.

z - statistics

	EVS91	TA	LTD	RD	ADV	GS	NSO	NC	WIDTH	DEPTH	CON2	NFS
I-II	0.60	0.62	-1.41	1.18	-0.31	2.64*	2.73*	6.29*	-3.76*	-4.75*	-24.0*	0.74
I-III	-2.44*	-3.48*	-0.83	-0.13	-0.93	1.50	-7.57*	-10.1*	-2.73*	-6.41*	3.76*	-0.81
I-IV	-0.15	11.4*	-2.58*	1.29	0.29	1.30	-5.45*	-6.71*	-1.11	-7.44*	-8.65*	-0.95
I-ALL	0.35	-0.97	-1.51	0.91	0.0	2.24*	-6.29*	-2.47*	1.57	-8.34*	-15.9*	0.12
II-III	4.15*	-10.7*	0.99	-3.39*	-2.38*	-2.22*	-8.07*	-13.8*	-12.6*	-0.79	28.9*	-4.04*
II-IV	-1.01	23.0*	-2.13*	0.44	0.0	-2.06*	-5.84*	-12.0*	-7.42*	-3.52*	16.6*	-3.63*
II-ALL	-2.14*	-5.35*	-0.17	-1.21	-1.03	-1.08	-7.83*	-10.4*	-4.73*	-0.80	7.46*	-2.73*
III-IV	2.68*	28.3*	-2.63*	3.38*	1.94*	-0.21	0.57	4.67*	2.28*	-3.01*	-13.7*	-0.31
III-ALL	3.12*	6.84*	-1.19	2.79*	1.88*	1.51	5.01*	8.93*	9.22*	0.08	-20.3*	2.51*
IV-ALL	-0.22	-26.6*	2.19*	-1.41	-0.62	1.42	3.44*	5.03*	4.34*	3.26*	-8.54*	2.39*

* denotes significance at the 10%-level or better.

Type I : NC <= NC* and CON2 <= CON2* ; Type II : NC <= NC* and CON2 > CON2*
Type III : NC > NC* and CON2 <= CON2* ; Type IV : NC > NC* and CON2 > CON2*

NC*=10 and CON2*=0.25 .

TABLE # 12 C

Coefficient estimates from switching regression model with two switching variables and one cut-off point. Switch variables are NC,CON2. ($NC^*=10, CON2^*=0.25$).

a) $EVS91 = a_0 + a_1{*}TA + a_2{*}LTD + a_3{*}RD + a_4{*}ADV + a_5{*}GS + a_6{*}NSO + a_7{*}NFS$

b) $EVS91 = a_0 + a_1{*}TA + a_2{*}LTD + a_3{*}RD + a_4{*}ADV + a_5{*}GS + a_6{*}WIDTH + a_7{*}DEPTH + a_8{*}NFS$

Type I: N=9; Model a):$R^2=0.9313$; Model b): $R^2=0.8439$;

a)	Inter.	LTD	RD	ADV	GS	NSO	NFS
Coeff.	-1.129	0.866	2.885	-5.968	5.598	0.374	-0.266
T-value	-2.89*	1.10	1.23	-1.65	4.04**	1.96	-1.65

b)	Inter.	LTD	RD	ADV	GS	WIDTH	DEPTH	NFS
Coeff.	-0.6	0.78	4.513	-6.808	6.273	0.139	0.0	-0.244
T-value	-0.525	0.51	1.34	-1.23	-3.09*	0.106	N/A	-0.758

Type I : $NC \le NC^*$ and $CON2 \le CON2^*$; Type II : $NC \le NC^*$ and $CON2 > CON2^*$
Type III: $NC > NC^*$ AND $CON2 \le CON2^*$; Type IV: $NC > NC^*$ AND $CON2 > CON2^*$
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
EVS91 = (Market Value - Book Value of Assets)/Sales .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales . ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 12 C (continued)

Coefficient estimates from switching regression model with two switching variables and one cut-off point. Switch variables are NC;CON2. (NC^*=10,$CON2^*$=0.25).

$$a)\ EVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*NSO + a_7*NFS$$
$$b)\ EVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*WIDTH + a_7*DEPTH + a_8*NFS$$

Type II: N=221; Model a):R^2=0.1523; Model b): R^2=0.1497;

a)	Inter.	LTD	RD	ADV	GS	NSO	NFS
Coeff.	0.26	-1.054	0.515	4.495	0.366	0.10	0.172
T-value	2.47**	-3.56***	0.477	3.72***	1.23	2.08**	1.60

b)	Inter.	LTD	RD	ADV	GS	WIDTH	DEPTH	NFS
Coeff.	0.215	-1.049	0.144	4.239	0.431	0.327	0.009	0.227
T-value	1.72*	-3.53***	0.13	3.47***	1.449	1.83*	0.331	2.07*

Type I : NC <= NC^* and CON2 <= $CON2^*$; Type II : NC <= NC^* and CON2 > $CON2^*$
Type III: NC > NC^* AND CON2 <= $CON2^*$; Type IV: NC > NC^* AND CON2 > $CON2^*$
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
EVS91 = (Market Value - Book Value of Assets)/Sales .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales . ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 12 C (continued)

Coefficient estimates from switching regression model with two switching variables and one cut-off point. Switch variables are NC,CON2. ($NC^*=10$,$CON2^*=0.25$).

a) $EVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*NSO + a_7*NFS$

b) $EVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*WIDTH + a_7*DEPTH + a_8*NFS$

Type III: N=80; Model a):R^2=0.2911; Model b): R^2=0.2973;

a)	Inter.	LTD	RD	ADV	GS	NSO	NFS
Coeff.	0.285	-2.271	0.382	8.109	1.254	0.15	-0.004
T-value	0.475	-2.39**	1.043	3.73***	0.94	1.04	-0.017

b)	Inter.	LTD	RD	ADV	GS	WIDTH	DEPTH	NFS
Coeff.	0.012	-2.352	0.292	8.04	1.215	0.975	-0.006	0.149
T-value	0.02	-2.49**	0.10	3.68***	0.90	1.3	-0.048	0.667

Type I : NC <= NC* and CON2 <= CON2* ; Type II : NC <= NC* and CON2 > CON2*
Type III: NC > NC* AND CON2 <= CON2* ; Type IV: NC > NC* AND CON2 > CON2*
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
EVS91 = (Market Value - Book Value of Assets)/Sales .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales . ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 12 C (continued)

Coefficient estimates from switching regression model with two switching variables and one cut-off point. Switch variables are NC,CON2. (NC^*=10,$CON2^*$=0.25).

a) $EVS91 = a_0 + a_1{*}TA + a_2{*}LTD + a_3{*}RD + a_4{*}ADV + a_5{*}GS + a_6{*}NSO + a_7{*}NFS$

b) $EVS91 = a_0 + a_1{*}TA + a_2{*}LTD + a_3{*}RD + a_4{*}ADV + a_5{*}GS + a_6{*}WIDTH + a_7{*}DEPTH + a_8{*}NFS$

Type IV: N=49; Model a):R^2=0.2598; Model b): R^2=0.2509;

a)	Inter.	LTD	RD	ADV	GS	NSO	NFS
Coeff.	0.966	-0.063	7.126	6.099	1.034	-0.256	-0.077
T-value	1.77^{*}	-0.09	2.03^{**}	2.27^{**}	0.956	-1.81^{*}	-0.40

b)	Inter.	LTD	RD	ADV	GS	WIDTH	DEPTH	NFS
Coeff.	0.404	-0.031	7.686	5.96	1.185	-0.046	-0.137	-0.109
T-value	0.84	-0.05	2.14^{**}	2.18^{**}	1.08	-0.08	-1.546	-0.542

Type I : NC <= NC^* and CON2 <= $CON2^*$; Type II : NC <= NC^* and CON2 > $CON2^*$
Type III: NC > NC^* AND CON2 <= $CON2^*$; Type IV: NC > NC^* AND CON2 > $CON2^*$
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
EVS91 = (Market Value - Book Value of Assets)/Sales .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales . ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 13 A

Descriptive statistics for the four types of MNCs obtained as the solution of the switching regression with one cut-off point (NC^{*}=10,$CON2^{**}$=0.25).

Type I: N=10

	DEVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	CON2
Me	0.014	6.456	0.138	0.049	0.021	0.133	8.3	8.3	0.701	1.0	0.3	0.219
Var	0.098	2.289	0.008	0.002	0.001	0.005	4.233	4.332	0.016	0.0	0.233	0.001

Type II: N=194

	DEVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	CON2
Me	0.111	6.168	0.177	0.032	0.018	0.075	3.943	5.938	0.541	1.51	0.186	0.711
Var	0.386	2.61	0.02	0.002	0.001	0.02	6.717	42.90	0.056	2.732	0.152	0.068

Type I : $NC <= NC^{*}$ and $CON2 <= CON2^{*}$; Type II : $NC <= NC^{*}$ and $CON2 > CON2^{*}$.
Type III : $NC > NC^{*}$ and $CON2 <= CON2^{*}$; Type IV : $NC > NC^{*}$ and $CON2 <= CON2^{*}$.

DEVS91 = EVS - (Average EVS for all DOMs in the same 3-digit SIC industry) .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 13 A (continued)

Descriptive statistics for the four types of MNCs obtained as the solution of the switching regression with one cut-off point (NC*=10,CON2*=0.25).

Type III: N=71

	DEVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	CON2
Me	0.416	8.14	0.148	0.053	0.03	0.098	24.52	42.72	0.818	1.592	0.394	0.175
Var	0.894	2.221	0.01	0.002	0.002	0.006	184.2	1747	0.02	0.785	0.242	0.003

Type IV: N=45

	DEVS91	TA	LTD	RD	ADV	GS	NC	NSO	WIDTH	DEPTH	NFS	CON2
Me	0.067	8.344	0.232	0.03	0.019	0.098	16.42	40.33	0.761	2.181	0.444	0.355
Var	0.36	2.348	0.024	0.001	0.001	0.008	53.16	1749	0.029	1.316	0.253	0.008

Type I : NC <= NC* and CON2 <= CON2* ; Type II : NC <= NC* and CON2 > CON2* .
Type III : NC > NC* and CON2 <= CON2* ; Type IV : NC > NC* and CON2 <= CON2* .

EVS91 = EVS - (Average EVS for all DOMs in the same 3-digit SIC industry) .
TA = log(Total Assets) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales .
ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 13 B

Means difference significane test among multinationals (MNCs) of Types I, II, III, IV, and the pooled sample respectively.

z - statistics

	DEVS91	TA	LTD	RD	ADV	GS	NSO	NC	WIDTH	DEPTH	CON2	NFS
I-II	-0.89	0.59	-1.29	1.17	0.31	2.36*	2.94*	6.44*	3.68*	-4.29*	-23.2*	0.73
I-III	-2.69*	-3.30*	-0.32	-0.26	-0.83	1.44	6.87*	-9.34*	-2.69*	-5.63*	3.78*	-0.57
I-IV	-0.39	-3.56*	-2.57*	1.27	0.19	1.34	-5.10*	-6.41*	-1.26	-6.94*	-8.16*	-0.85
I-ALL	-1.45	-0.95	-1.33	0.84	0.0	2.05*	-5.82*	-2.32*	1.47	-7.54*	-15.2*	0.18
II-III	-2.52*	-9.32*	1.86*	-3.38*	-2.08*	-1.68*	-7.38*	-12.7*	-11.6*	-0.52	27.3*	-3.21*
II-IV	0.44	-8.49*	-2.18*	0.35	-0.19	-1.37	-5.50*	-11.3*	-7.20*	-3.26*	15.5*	-3.22*
II-ALL	-0.97	-4.85*	0.0	-1.23	-1.04	-0.81	-7.33*	-9.83*	-4.52*	-0.67	7.22*	-2.29*
III-IV	2.43*	-0.71*	-3.23*	3.24*	1.54	0.0	0.29	4.16*	1.87*	-2.97*	-12.33*	-0.53
III-ALL	2.07*	5.94*	-2.06*	2.73*	1.61	1.13	4.51*	8.16*	8.32*	-0.11	-18.9*	1.92*
IV-ALL	-1.04	-5.67*	2.26*	-1.31	-0.39	0.87	3.29*	4.79*	4.24*	3.07*	-7.77*	2.18*

* denotes significance at the 10%-level or better.

Type I : $NC <= NC^*$ and $CON2 <= CON2^*$; Type II : $NC <= NC^*$ and $CON2 > CON2^*$
Type III : $NC > NC^*$ and $CON2 <= CON2^*$; Type IV : $NC > NC^*$ and $CON2 > CON2^*$

$NC^*=10$ and $CON2^*=0.25$.

TABLE # 13 C

Coefficient estimates from switching regression model with two switching variables and one cut-off point. Switch variables are NC,CON2. (NC^*=10,$CON2^*$=0.25).

a) $DEVS91 = a_0 + a_1{*}TA + a_2{*}LTD + a_3{*}RD + a_4{*}ADV + a_5{*}GS + a_6{*}NSO + a_7{*}NFS$
b) $DEVS91 = a_0 + a_1{*}TA + a_2{*}LTD + a_3{*}RD + a_4{*}ADV + a_5{*}GS + a_6{*}WIDTH + a_7{*}DEPTH + a_8{*}NFS$

Type I: N=9; Model a):R^2=0.8627; Model b): R^2=0.9846;

a)	Inter.	LTD	RD	ADV	GS	NSO	NFS
Coeff.	0.253	-4.686	3.465	-18.39	8.459	-0.336	-0.266
T-value	0.351	-3.29**	0.803	-2.76*	3.31**	-0.955	2.11

b)	Inter.	LTD	RD	ADV	GS	WIDTH	DEPTH	NFS
Coeff.	2.21	-6.782	3.522	-20.2	8.2	-3.039	0.0	0.14
T-value	4.72**	-10.8***	2.57*	-8.92***	9.88***	-5.64**	N/A	1.066

Type I : NC <= NC^* and CON2 <= $CON2^*$; Type II : NC <= NC^* and CON2 > $CON2^*$
Type III: NC > NC^* AND CON2 <= $CON2^*$; Type IV: NC > NC^* AND CON2 > $CON2^*$
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
DEVS91 = EVS - (Average EVS for all DOMs in the same 3-digit SIC industry) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales . ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 13 C (continued)

Coefficient estimates from switching regression model with two switching variables and one cut-off point. Switch variables are NC,CON2. (NC^*=10,$CON2^*$=0.25).

a) $EVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*NSO + a_7*NFS$

b) $EVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*WIDTH + a_7*DEPTH + a_8*NFS$

Type II: N=221; Model a):R^2=0.1523; Model b): R^2=0.1497;

a)	Inter.	LTD	RD	ADV	GS	NSO	NFS
Coeff.	0.26	-1.054	0.515	4.495	0.366	0.10	0.172
T-value	2.47^{**}	-3.56^{***}	0.477	3.72^{***}	1.23	2.08^{**}	1.60

b)	Inter.	LTD	RD	ADV	GS	WIDTH	DEPTH	NFS
Coeff.	0.215	-1.049	0.144	4.239	0.431	0.327	0.009	0.227
T-value	1.72^{*}	-3.53^{***}	0.13	3.47^{***}	1.449	1.83^{*}	0.331	2.07^{*}

Type I : NC <= NC^* and CON2 <= $CON2^*$; Type II : NC <= NC^* and CON2 > $CON2^*$
Type III: NC > NC^* AND CON2 <= $CON2^*$; Type IV: NC > NC^* AND CON2 > $CON2^*$
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
EVS91 = (Market Value - Book Value of Assets)/Sales .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales . ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 13 C (continued)

Coefficient estimates from switching regression model with two switching variables and one cut-off point. Switch variables are NC,CON2. (NC^*=10,$CON2^*$=0.25).

a) $DEVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*NSO + a_7*NFS$

b) $DEVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*WIDTH + a_7*DEPTH + a_8*NFS$

Type III: N=70; Model a):R^2=0.1974; Model b): R^2=0.24;

a)	Inter.	LTD	RD	ADV	GS	NSO	NFS
Coeff.	0.729	-2.598	-4.672	6.195	1.136	-0.004	0.072
T-value	1.09	-2.14**	-1.65*	2.71***	0.757	-0.02	0.3

b)	Inter.	LTD	RD	ADV	GS	WIDTH	DEPTH	NFS
Coeff.	-0.357	-2.232	-5.649	5.913	1.193	1.434	-0.097	0.217
T-value	-0.467	-1.87*	-1.98*	2.63**	0.81	1.82*	-0.773	0.903

Type I : NC <= NC^* and CON2 <= $CON2^*$; Type II : NC <= NC^* and CON2 > $CON2^*$
Type III: NC > NC^* AND CON2 <= $CON2^*$; Type IV: NC > NC^* AND CON2 > $CON2^*$
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
DEVS91 = EVS - (Average EVS for all DOMs in the same 3-digit SIC industry) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales . ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

TABLE # 13 C (continued)

Coefficient estimates from switching regression model with two switching variables and one cut-off point. Switch variables are NC,CON2. (NC^*=10,$CON2^*$=0.25).

a) $DEVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*NSO + a_7*NFS$
b) $DEVS91 = a_0 + a_1*TA + a_2*LTD + a_3*RD + a_4*ADV + a_5*GS + a_6*WIDTH + a_7*DEPTH + a_8*NFS$

Type IV: N=44; Model a):R^2=0.1808; Model b): R^2=0.1595;

a)	Inter.	LTD	RD	ADV	GS	NSO	NFS
Coeff.	0.436	0.711	6.538	2.602	-0.293	-0.244	0.189
T-value	0.778	1.08	1.87*	0.98	-0.28	-1.73*	0.965

b)	Inter.	LTD	RD	ADV	GS	WIDTH	DEPTH	NFS
Coeff.	-0.319	0.729	7.203	2.356	-0.117	0.197	-0.121	0.186
T-value	-0.64	1.06	1.99*	0.87	-0.109	0.339	-1.375	0.882

Type I : NC <= NC^* and CON2 <= $CON2^*$; Type II : NC <= NC^* and CON2 > $CON2^*$
Type III: NC > NC^* AND CON2 <= $CON2^*$; Type IV: NC > NC^* AND CON2 > $CON2^*$
*, **, and *** denote significance at the 10%-,5%- and 1%-level respectively.
DEVS91 = EVS - (Average EVS for all DOMs in the same 3-digit SIC industry) .
LTD = (Long Term Debt)/(Total Assets) .
RD = (R&D Expenditures)/Sales . ADV = (Advertising Expenditures)/Sales .
GS = Geometric 4-year growth rate of Sales .
NC = Number of foreign countries .
NSO = Number of foreign subsidiaries .
WIDTH = (NSO)/(Total number of subsidiaries) .
DEPTH = (NSO)/(NC) .
NFS = Financial subsidiary dummy .
CON2 = Concentration ratio of foreign subsidiaries in top two foreign countries .

APPENDIX A

In addition to relaxing (A3), assume that the companies A and M in country-a have been producing and selling toy-balls while companies B and M in country-b have been into the sports uniforms business. The potential links between the three above-mentioned markets that could create synergy or improve efficiency by cutting transactions costs are described in the graph below

Plant & Equipment
Research & Development
TOY-BALLS RETAIL OUTLETS
ADVERTISING
MARKET RESEARCH

FOOTBALLS

MARKET RESEARCH
SPORTS ADVERTISING
UNIFORMS RETAIL OUTLETS
Promotion/Sales Force

The international links extend on both sides of the Footballs product market and are denoted by capital letters. Links that connect the Footballs market with only one of the other two markets are purely domestic links in this setup, and are denoted by small letters. For simplicity assume that:

$$X^{c+}{}_{C}(s) = R^{+}(s) - SUM_{j=1..n}(w_{Cj,c} * i_j(s)) \quad (2)$$

, where:

$X^{c+}{}_{C}(s)$ is the payoff of the project in state s when undertaken in country c (c=a,b) by company C (C=A,B,M);

$R^{+}(s)$ is the revenue generated by the undertaking of the international-event-contingent project in state s;

$w_{Cj,c}$ is the weight assigned to input j by company C producing in country c; finally,

$i_j(s)$ is the cost of input j in state s.

In this example n=7 (Labor {l}, Plant/Equipment {p}, R&D {r}, Retail Outlets {o}, Advertising {a}, Market Research {m}, Promotion/Sales Force {s}).

If every link implies an area where cost savings are achieved because of synergy, then:

$w^{A}{}_{j,a} = w^{M}{}_{j,a} < w^{B}{}_{j,b}$ for j={l,p,r} ; that is, the domestic (country a) links that exist with respect to labor, plant and equipment and R&D create synergy gains for firms A and M.

$w^{B}{}_{j,b} = w^{M}{}_{j,b} < w^{A}{}_{j,a}$ for j={s} ; that is, the domestic (country b) link that exists with respect to promotion creates synergy gains for firms B and M.

$w^{M}{}_{j,a} = w^{M}{}_{j,b} = w^{M}{}_{j,+} < \min(w^{A}{}_{j,a} ; w^{B}{}_{j,b})$ for j={o,a,m} ; that is, the international links that exist with respect to advertising, retail outlets, and market research, create synergy gains to M only.

Thus, for the MNC that undertakes the project there are (at least) two operational modes, or input mixes, available:

- a-based mix: $(w^M_{l,a}, w^M_{p,a}, w^M_{r,a}, w^M_{a,+}, w^M_{o,+}, w^M_{m,+}, w^M_{s,a})$

- b-based mix: $(w^M_{l,b}, w^M_{p,b}, w^M_{r,b}, w^M_{a,+}, w^M_{o,+}, w^M_{m,+}, w^M_{s,b})$

Thus, for the MNC (M) (at least) two project payoffs are possible, X^{a+}_M (when it chooses the "a-based" input mix) and X^{b+}_M (when it chooses the "b-based" input mix).

Of course, given the above, $X^{a+}_M > X^{a+}_A$ and $X^{b+}_M > X^{b+}_B$ .The market values can be written now as:

$$V_A = PV(AIP)_A + C_{A1} + C_{A2} + (p * C_{A3})$$

$$V_B = PV(AIP)_B + C_{B1} + C_{B2} + ((1\text{-}p) * C_{B3})$$

$$V_M = PV(AIP)_M + C_{MA1} + C_{MB1} + C_{MA2} + C_{MB2} + MAX$$

where:

$C_{A3} = C(X^{a+}_A, K^{a+}_A, t)$: value of future growth opportunities from international event-contingent project to be carried out in country a.

p : probability that international event-contingent project will be carried out in country a.

$C_{B3} = (X^{b+}_B, K^{b+}_B, t)$: like C_{A3} but for domestic firm B.

1-p : probability that international event-contingent project will be carried out in country b.

$MAX = C(X^{a+}_M, X^{b+}_M, K^{+}_M, t)$: value of future growth opportunities from international event-contingent projects for MNC. This will be proxied by a call option on the maximum of two project payoffs, one from an a-based and one from a b-based input mix.

V. BIBLIOGRAPHY

Aliber,R., **1970**, "A theory of foreign direct investment", in C.P.Kindleberger,ed.,"The international corporation", Cambridge, Mass.: MIT Press.

Aliber,R.., **1983**, "Money, multinationals, and sovereigns", in C.P.kindleberger and D.B.Audresch,eds., "The multinational corporation in the 1980's", Cambridge, Mass.: MIT Press.

Bain,J.S.,**1956**, "Barriers to new competition", Cambridge, Mass.: Harvard University Press.

Buckley,P.J.,**1990**, "Problems and developments in the core theory of international business", Journal of International Business Studies, 4th qtr, pp 657-665.

Buckley,P.J. and Casson,**1976**, "The future of the multinational enterprise", New York: The McMillan Company.

Casson, **1987**, "The firm and the market", Oxford: Basil Blackwell.

Casson,**1990**, "Internalization theory and beyond", in P.J.Buckley,ed., "New directions in multinational business", London: Edward Elgar Publishing Ltd.

Caves,R.E.,**1974**, "Causes of direct investment: foreign firms' shares in Canadian and UK manufacturing industries", Review of Economics and statistics, 56, pp 279-293.

Chauvin,K.W. and Hirshey,M.,**1994**, "Advertising, R&D expenditures and the market value of the firm", Financial Manangement, vol.22, #4, pp 128-140.

Cho,C.D., Eun,C.S. and Senbet,L.W., **1986**, :International arbitrage pricing theory: an empirical investigation", Journal of Finance, volXLI, no.2, pp.313-329

Coase,R.H.,**1937**, "The nature of the firm", Economica, 4 (November), pp 386-405.

Dunning,J.H.,**1973**, "The determinants of international product", Oxford Economic Papers, 25, November,pp 289-336.

Dunning,J.H.,**1977**,"Trade, location and the multinational enterprise: A search for an eclectic approach", in B.Ohlin et.al.,eds., "The international allocation of economic activity", London: Holmes and Meier.

Dunning,J.H.,**1980**, "Toward an eclectic theory of international production: Some empirical tests", Journal of International Business Studies, 11(1), pp 9-31.

Dunning,J.H., and Rugman,A.,**1985**, "The influence of Hymer's dissertation on theories of foreign direct investment", american Economic Review, May, pp 228-232.

Errunza,V. and Losq,E., **1985**, "International asset pricing under mild segmentation: theory and test", Journal of Finance, volXL, no.1, pp105-124

Flood,E. and Lessard,D.R., **1986**, "On the measurement of operating exposure to exchange rates: a conceptual approach", Financial Management, spring 1986, pp.25-36

Galbraith,S.K. and Kay,N.M.,**1986**, "toward a theory of multinational enterprise", Journal of Economic Behavior and Organization, 7, pp 3-19.

Goldfeld,S.M. and Quandt,R.E.,**1973**, "The estimation of structural shifts by switching regressions", Annals of Economics and Social Management, 2/4, pp 475-485.

Grauer,F., Litzenberger,R., and Stehle,R.,**1976**, "Sharing rules and equilibrium in an international market under uncertainty", vol3(3), pp 233-256.

Guletkin,M., Guletkin,B. and Penati,A., **1989**, "Capital controls and international market segmentation: the evidence fron the japanese and american stockmarkets", Journal of Finance, volXLIV, no.4, pp.849-869

Hirsch,S.,**1976**, "An international trade and investment theory of the firm", Oxford Economic Papers, 28, pp 258-270.

Hirshey,M. and Wichern,D.,**1984**, "Accounting and market-value measures of profitability: Consistency, determinants and uses", Journal of Business and Economic Statistics, vol2, #4, pp 375-383.

Horst,T.,**1982**, "The industrial composition of US exports and subsidiary sales to the Canadian market", American Economic Review, 62(1), pp 37-45.

Hymer,S.,**1960**, "The international operations of national firms: A study of direct investment", Ph.D. thesis, MIT; published by MIT Press in 1976.

Isard,P., **1977**, "How far can we push the law of one price?", The American Economic Review, vol67, no.5, pp.942-948

Jorion,P. and Schwartz,E.,**1986**,"Integration vs segmentation in the Canadian stock market", Journal of Finance, Vol XLI, No 3, pp 603-616.

Johnson,H.G.,**1968**,"Comparative cost and commercial policy theory for a developing world economy", Wicksel Lectures, 1968, Stockholm, Almquist and Wicksel.

Johnson,H.G.,**1970**,"The efficiency and welfare implications of the international corporation", in Kindleberger,C.P.(ed.),The International Corporation, Cambridge:MIT Press, pp 35-56.

Kim,W.S. and Lyn,E.O., **1990**, "FDI theories and the performance of foreign multinationals operating in the US", Journal of International Business Studies, 1st quarter 1990, pp.41-54

Kindleberger,C.P.,**1963**, "International Economics", 3rd edition, Homewood,Ill.: Irwin.

Kindleberger,C.P.,**1968**, "International Economics", 4th edition, Homewood,Ill.: Irwin.

Kindleberger,C.P.,**1969**, "American business abroad: Six lectures on direct investment", New Haven: Yale University Press.

Kindleberger,C.P.,**1984**, "Multinational excursions", Cambridge,Mass.: MIT Press.

Kogut,B.,**1983**, "Foreign direct investment as a sequential process", in Kindleberger,C.P., and Audresch,D.,eds., "The multinational corporation in the 1980's", Cambridge, Mass.: MIT Press.

Kogut,B.,**1985**, "Designing global strategies: profiting from operating flexibility", Sloan Management Review, 26(fall), pp 27-38.

Lee,K.C. and Kwok,C.CY., **1988**, "Multinational corporations vs. domestic corporations: international environmental factors and determinants of capital structure", Journal of International Business Studies, summer 1988, pp.195-217

McMannus,J.,**1972**,"The theory of the international firm", in Paquet,G.(ed.), The Multinational Firm and the Nation State, Toronto:Collier-Macmillan, pp 66-93.

Magee,S.P.,**1977**, "Information and multinational corporation: An appropriability theory of direct investment", in Baghati,J.W.,ed., "The new international economic order: the north-south debate", Cambridge, Mass.: MIT Press.

Margabe,W.,**1978**, "The value of an option to exchange an asset for another", Journal of Finance, vol33(1), pp177-186.

Mello,A., Parsons,J., and Triantis,A.,**1992**, "An integrated model of multinational flexibility and hedging policies", working paper.

Merton,R.C., **1973**, "Theory of rational option pricing", Bell Journal of Economics and Management Science, spring 1973

Morck,R. and Yeung,B., **1991**, "Why investors value multinationality", Journal of Business, vol64, no.2, pp.165-187

Myers,S.C., **1977**, "Determinants of corporate borrowing", Journal of Financial Economics 5, pp.147-175

Roll,R. and Solnik,B, **1976**, "On some parity conditions frequently encountered in international finance",UCLA working paper

Roll,R., **1977**, "Violations of the law of one price and their implications for differentially denominated assets", UCLA working paper

Rugman, A.,**1980**, "Internalization as a general theory of foreign direct investment: A reappraisal of the literature", Journal of World Economics, 2, pp365-379.

Rugman, A.M.,editor, **1982**,"New theories of the multinational enterprise"

Shapiro,A.C., **1983**, "What does purchasing power parity mean?", Journal of International Money and Finance, 2, pp.295-318

Shapiro,D.,**1983**, "Entry, exit and the theory of the multinational corporation", in Kindleberger,C.P. amd Audresch,D.,eds., "The multinational corporation in the 1980's", Cambridge,Mass.: MIT Press.

Siddhartan,N.S., and Lall,S.,**1982**, "The monopolistic advantages of multinationals: Lessons from foreign investment in the U.S.", The economic Journal, 92, September, pp 668-683.

Solnik, B., **1978**, "International parity conditions and exchange risk", Journal of Banking and Finance, 2, pp.281-293

Stulz,R.M., **1982**, "Options on the minimum or the maximum of two risky assets", Journal of Financial Economics, 10, pp.161-185

Teece,J.,**1980**, "Economies of scope and the scope of the enterprise", Journal of Economic Behavior and Organization, 1, pp 223-247.

Teece,J.,**1981**, "The multinational enterprise: Market failure and market power considerations", Sloan Management Review, vol 22, pp 3-17.

Teece,J.,**1982**, "Towards an economic theory of the multi-product firm", Journal of

Economic Behavior and Organization, 3, pp 39-64.

Thomadakis,S.B. and Usmen,N., **1991**, "Foreign project financing in segmented capital markets: Equity vs. debt", Financial Management, vol 20(4), pp 42-53.

Thomadakis,S.B.,**1977**, "A value-based test of profitability and market structure", Review of economics and Statistics, 59, pp 179-185.

Vaupel,J.W.,**1971**, "Characteristics and motivations of the U.S. corporations which manufacture abroad", working paper.

Vernon,R.,**1971**, "Sovereignty at bay: Multinational spread of U.S. enterprises", New York: Basic.

Williamson,O.,**1975**, "Markets and hierarchies", New York: Free Press.

Wolf,B.M.,**1977**, "Industrial organization and internationalization: Some empirical evidence", Journal of Industrial Economics, 26(December), pp 177-191.