CAPITAL MARKETS AND THE MARKET STRUCTURE OF FOREIGN INVESTMENTS

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Thesis Summary

Contrary to the long-received theory of FDI, interest rates or rates of return can motivate foreign direct investment (FDI) in concert with the benefits of direct ownership. Thus, access to investor capital and capital markets is a vital component of the multinational's competitive market structure. Moreover, multinationals can use their superior financial capacity as a competitive advantage in exploiting FDI opportunities in dynamic markets. They can also mitigate higher levels of foreign business risks under dynamic conditions by shifting more financial risk to creditors in the host economy. Furthermore, the investor's expectation of foreign business risk necessarily commands a risk premium for exposing their equity to foreign market risk. Multinationals can modify the profit maximization strategy of their foreign subsidiaries to maximize growth or profits to generate this risk premium. In this context, we investigate how foreign subsidiaries manage their capital funding, business risk, and profit strategies with a diverse sample of 8,000 matched parents and foreign subsidiary accounts from multiple industries in 38 countries.

We find that interest rates, asset prices, and expectations in capital markets have a significant effect on the capital movements of foreign subsidiaries. We also find that foreign subsidiaries mitigate their exposure to foreign business risk by modifying their capital structure and debt maturity. Further, we show how the operating strategy of foreign subsidiaries affects their preference for growth or profit maximization. We further show that superior shareholder value, which is a vital link for access to capital for funding foreign expansion in open market economies, is achieved through maintaining stability in the rate of growth and good asset utilization.

Keywords: Foreign Direct Investment, Capital Markets, Profit Theory, Investment Theory, International Trade.

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Peer Review

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CHAPTER ONE INTRODUCTION

This thesis seeks to build on the traditional theories of foreign direct investment (FDI) through the investigation of contemporary challenges in the international business environment through empirical testing and analysis of economic and financial models. We demonstrate that capital markets are a functioning component of the multinational firm's market structure. As a component of the firm's market structure, capital markets both internal and external affect the focus and scope of operating strategies. This in turn has an impact on the investment policies of foreign direct investments including their capitalization, capital structure, and their profit maximization strategy. The long-standing emphasis on FDI as a measure of national economic activity and international vehicle to exploit cross-border strategic advantages should also consider the effects of the underlying financial motives of FDI. These financial motives link the socio-economic performance of FDI with the volatility and risk in global financial markets. This linkage is important to the development of economic policy and efficient managerial practice. In this context, the capital movements to FDI are an important link in explaining the future trends of financial market integration and the globalization of world trade. We seek to expand the research literature by developing the underlying financial principals that motivate FDI as a foreign investment strategy.

In this thesis, we apply the principles and methods of financial economics to three research problems in international business (IB). Financial economics is a specialized area of research in applied economics which focuses on the firm-level financial determinants of economic performance including: (a) investment under

uncertainty; (b) asset pricing; (c) the modeling of corporate financial systems; and in particular, (d) the funding of major capital investment projects (Jones, 2008). Specifically, we explore the funding, risk mitigation and profit strategies of foreign subsidiaries of multinationals as the primary channels of international foreign investment.

Organization of Thesis

We begin the thesis by framing the basic research agenda and the contemporary challenges in the global economic environment that motivated this research. The central arguments that underpin the empirical analysis follow, along with a review of the policy motives for the research. This is followed by a general literature review that is intended to provide a historical context and critique of the basic theories of foreign direct investment and general determinants of FDI as they apply to the three empirical chapters. A general overview of the econometric approach is presented together with the data collection methods and description of the data set. Finally, we have the three empirical research chapters, each with its own concluding remarks and summarization of the chapter findings. The tables, figures and research questions of each chapter are labeled with the system "1-1" or Table 1 of Chapter One, etc.

The three empirical chapters each address a different research problem in international business and include a chapter-specific literature review following the chapter introduction. Each chapter has a distinct data set that is taken from the same master data set. In addition, we summarize each chapter's results with suggestions for future research on the chapter's specific results. The thesis conclusion restates

the chapter findings but also integrates the results in more comprehensive support of the central arguments. This is followed by a discussion that includes a subjective opinion about the motives of the research and its future policy implications.

Research Agenda

Kindleberger records over 38 market bubbles and asset price crashes between 1618 and 1998, or a recurring financial market crises about every 10 years (Kindleberger, 2000). In the last several financial markets crashes, FDI capital flows have declined and recovered with the overall value of world financial markets that points to a linkage between FDI and market rates (i.e., the price of shares of publicly traded firms based on the value of the operating assets). In the research literature, we typically see FDI as a phenomenon of *national economic activity* with its linkage to domestic policy development and international trade. However, FDI is also like any other type of major capital investment that is linked with business cycles, arbitrage mechanisms, interest rates, and expectations on future growth and other factors more exclusively associated with *financial assets.* In fact, over 30% of world trade is comprised of the commercial trade movements (i.e., the purchase and exchange of goods and services) between foreign subsidiaries of multinational corporations. FDI as a driver of international trade and economic growth is linked with the internationalization of financial markets, and the export and allocation of national domestic assets and productive resources in foreign markets. Moreover, developing the linkages between capital markets and FDI will support future research of spillovers or externalities that FDI has on emerging host economies where the current literature is inconclusive.

The multinational enterprise (MNE) has been the steady topic of economic inquiry since the early 1950's with the post-war expansion of US firms in the UK and Europe. There is a general understanding on the strong link between the multinational's foreign investments and FDI, but this relationship is not extensively researched at the firm level. We know that overall, multinationals are the main drivers of FDI *capital flows* (i.e., the flow of capital between parents and their foreign affiliates or between the foreign affiliates themselves). For example, a 2005 study shows that 100 of the largest multinationals comprise 12% of the world's total foreign owned assets. Moreover, multinationals account for over two-thirds of world exports, and over one-third of that trade is between the foreign subsidiaries themselves (UNCTAD, 2009). If we consider the trade between foreign subsidiaries themselves comprised almost 30% of the world trade in 2010, then we should expect that the parallel capital flows amongst parents and foreign subsidiaries also form a vital link in maintaining global economic stability.

Of the world's 100 largest economies, 51 are corporations and 49 are countries (Cohen, 2007). In fact, capital flows to FDI in 2010 are estimated to be almost $1.4T, and the sales (i.e., the trade flows) of foreign subsidiaries will approach 50% of world total GDP. Moreover, as multinationals account for the largest single factor in international trade, they are vital to the financial stability of world capital markets. For example, following the global financial crisis of 2008/9, a majority of multinationals reported that they intended to reduce their FDI to levels prior to 2008 (UNCTAD, 2009). Yet, in spite of 50 years of IB research, we have only a handful of studies that stress the financial motives and financial risks underlying the capital funding of the FDI process. This thesis will close part of the

gap in the research literature by moving beyond FDI as a measure of national or industrial economic activity towards the identification of the important financial motives and determinants that drive FDI as a critical *foreign investment activity* of the multinational.

We also address a current issue in international business (IB) research by extending its agenda to integrate other topics more common to financial economics. Buckley commented that the IB research agenda is "running out of steam" in that it has successfully explained FDI flows, the strategy of the multinational and the explanation of the process of *internalization* in the global environment (Buckley, 2002). One of the new (IB) research agendas that Buckley suggests is to understand the challenges to global capitalism. The financial successes and failures of the large and visible multinational has arguably become a highly identifiable symbol of global capitalism. This research provides a closer examination of the investment policies and profit maximizing strategies that foreign subsidiaries employ and will help to explain how FDI will be linked with the evolution of free market and state capitalism.

While it has been argued that international business research has successfully explained many of the central problems in international business, it is not clear that all the determinants of FDI have really been fully explained or even identified. In the paper, "Is the international business research agenda running out of steam?," Buckley points to a general trend toward rehashing the same few questions in explaining FDI flows and determinants of FDI (Buckley, 2002). In contrast, we show that FDI capital flows that are linked with global assets prices and returns and growth expectations would not be generally predicted by the direct

investment and internalization theories, but flow in concert with interest rates and price expectations in contrast to the theories of direct ownership control. This challenges the assertion that FDI flows and motives have been successfully explained. A similar challenge arises in "The new theory of foreign direct investment: merging trade and capital flows," where the argument is forwarded that a general model of FDI is emerging from the various research streams with the exception of the effect of the sources of financing on FDI (Russ, 2009).

The Central Arguments

The *strategy-conduct-performance* (SCP) paradigm within the industrial organization tradition says the firm's market structure has a strong influence on its conduct (e.g., its investment, profit, or risk strategies), which in turn determines its performance (Porter, 1981). The three central arguments of this thesis each touch on a different aspect of the SCP paradigm. In Chapter Four, we will show that the firm's relationship with its capital markets which is its main source of investment capital are as fundamental to its conduct (i.e., its investment strategy) as some of the other traditional elements in the firm's market structure such as the concentration of competitors. In Chapters Five and Six, we will show that the multinational firm's conduct (i.e., its risk mitigation and profit strategies respectively) are also linked with its relationship with capital markets and other factors in its market structure. The three central arguments are developed in three empirical chapters.

(a) *Capital markets (i.e., the external financial markets where firms raise capital funds for investment), are part of the firm's market structure and affects its investment strategy (i.e., how it will invest in foreign assets).*

(b) *Risk and uncertainty in the business environment of foreign subsidiaries can be mitigated by shifting financial risk to creditors in the host market by adjusting the level and maturity of its debt structure.*

(c) *The risk premium that is demanded by investors for investment of their equity in foreign market risk affects the form of the profit maximization strategy chosen by the parent on behalf of the shareholder for its foreign subsidiaries and based on the firm-level risk factors in the host environment.*

These three arguments also correspond to three major topics in financial economics: (a) the funding of investment, (b) investment under risk, and (c) the impact of uncertainty on asset pricing. Moreover, our three topics in financial economics also correspond to the three basic principles of *financial management* theory which are: (a) the funding of capital requirements for operating needs and growth, (b) the management of the value generating process with its attendant risks, and (c) the creation of shareholder value (Brigham & Erhardt, 2002). We apply these principals to a different research problem in international business.

In Chapter Four, we examine the link between market valuation levels and capital funding of FDI. In this study, we investigate how external market prices, expectations of growth and interest rates drive capital flows to foreign subsidiaries (FDI). The firm's financial capital and net worth are substantial cofactors in the capacity for foreign subsidiaries to capitalize their growth and increases the likelihood that multinational firms can successfully exploit their internal strategic advantages in foreign markets. We also distinguish between capital flows to FDI

and capital investments which are critical to linking FDI with capital markets. We demonstrate that asset prices, the future expectation of growth, and the firm's financial strength have a significant relationship with capital movements in foreign subsidiaries.

In Chapter Five, we examine the linkage between the foreign affiliate's operating strategy and its capital structure. Explaining this linkage is important to understanding how foreign risk is mitigated through the foreign subsidiary's capital structure where financial risk is shared with host creditors. By using higher levels of debt and more short-term debt, foreign subsidiaries can reduce the shareholder's financial risk, and improve the returns necessary to generate the risk premium for foreign asset investment. Moreover, foreign subsidiaries have distinct operating strategies that are linked with their traditional economic motivation in the applied economic literature. The linkage between the firm's *operating strategy* (i.e., how it organizes its factors of production in foreign markets) and its capital structure are investigated. We show that operating strategy is linked with changes in its capital structure, which in turn is how the foreign subsidiaries balance business and financial risk.

In Chapter Six, we examine the linkage between growth and profit maximization in foreign affiliates and their capacity to create shareholder value for the parent firm and their capital investors. We define the primary measure of *shareholder value* for the foreign subsidiary as the excess return on equity over that of the parent's return on equity. This excess return measures the risk premium that is being paid on the investment in foreign assets. We investigate the firm-level and

host-level determinants which affect the ability of the foreign subsidiary to generate sustainable shareholder value through this risk premium. We show that stable growth in revenues when coupled with higher asset efficiency is strongly related to the creation of shareholder value as defined by the subsidiary's excess return.

Policy Motives

The complex and qualitative features of the financial motives of FDI would normally incline our examination of foreign investment activities from the strategic management perspective with its emphasis on managerial policy and individual choice behavior as an idiosyncratic function of the firm's performance. In contrast, the analysis this thesis is organized within common approaches of financial economics. The objective of this thesis is to provide a *quantitative analysis* of the observable features in the public firm's conduct and performance so that we can draw inferences about unobservable choice and policy preference.

An optimal profit strategy is vital to the long-term sustainable growth of the multinational and it is the primary focus of its managers and investors. Through this research, we will also see that *financial motives* (i.e., the factors that influence investment, profit and risk policies) are important in developing broader industrial and social policy given the strong links between FDI and the stability of the global economy. A brief discussion of some of the policy motives follows.

While financial capital has practically very few barriers to mobility in a contemporary context, labour capital is no more mobile than in the 1900's and this

has an impact on social entitlement policies particularly in developing economies (Geide-Stevenson, 1998). Multinationals and their foreign affiliates must organize and operate their production cycles within a broad range of political and economic paradigms and in different economic systems; from open and free markets, to closed state-managed economies. National industrial policy can motivate non-financial firms to modify their production cycles in ever-increasing complex patterns to maximize access to labour pools and nationally controlled natural resources (e.g., coal, oil, metal ores, etc.). It is the growth and profit maximization strategies of foreign subsidiaries that will determine both its performance and its economic contribution to domestic economies through significant externalities in host labour and factor markets.

Sustaining economic growth in the developing world is a challenge particularly for emerging economies which need foreign direct investment as a source of investment capital (Thangavelu et al., 2009). Contemporary theories of economic growth have long recognized that *profit maximizing firms* (as compared to state operated firms) are the central motivating agents in the modern, endogenous model of industrial growth (Romer, 1986). The operating strategies and investment policies of foreign subsidiaries will dictate how they will allocate the capital from inward investing countries and to what extent local and regional social policy will have in encouraging inward FDI. If this intersection between trade flows, capital movements and labour policy is more fully understood, it is less likely to impair the development of domestic industrial policy that is beneficial for growth and fair international trade.

This thesis proposes to expand the understanding of the importance of financial motives underlying FDI that if balanced properly, may benefit both academic research and the practitioner in international trade and investment.

Contribution to Knowledge

The long-standing, received theories of FDI and international business have for the most part, concentrated on the traditional *economic* determinants of FDI at the industry and country level largely in the context of social policy and the *economic problem*.[1] This thesis develops financial linkages between foreign subsidiaries, their host market structure, and their parent firms by direct investigation at the firm level which is frequently a deficiency with the traditional economic literature. The unique contribution of this thesis is to bridge the methods of financial economics with topics in international business in the following areas:

(a) the contemporary literature on foreign direct investment is contrasted with theories from economics, finance, strategic management, and international business to provide a broad context for understanding the importance of financial motives and determinants of FDI, thus bridging a gap in the literature between international business and corporate finance;

(b) the link between FDI and standard investment theory which governs the rate of capital investment via the demand and production function, and interest

[1] For a historical discussion of the classical economic problem, or socio-economic dynamic of the free market and its function within society, see Scherer (1970).

rates is explored and tested showing that capital markets (i.e., the source and cost of investment capital) have a direct effect on capital flows and capital investments of foreign subsidiaries thus linking these two theories of investment;

(c) a new framework for linking business and financial risk is proposed. Using the taxonomy for classifying competitive FDI strategy by Driffield and Love, we show how the competitive market strategy of foreign subsidiaries (e.g., an efficiency or location advantaged strategy) are linked with specific business risks such as labour actions or high fixed-capital investment. Foreign subsidiaries may adjust their level of financial risk by modifying their capital structures in response to firm-specific business risks in the host environment by placing higher amount of debt on host creditors or with the use of short-debt maturities or trade credit;

(d) contemporary econometric estimation methods are applied to improve on some of the more elementary results used in many of the more traditional empirical research literature in modeling capital flows and capital structure of foreign subsidiaries; and

(e) the contemporary research on the determinants of capital structure modeling within foreign subsidiaries is tested with a large, proprietary data set with a set of unique firm-level accounts.

CHAPTER TWO HISTORICAL LITERATURE REVIEW

As an introduction to the thesis, we review the foundational literature that provides a historical perspective and philosophical tradition of the thesis as an academic work of social science and empirical research. We explore the historical foundations of FDI theory, the financial theories of *profit maximization,* and the *portfolio theory of FDI* that are necessary to understand the basic principles and factors affecting the financing of foreign investments. Afterwards we support each empirical chapter with a separate and specific literature review that underlies the development of the chapter research questions and models in each chapter.

Foundations of FDI Theory

The foundations of contemporary FDI theory is rooted in the traditional industrial economics/organization approaches, international business, and strategic management fields that also recently include treatments from international finance. In the industrial organization (IO) context, foreign direct investment is a central or key component of the multinational's *profit maximizing strategy*. The central argument of contemporary industrial organization's strategy-conduct-performance (SCP) theory is the firm's *market structure* has a significant effect on how the firm organizes its profit maximizing strategy that in turn determines its *performance.* In contrast, the resource-based view and strategic management theories recognizes the feedback loops between these market and firm-level functions and argue that profit strategies and performance can also alter the market structure of firms (Porter, 1981). The very early theoretical foundations of industrial organization were built on the theory or model of the firm as the "combiners of inputs" in imperfect markets. The

first, early theory of the firm was given by Ronald Coase who introduced the 'transaction cost' approach to explaining the origins and nature of the firm, which he saw as a mechanism for reducing the cost of market transactions (Coase, 1937).

The first working theories of FDI were developed from within the field of industrial economics which holds that there is a strong relationship between market structure and the firms conduct or strategic policy (Bain, 1952). The Bain arguments also asserted that monopolistic power has a negative social welfare implication by enabling the constraint of production to maximize price. In contrast, Schumpeter's work argued the purpose of the firm is to exploit competitive opportunities and render competitive action obsolete which necessarily entails "creative destruction" of inefficient business models in favor of more efficient resource-allocating firms (Schumpeter, 1951). In contrast, the 'Chicago' school of industrial economics countered the Bain arguments that monopolies had a detrimental social welfare feature by showing that profits are more likely to result from efficiency in production and distribution rather than through collusion or monopolistic powers (Stigler, 1950). From these theories of the firm, foreign direct investment theory grew with an over-arching interest in social policy that dominated most academic economic research in the mid twentieth century.

Early FDI Theory

Applying the concepts of the firm to the international setting, the first, practical theory of FDI was organized by Stephen Hymer as an early attempt to address the internationalization of domestic firms and outline the mechanism of

international market structure which motivated cross-border profit seeking behavior (Hymer, 1960). Vernon extended FDI theory by showing how market structure motivates the organization of production in stages and cycles in competitive cross-border settings (Vernon, 1966). Later, Caves' seminal work "International Corporations: The Industrial Economics of Foreign Investment" provided the first proper treatment of FDI theory within the industrial organization framework which detailed how the competitive market structure of monopolistic and oligopolistic firms is determined by product differentiation and diversification, thus affecting their performance (Caves, 1971) .

Caves was the first to argue that "high capital charges" which are imposed by markets for financing large transactions might serve as a barrier to foreign market entry for some firms. In this context, Caves is one of the first to suggest the linkage between capital markets and the firm's market structure. Moreover, he also recognizes early in the development of the FDI theory the relationship between risk and return in foreign investments and that investors in foreign firms may insist on higher rates of returns. In this context, Caves early works somewhat contrasts the notions of Hymer that interest rates or rates of return are not sufficiently determinative in the FDI decision process, although this notion escapes much further scrutiny for another 40 years.

The early work of Hymer, Vernon, and Caves provided the early theoretical foundations for the development of the *internalization* theory (Dunning, 2003). Internalization theory is one of the most important works toward the formulation of a general theory of FDI as proposed in "The Future of the Multinational Enterprise"

(Buckley & Casson, 1976). In this work, the authors forward a general theory of the internalization of foreign markets. Markets are internalized by firms until the "benefits of further internalization are outweighed." By extension, it is the cost of cross-border market failures that drive FDI over indirect investment such as licensing or exporting. Buckley et al also show a high degree of correlation between technology and multinationality of firms, concluding that internalization of technology resulted from higher transaction costs in external imperfect markets. They also argued that stronger and not weaker property rights would stimulate sharing of technologies. Moreover, what set this work apart from other similar research in FDI was that it was the first to be "distinguished by its positivist stance" (Buckley & Casson, 2003).

In contrast to the industrial organization literature, *strategic management* is a parallel and complementary research field, and in the case of FDI theory is largely organized within the international business research framework. It is commonly associated with the resource-based view (RBV) of the firm. The RBV seeks to identify the internal nature of the firm which enables it to sustain a competitive advantage through some proprietary function or other feature which creates high barriers to entry (Lockett et al., 2009). The RBV both embraces and rejects some of the key principles of IO, of which the most important distinction being the emphasis which IO attributes to the impact of the external market structure on the firm. In contrast, the RBV stresses a focus on the firm's internal resources in defining or shaping the firm's profit maximizing strategy (Conner, 1991).

Direct Ownership Motives in Early FDI Theory

Hymer's 1960 doctoral thesis on "*The International Operations of National Firms, a Study of Foreign Direct Investment"* is the first modern economic theory of FDI. It is one of the seminal works of early conceptual FDI theory in which he rejects the classical Ricardian idea of portfolio investment as a motive for foreign direct investment (Hymer, 1960). Among the paper's numerous and original insights, he is the first to distinguish that FDI is not necessarily motivated by interest rates or differential rates of return as suggested in classical economics but by the ability to exploit ownership advantage. The theory is set in the context of monopolistic competition and asserts that firms will only engage in the higher risk of foreign operations if those returns are higher than a domestic expansion of the same type. The strength of Hymer's arguments lay in the clear examples and the simple logic of his observations even though the study provides only limited data analysis or rigorous rationalization of his research methodologies. Dunning and Rugman later provide a more extensive analysis of Hymer's considerable contribution to the formation of a general FDI theory (Dunning & Rugman, 1985).

Hymer's rejections of interest rates on direct investment are based on his analysis of the classical *portfolio theory* of trade that states that *capital flows in response to differentials in interest rates*. Hymer argues that since portfolio theory does not explain the preference for direct investment, it must be rejected in favor of a direct theory of foreign investment that he offers as an alternative. Hymer offers four points in evidence against portfolio theory:

(a) the international account balances of the Standard Oil Company would discount any movement with respect to interest rates because capital move to countries where interest rates or returns are lower;

(b) the cross-border movement of capital from the US to other countries is insufficient to be explained by interest rates alone;

(c) that nearly all FDI is undertaken by the US so if interest rates were a motive of FDI more countries would be engaged in FDI; and

(d) that FDI persists in some industries and not in others.

In retrospect, Hymer's main arguments really only suggest that portfolio theory alone is *insufficient* to explain FDI. His arguments were more relevant before FDI began to spread to other industries and countries in the late 1960's. Hymer's strongest argument is that portfolio theory alone does not explain the desire for the *control* of foreign assets as found in direct investment. In other words, if control were not important, then investors would simply invest in a portfolio of assets (e.g., the stocks of multinationals with foreign operating firms). However, in a contemporary context, global credit, capital formation and interest rates are even more relevant in the expansion of FDI than in Hymer's time when only very large, mostly public firms engaged in FDI. Therefore, while it can be argued that portfolio theory is indeed *insufficient* to explain FDI, we argue that it is not altogether *unnecessary*.

Hymer's theory was influenced by Dunning's early work on FDI "American Investment in British Manufacturing Industry" (Dunning, 1958). In Hymer's view, direct foreign operations were a strategy conceived of very large companies with few capital constraints. Moreover, FDI as seen by Hymer and his contemporaries was primarily a practice of very large UK firms in the pre-war period followed by US firms in the post-war period. These firms were thought to be international vehicles for the allocation of excess or surplus domestic capital that sought to exploit under-served and weakly protected foreign markets. Now, FDI is no longer overly constrained by firm size or surplus domestic capital and is more prone to opportunistic impulses in the business and financial market cycles.

Mid-Century FDI Theory

Vernon is a central figure in early FDI theory whose simple and direct analysis remains popular and frequently cited in contemporary literature as a general economic motive for FDI (Vernon, 1966). Vernon's FDI theory appears in his "*International Investment and International Trade in the Product Cycle*" where products are produced in different global locations at different phases of their life cycle according to the comparative advantage of the host country. As products mature, they will become more technologically simple to reproduce thereby seeking out the lowest labour inputs as economies of scale are achieved.

Following Vernon, Caves builds a more formal industrial organization framework of FDI in "*International Corporations: The Industrial Economics of Foreign Investment*." In contrast to Hymer's emphasis on direct ownership, Caves

argues that the motives for FDI are driven through the operational structure of the multinational's need to expand or diversify by: a) vertical integration of more of suppliers, or b) horizontal addition of more production capacity. One of the shortcomings in the Caves analysis is the discounting of the possible spillover benefits on host economies, but it possesses an overall strong and practical model for the economic motivations for FDI in the familiar context of the IO framework. Following Caves, much of the work on FDI theory moves stepwise through more topic specific details of economic variables of interest on the specific economic determinants of FDI.

In McManus' work "*The Theory of the International Firm,*" he discusses a general theory of how interdependent corporations are formed in different countries, and coordinate though pricing and ownership mechanisms (McManus, 1972) . Likewise, Oliver Williamson's work "*Markets and Hierarchies*" observes that the existence of different firms derives from 'asset specificity' in production. Williamson also discusses the factors of the internalization of market functions, and in particular he introduces the idea of 'bounded rationality' that argues for the limits on human capacity as a key factor which determines the capacity for growth in the firm (Williamson, 1973). Arguably, this type of 'transaction cost' reasoning became most widely known through his early works on this subject. Rugman's "*Risk Reduction by International Diversification*" asserts that a motive for FDI is the risk diversification which is facilitated by operating in different locations (Rugman, 1976) which remains somewhat inconclusive in the current research literature.

In 1979, James Anderson introduced the 'gravity' theory of trade that has been frequently used as a model for bi-lateral FDI. As the distance between trading countries increases, cross-border trade decreases. Anderson claims "the gravity equation is one of the empirically successful models in economics" (Anderson, 1979). In 1984, Helpman examined the different determinants of FDI which combined with the factors of ownership and location advantages to show that more productive firms are generally engaged in FDI as opposed to exporting or licensing (Helpman, 1984). In 1997, Brainard proposed a theory on the location of FDI by moving plants and production facilities closer to its foreign customers so that achieving scale economies with multiple locations is more efficient (Brainard, 1997).

While Hymer, Vernon and Caves provided the early, broad foundations of research on the economic determinants of FDI, the four decades of research that followed have produced only one general economic factor that is consistently correlated in the empirical research literature with capital flows to FDI; that is, market size or GDP. In the comparative study "*The Determinants of Foreign Direct Investments: Sensitivity Analyses of Cross-Country Regressions,*" Chakrabari examines all of economic determinants of FDI in the research literature such as GDP, labour costs, and tax and exchange rates. He shows that GDP (per capita) as the only general economic determinant that has shown a consistent consensus among researchers with respect to its correlation with FDI. In other words, FDI is more strongly correlated in developed countries where firms can more readily build or expand market share in an environment that has a developed infrastructure and commercially advanced markets (Chakrabarti, 2001).

In "*A Review of the Empirical Literature on FDI Determinants*," Blonigen gives a contemporary and comprehensive survey of the large body of current studies of the economic determinants of FDI. In this work, he summarizes the major determinants as currency exchange rate effects; tax schemes; quality of infrastructure; trade protection; and exchange and tax rates (Blonigen, 2005). These economic determinants are all linked in part with some profit motive that seeks return for foreign risk. However, these basic *economic motives* do not reflect the complete or final form of profit maximization that foreign subsidiaries may undertake.

Profit Maximization in FDI

FDI by definition is the direct ownership of a foreign enterprise of not less than 10% of the firm's assets or equity (Cohen, 2007). For this research, a practical working definition of FDI would be: *capital investment in foreign productive assets that are engaged in economic activity by a foreign investor with a controlling interest.* By this definition, we generally mean that FDI is foreign capital that is engaged in *production for profit* (e.g., the manufacture of goods and services).

Most multinationals at some point were successful domestic firms which mastered the managerial and capital demands of growth in an international market structure (Cohen, 2007). That foreign operations are distinctly more profitable than their domestic counterparts has long remained a stylized fact in economics (Daniels & Bracker, 1989). It has been shown that foreign subsidiaries frequently perform better than their purely domestic competitors suggesting they have more adaptive foreign operating strategies in a dynamic market structure (Razin & Sadka, 2007b).

The capacity for sustained growth in multi-site and geographically diverse organizations necessarily requires the ability to manage complex and competing financial priorities over secular business cycles. The distinguishing feature of the multinational's profit-maximizing motive is the structure of its foreign risk. As compared to direct investment in a domestic affiliate, the foreign affiliate must in many cases, generate a *foreign risk premium* in addition to the investor's required rate of return on domestic investment alternatives. This necessarily requires a significant financial planning component in the FDI decision process.

From the perspective of the literature of international business, we rarely see a distinction between the profit strategies of the parents and that of their foreign subsidiaries. More recent studies have shown that more capital is in fact allocated to foreign subsidiaries with better strategic growth opportunities (Mudambi, 1999). Thus, the profit maximization strategy of foreign subsidiaries is not merely the result of its initial market entry mode or ownership structure, but linked with the economic risks and opportunities in the host which it seeks to exploit (Gilroy & Lukas, 2006). There must be some other unique feature of the foreign subsidiary's profit maximization strategy which reflects the alignment between the basic operating motives for FDI (e.g., access to labour markets) and the business risks inherent in a given host economy (Barrell, 1996).

Most large multinationals have their own internal capital markets as the result of their multiple cross-border operating assets (Desai et al., 2004). This also gives them some limited capacity to modify the profit strategy of their foreign subsidiaries based in part on their unique market structure. As a consequence, some foreign

subsidiaries may alter their short-run profit maximizing strategy to match or exploit dynamic market shocks in localized settings. For example, they may absorb short-term losses or take on additional risks to shelter their parent or other vulnerable sister divisions in dynamic cycles (Peyer & Shivdasani, 2001). This is a key concept that underpins one of our central arguments; the foreign subsidiaries' profit maximization is always linked with its *operating strategy* (i.e., how it organizes its factors of production in foreign markets) which are linked to the initial economic market entry decision and the dynamic risks and competitive market structure of the host economy.

We argue that capital markets (i.e., where the source of investment financing is arranged) have an effect on the market structure of the multinational firm and its subsidiaries. It may motivate them to modify their strategic conduct by choosing, for example, where and when to invest in additional capacity or to diversify its product offerings. These modifications can affect the funding, risk mitigation and profit maximization strategies that are the topics of the three empirical chapters.

FDI and Portfolio Theory

Traditional portfolio investment theory within economics says that capital flows in response to comparative country-level interest rates (i.e., the rates of returns on local investments) and international trade is therefore regulated by national, comparative advantage (e.g., countries with natural efficiencies should have better returns on their sources of national competencies) (Maneschi, 1992). One of Hymer's important arguments draws from his observation that many firms cross-invest between countries, thus eclipsing the interest rate motive for direct investment

(Driffield & Love, 2005). Instead, Hymer theorized that FDI was largely undertaken as a form of firm-specific advantage seeking via direct investment as opposed to other types of portfolio investment. Thus, portfolio theory was laid aside as the search for FDI theories focused on economic motives that discounted significant interest rate considerations. In contrast, we argue that in today's credit constrained environments, the cost of capital is central to the interest rate motive, which is why the firm's relationship with its sources of capital is so important. Firms with strong ties to financing alternatives not only finance at a lower cost, but also may possess a fundamentally different view of FDI opportunities simply based on their financial capacity for greater FDI at the margin.

The long-standing arguments against portfolio theory or the 'differential rates of return' theory of FDI have centered on three points: that portfolio or *arbitrage* theory of FDI (a) does not explain why FDI is financed with foreign capital (b) does not explain the intra-industry investment between similar industrial sectors, and (c) does not explain the preference of corporate investors for direct ownership over portfolio investing (i.e., if an industrial firm could receive the same rate of return by investing in other international firms rather than in its own foreign production). Through an investigation of the financial determinants of the FDI process, we attempt to address some of the significant gaps in the arguments against the portfolio theory of FDI.

Summary of the Historical Literature

The current FDI literature proposes only a few candidates for a realistic and comprehensive theory of FDI (Russ, 2009). The early theories of FDI grew out of transaction cost economics where the internalization of market functions resulted in lower costs through development of internal company functions. As this concept was applied to cross-border settings, economic theory sought out different motives for direct investment that were not explained by transaction costs, interest rates or rates of returns as was traditionally held in portfolio theory. Direct foreign investments were believed to be motivated by some form of direct ownership advantage where profit maximization depends on the ability to exploit some form of intangible competency in a cross-border context. Internalization theory later explained how FDI lowers transaction costs in a cross-border setting where ownership advantage enables the exploitation of foreign markets. In contrast, firm-level profit maximization theory has not really explained how strategies work in cross-border settings where there may be dynamic or incompatible strategies between the parents and its diverse set of subsidiaries. In seeking to explain how firms modify their profit strategies of their foreign subsidiaries, we must return to portfolio theory to explain how the access to capital and credit, and the cost of capital are critical determinants of FDI in a world of global trade and dynamic credit cycles.

CHAPTER THREE METHODOLOGY

We apply the general methods of financial economics in our analysis of firm level accounts and introduce concepts from financial and strategic management literature that address some of the choice and feedback mechanisms from the firm's performance back to the adjustment of the firm's strategy.

The basic research paradigm in this thesis may be categorized as essentially *positivistic*. That is, this thesis seeks to find definitive explanations of economic behavior through the observation of economic systems, the exploration of logically available facts, rational argument, and empirical analysis.[2] One of the challenges in economic positivism is to reconcile the apparent conflict in social economic theory between the firm's performance and its profit maximization strategy. For example, the traditional measures of *firm performance* within industrial economics are: (a) the firm's selection of which products to produce; (b) the continuous engagement of new technologies to support efficient production; (c) the full employment of resource factors such as labour and capital; and (d) the equitable distribution of income to achieve price stability (Scherer, 1970). While we do not explore these motives or any other specific choice behavior, we do seek to understand the underlying policy motives that deal generally with our research questions. We

[2] It is the express intent of this research to provide a rational explanation of economic behavior without value judgments or advocacy of any particular national policy or political position. In contrast to research on managerial behavior or business theory approaches, this research is set firmly in application of established economic theory for the exploration of quantitative research problems. In this context, it is an also a work of *applied economics* as the logical consequences of the results are ultimately linked with the *economic problem*, that is choice of what is to be produced and how the allocation of capital and labour serves those choices. Moreover, we could also say that this thesis is a more generally a work *of instrumentalism*, that is, we are not concerned with testing the truth status of the long-standing economic theories and their derivative models but whether they can provide and useful or practical results (Boland, 1989).

reserve the discussion of the broader implications of social policy in the thesis conclusion.

Economic Modeling

In each chapter, the introduction and review of the research literature is intended to support the formation of the main arguments, which are then reduced to specific research questions for testing. Econometric models are formulated for each research question, followed by analysis of the results from the econometric estimations of the non-experimental data sets. In each case, the underlying financial and economic theory is identified as the foundation for the research question that is subjected to econometric testing of the data. Where possible, the chapter literature review and arguments are intended to identify the gaps in the theoretical foundations that account for the divergence of the models with the real-world features of the data set and the uncertainty in the economic environment. For each model, we introduce new, and in some cases, novel exogenous variables that attempt to better explain the model and its explanatory variables of interest.

The basic unit of economic activity in the traditional industrial organization view of economic activity has been at the *industry level,* while the strategic management and financial theories have focused more closely at the *firm level*. In this research, the foreign subsidiary is the basic unit of empirical study. We link all the variables of the accounts of the foreign subsidiaries with the variables of interest from its parent firm, host economy, and industry. We also examine different classes of *strategic groups* within and across industries and classes of FDI. This also means

there are some gaps in the data sets that may affect the consistency and efficiency of the estimation of the models.

The general approach to econometric modeling is to first identify any functional forms from extant economic and financial theory within the current literature that may have been previously employed to analyze a similar problem statement. We then seek to modify or extend those models with the assumptions outlined in each chapter. There are also several statistical assumptions made with respect to all the models in this thesis. First, all of the model specifications in this thesis are *dynamic*, that is, they include a lagged dependent variable as an explanatory regressor to capture the prior year effects or shocks in expression of the current year values. Secondly, all the empirical models are *stochastic* in that each model anticipates some indeterminate outcome and therefore contains an error term.[3]

All the model specifications assume the presence of some unobserved heterogeneity as the result of some omitted variables and generally, we discount the occurrence of measurement error given the standard accounting practices of most of the firms in the sample.[4] However, this does not mean that there are no reporting biases within each firm that would have similar effect to a measurement error. This is why we seek the largest possible sample constrained by those firms with near-complete accounting data.[5]

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[3] Generally, we assume that the errors are identically and independently and distributed. We report z-values (i.e., student t values in a panel data set) of greater than 2.00 as significant with confidence levels of 95%.

[4] All of the firms in the data set use international accounting standards IRFS.

[5] This may produce some sample selection bias against firms that under-report results; but in this case, we are only investigating firms with capacity to engage in, and already committed to FDI, and firms that under-report are unlikely to have strong financing links with capital markets in any case.

The estimation methods are selected based on their capacity to handle the various violations of the ordinary least square (OLS) assumptions, fixed effect or instrumental estimation methods that are common in the research literature. The recent development of the generalized method of moment (GMM) estimators for panel data sets in the 1990's has greatly improved the ability to handle these violations with internally generated instruments in dynamic panel sets (Arellano & Bond, 1991).

There are two different types of econometric models that are used for analysis in this thesis: descriptive and reduced form equation models. Descriptive econometric models seek to recover statistically significant features within the data set and the inferences made with these models may only be applied to the subjects or agents within the data set. In contrast, reduced form equation models are based in economic theory, and seek to recover some economic primitive. They are generally derived from a structural system of equations. The objective of these structural models is to transform a basic, deterministic economic model into a dynamic, stochastic econometric model that can provide efficient and un-biased estimates with non-experimental data. However, most of our reduced form equations are more properly described as a descriptive regression of joint population density (Reiss & Wolak, 2000). For clarity, we address underlying the economic and statistical assumptions in all three chapters below to show the context of the applied economic and financial theories in the models.

In Chapter Four, we are seeking to link capital markets with capital flows and capital investments to and by foreign subsidiaries. This presupposes a the linkage between capital markets and the firm's market structure. Model 2.0 describes the aggregated capital flows as given in Baker, Wurgler and Foley (Baker et al., 2008). Model 2.1 is our extension of the Baker et al model that is a descriptive econometric model derived from a reduced form *demand function* common to economic theory where demand increases with a decrease in price. In this case, the increased price of the firm's assets is based on total returns or forward-looking market values (e.g., PE ratios) and has a reciprocal relationship with its cost of equity.

The changes in capital investment is given in Model 3.2 and is also a descriptive model which has some similarities with a demand function if we assume that future expectation of growth has a reciprocal relationship with the cost of financing foreign assets. Model 3.2 is a dynamic model derived from Precious' model for an investment function shown in Model 3.1. that was built on the static and deterministic Cobb-Douglas production function (Precious, 1985).

In Chapter Five, we are modeling factors that affect or *"drive"* the capital structure of the foreign subsidiary in response to business risk factors. Model 4.0 is also a descriptive econometric model that is derived indirectly from an economic cost function, but also contains some aspects of a profit function and utility function where some qualitative feature of the type of capital may affect the selection of the source of capital. It is built on similar contemporary models for capital structure of corporations (Rajan & Zingales, 1995; Frank & Goyal, 2009).

In Chapter Six, we model the factors that support or constrain growth in foreign subsidiaries. The models include variants with different dummy variables used to distinguish the effects of different categorical responses. In Model 5.0, we specify revenue growth as our measure of output and allow for externalities, dynamic shocks, individual and time effects and the use of proxies for productivity in a purely descriptive model (Griliches & Mairesse, 1995). In Model 6.0, we specify an ordered, four-vector model using vector autoregression on panel data sets. This model measures the impact or response of the dependent variable, (i.e., in this case, the rate of sales growth) of producing a 1% shock (impulse) on an explanatory variable of interest (Holtz-Eakin et al., 1988).

We conclude Chapter Six with Model 7.0, a purely descriptive econometric model to measure shareholder value as function of the foreign risk premium. This model has an implied cost function as higher growth rates of sales or revenues entail both higher commitments to capital and the constraint of the limited rate of technological change which a firm can integrate over time (Fisher & Pry, 1971). It is designed to recover a hypothetical relationship between growth and the risk premium paid to foreign shareholders (i.e., the FDI risk premium) holding profitability constant.

Master Data Set

For this research, we required a unique set of firm-level accounts that contained matched parent and subsidiary level details over a large number of industries and countries. Many firm-level studies are frequently limited to the use of

proprietary data bases such as the COMPUSTAT® database which contains detailed records for only US firms over a long sampling period.

To model the economic conditions of foreign subsidiaries in a host economy, we need to model factors common to most industrial foreign subsidiaries with contemporaneous country-level and parent-level data. Subsidiary-level data has been traditionally difficult to obtain on any large scale with good accuracy. In particular, the ownership structure and reporting mechanisms of large, multi-site multinationals creates a daunting accounting task of building a model of capital flows that can be applied across different firm types. However, recent developments in data mining and computer databases have provided better and more accurate access to subsidiary-level data with standardized accounting that supports the development of firm-level modeling.

Data Collection and Organization

We selected the ORBIS® database by Bureau Van Dijk, a large, proprietary database of over 40 million firms worldwide. We began with raw data from our data sources in electronic format directly from ORBIS®. The data set was then organized and programmed into a relational database that allows all data sources to be linked at the firm level. Each firm is uniquely coded with an identifier that also serves as its panel identification number. All the variables of the subsidiaries parent values were linked directly with each subsidiary's value for each year in the 8-year sample 2000 to 2007. About three-quarters of the parent firms are publicly held.

The working database for this research contained over 2 million firms of both parents and subsidiaries from over 50 countries, and included country-level data such as GDP or inflation. However, given the accounting variables necessary to track transactions between parent and subsidiaries, the final working dataset comprised a list of about 8,000 subsidiary firms from 38 countries. This is about 16,000-matched parent and subsidiary firms as a few parents have multiple subsidiaries reported in the data set. The data set was program into a relational data base which combined all external datasets for country-level and firm-level data elements to be combined for panel analysis. The advantage of this approach lay in the ability to redraw a sample from the master data set with a new or different set of explanatory variables to test or contrast changes in the regressions, the strength of its instrument matrixes, and other similar problems inherent in working with large data sets. These sampling techniques enabled more exogenous variables of interest to be identified. This also helped produced regressions with stronger instruments and only one model reported a Hansen test below 0.100 as weak instrumentation is a known weakness of GMM estimates of panel sets.

On average, a 8-year panel with 8,000 matched firms, each with 50 annual data elements from the firm's income statement and balance sheet, and 25 annual data elements from the host and source country yielded a typical panel data with over 64,000 observations for each regression. For a typical GMM estimation with 10 variables of interest, about 80 to 100 internal instruments would be generated to handle endogeneity. The sample selection process only reduced the dataset by excluding firms with too many gaps in their accounts. Typically, firms which reported fewer than 5 of the 8 year sample period were excluded. This tends to bias

the data set with firms with established public reporting and could may under-represent higher performing firms that have poor reporting records.

The division of firms is about 60% within OCED and 40% within the emerging world. In addition, the sample is more heavily weighted in the older EU countries as they have a longer history of reporting data for public consumption (See Table A-1 in the Appendix). The use of different data sources is outlined in each chapter as they apply to the specific problems in the modeling process. Unless otherwise specified, all currency values are denominated in thousand ($000) US dollars.

CHAPTER FOUR CAPITAL MARKETS AND FINANCING

This chapter seeks to fill a significant gap in the international business literature by bringing together the standard analysis of the motivation for FDI, with the multinational's ability to finance growth and expansion. We provide direct evidence that capital market rates affect the rate of investment in foreign subsidiaries. Using a large, firm-level data set of matching parents and subsidiaries within the OCED, we show that secondary capital flows and capital investments to FDI are linked with capital market values. As parent firms can raise capital in periods of high market values to fund FDI, this type of 'arbitrage' driven FDI may in turn lead to the partial decoupling of economic and financial motives for FDI in financial market bubbles. This suggests that internationalisation decisions that are taken by firms in response to over-valued equity markets, may well be rational in the short term, but may be unsustainable in the long-run.

Introduction

The rates of return or yields on capital market securities and financial assets can influence the funding of FDI by changing expectations of future growth, asset prices, and interest rates. This has a significant impact on the ability of firms to raise capital and exploit opportunities in foreign markets. The long-standing theoretical research on foreign direct investment (FDI) has emphasized the importance of firm specific advantages such as host country technological development, labour costs, and macroeconomic conditions as the economic drivers of FDI. The conceptual FDI motives of Hymer and Vernon which have dominated FDI research for 40 years have focused on the initial entry mode decisions and the operational and technological functions of the international firm. However, the more recent research on the motivations of FDI has shown that some financial factors may also play a significant role in determining capital flows to FDI. For example, Baker, Foley and Wugler show how 'cheap' capital created by high stock market values in the parent firm's source country is linked with higher rates of FDI (Baker et al., 2008). In a similar context, Forssbaeck and Oxelheim show that the firm's financing capacity is also linked with higher levels of FDI (Forssbaeck & Oxelheim, 2008). Together, these trends suggest a link between capital markets and the funding of FDI that points to an under-developed area within the traditional economic theories of FDI; namely, how the firm's financial strength and capital market rates may function as financial determinants of FDI.

The evidence of a linkage between capital markets and the capital funding of FDI also suggests a new inter-disciplinary research agenda in investigating the impact of global financial turbulence on the capital movements of foreign

subsidiaries. For example, global financial crises frequently affect domestic interest rates in emerging economies and may motivate the lowering of local trade restrictions to encourage more inward FDI (Aizenman, 2005). In light of the global financial crisis of 2008/9, there are also some links being drawn to the Asian crisis of 1996/7 when cheap capital fuelled excessive investments in several Asian countries, leading to an over-reliance on debt that was unsustainable (Driffield et al., 2007). In this context, we undertake a new investigation on the link between capital markets and FDI by modelling the capital movements of foreign subsidiaries in two parts. First, we develop the 'cheap' capital hypothesis expounded in (Baker et al., 2008) to examine the link between capital markets and *new capital flows* (i.e., new additions or 'injections' of debt or equity to fund working capital or fixed asset investments that are in excess of the subsidiary's available cash on hand); and secondly, we examine the new capital investments made by those same foreign subsidiaries which are more reflective of actual investment in economic activity.

This chapter undertakes a new analysis that builds on the recent research on the financial determinants of FDI that couples firm-level factors, host economic conditions and factors within global capital markets. We employ a large sample of matched parents and subsidiaries over a large number of years, industries and across a range of OECD countries. We demonstrate the difference between capital flows and capital investments is linked with expectations of growth, asset prices, and the firm's financing capacity. We also seek to address a basic paradox in the literature: that is, why the two long-standing theories of economic investment (i.e., FDI and 'Keynesian' capital investment theory) should run parallel with little real intersection. We address a gap in the international business literature by providing a

firm-level model of capital movements that link capital markets with the basic market structure of foreign subsidiaries. This contribution is made possible by developments that are more recent in availability of detailed firm-level data.

Since the path-breaking work of Hymer, the emphasis in IB research has been on developing foreign direct investment theory with the firm as the coordinating unit of value-adding activity. Within these strands of analysis, firm-specific advantages and host-country-specific factors combine to motivate FDI based on economic competition and the capacity to exploit competitive advantages, particularly those in which the firm can exploit some form of intangible intellectual property. The clearest example of this theoretical stream is seen in the dominance of Dunning's OLI framework as a tool of IB research. Dunning argues that for foreign market entrants to be successful, they must possess advantages in ownership, location and other internal factors which it can exploit exclusively in a foreign market (Dunning, 1988). In an extension of this paradigm, Buckley and Casson developed the more inclusive internalization theory which provides a competitive framework for the motives of FDI by demonstrating how firms seek foreign ownership in response to market imperfections in cross-border trade environments (Buckley & Casson, 1976).

The dominance of these paradigms within IB research has meant that much of the empirical work in both international business and economics, as well as regional science, have focused on very similar models, augmented only by particular variables of interest (Buckley, 2002; Buckley & Casson, 2009). But despite the abundance of empirical research in this area, Blonigen argues that our understanding of the determinants of FDI is still in a stage of relative infancy (Blonigen, 2005). This state

of relative underdevelopment is partly a function of the complexities underlying the motivating behaviours for FDI. The IB literature as such has largely side-stepped the importance of standard economic *investment* theory in explaining FDI, which like all other types of investment, are linked with expectations on interest rates, asset prices and other factors common to irreversible investment.

More recent trends in the research on the motivation for FDI have sought to bridge international business research with other areas of economic theory to link FDI motivations with trans-national trade, capital flows, and firm-level financing effects (Blonigen, 2005). For example, Doukas and Lang show that the relationship between new 'Greenfield' FDI and changes in shareholder value provide a link between the portfolio investor's demand for risk premium and the foreign direct investment activities of the multinational firm (Doukas & Lang, 2003). In general, the financial dimensions of FDI motivation have been relatively absent in the research literature. This seems likely to be driven by Hymer's initial rejection of interest rates as a determinant of FDI in the late 1950's. Hymer stressed the advantages of direct foreign ownership control as a critical feature of the ability to exploit property rights in foreign markets (Hymer, 1960). In historical context, Hymer's arguments were indeed relevant as at that time only very large domestic, highly profitable corporations where engaged in FDI. However, in the contemporary global economy, firms of all sizes are engaged in FDI and must compete for capital in a global market. Given the role of financial markets in the recent global economic crisis, there is clearly a new incentive for considering the role of financial determinants of FDI at the firm level.

Financial Determinants of FDI

The empirical studies of FDI have mostly focused on larger firms that typically had generated sufficient cash through sales in their home country, and were subsequently motivated to exploit their distinct ownership advantages in foreign markets. For example, Bhaumik et al have identified how Indian firms engaging in FDI are funded by very high sales of relatively generic products in their home markets (Bhaumik et al., 2009). However, the financial capacity to exploit these conditions was not widely considered as a component of the basic FDI decision process. International operations were seen primarily as economic vehicles to exploit some distinct firm-level advantage or other form of intellectual property in a cross-border setting. However, it was Caves who organized the first formal industrial organization view of FDI theory that recognized that the cost of capital could have in limiting FDI opportunities (Caves, 1971). In about the same period, Aliber stressed an alternative 'financial' theory of FDI where the exploitation of currency exchange rates provided firms with a comparative advantage in funding FDI, largely based on imperfections in capital markets (Aliber, 1970).

To further develop the linkage between financing capacity and FDI within the traditional IB research streams, Oxelheim et al extend Dunning's OLI framework with a set of testable hypotheses which overlay a set of finance specific factors which may be linked with OLI advantages (Oxelheim et al., 2001). These include the exploitation of market mis-pricing, the ability to source capital globally, and reducing operating and transaction costs through FDI. These hypotheses are later tested by Forssbaeck and Oxelheim who find a significant relationship between the measures of financial strength and foreign acquisition (Forssbaeck & Oxelheim, 2008). Thus,

the multinational firm's *financial expertise* is an important *intangible* asset that provides an ownership advantage over smaller or purely domestic firms. In contrast to Hymer's rejection of portfolio theory, financial strength can also be a type of location advantage by allowing the funding of FDI at lower costs compared to its foreign competitors in countries with weaker capital markets.

A firm with comparatively higher net worth (i.e., greater total assets than total liabilities) has an increased ability to borrow or raise capital because it lowers their *external finance premium*, which is the cost of raising capital in external markets (Bernanke & Gertler, 1995). Firms with a high net worth generally have greater creditworthiness, which is the capacity to assume interest bearing debt, and therefore more likely to receive favourable interest rates and repayment terms in their borrowing contracts. However, firm's with excessive debt are also more likely to lose substantial market share in the event of a severe economic down turn (Opler & Titman, 1994). In this context, firms with lower net worth may have difficulty in obtaining external financing for FDI if the company does not have sufficient new growth prospects to justify the investor's expectations of future growth. Moreover, the use of high debt levels often results in a distorted investment policy which may lead managers to allocate new capital to higher cash generating subsidiaries and thereby discouraging more long-term investments (e.g., FDI) in favour of short term cash generating activities (Gifford, 2001). So while foreign subsidiaries with greater debt bearing capacity may have a competitive advantage to exploit near term opportunities, they also present greater financial risk to the parent's shareholder if the parents has to guarantee the loans taken from local, host sources (Kolasinski, 2009).

There is also a branch of literature which outlines the link between currency exchange rates and FDI (Aliber, 1970; Froot & Stein, 1991; Choi & Jeon, 2007). These empirical studies demonstrate how exchange rates provide foreign investors an advantage in the purchase of foreign owned assets because of the relative 'wealth effect' that is created by investing in a foreign market with a devalued currency. More recently, Buch and Kleinert have also argued that exchange rates create a wealth effect on the value of foreign assets that also affects the bidding price of foreign assets (e.g., the competitive bidding process for nascent FDI projects by foreign investors) (Buch & Kleinert, 2008). This stresses the importance of financial capacity in competing for a finite set of suitable FDI opportunities. Moreover, larger multinationals with significant foreign currency exposures are more likely to employ currency hedging strategies, this may also be useful in offsetting undesirable effects of currency movements and increase their tolerance or capacity for foreign risk (Makar & Huffman, 2008). Thus, a firm's total financial strength and expertise in managing its debt capacity, foreign exchange exposures, and capital markets can be a competitive advantage over less sophisticated firms with lower financing capacity.

Market Bubbles and FDI

Gilchrist et al find that during periods of very high market valuations (i.e., market 'bubbles'), public firms can issue new equity shares to raise capital at much lower cost than by using increased debt financing (Gilchrist et al., 2005). In a similar study, di Giovanni also finds a significant linkage between stock market values and the funding of new FDI transactions for M&A (di Giovanni, 2005). Most recently, empirical studies have sought to link high or 'over-valued' markets directly

with FDI flows. For example, Aulakh and Mudambi show how higher market liquidity in the parent's source country has a positive impact on inward FDI in a panel of UK firms, although notably from a single industry (Aulakh & Mudambi, 2005). Market liquidity is the market condition that reflects the ability to sell an asset without having a strong downward effect on its price. It is also a condition which is directly related to 'over' valued markets (e.g., high price to earnings ratios of greater than 16) since parent firms can sell these 'over' valued shares without a significant decline in the share price.

Baker et al demonstrate that high market values in a parent firm's source country can be a source of "cheap capital" to fund opportunistic FDI and supports these arguments by examining US outward FDI with aggregate firm data from national capital accounts (Baker et al., 2008). These higher market valuations are assumed to provide lower-cost capital by enabling firms to issue new shares at inflated prices. These findings point to a general linkage between the global financial markets and FDI. We can further illustrate the global scope of this linkage by looking at the total return of the S&P 500 over a 15-year period (See Figure 1-4). Note, that in 1997 at the time of the Asian financial crises, the total market return was over 30%, compared to the prior 40-year average of 11.4%. As shown in Figure 1-4, we see the changes in capital flows to FDI within the OECD closely follow the total return of the S&P 500 over this 15 year period.

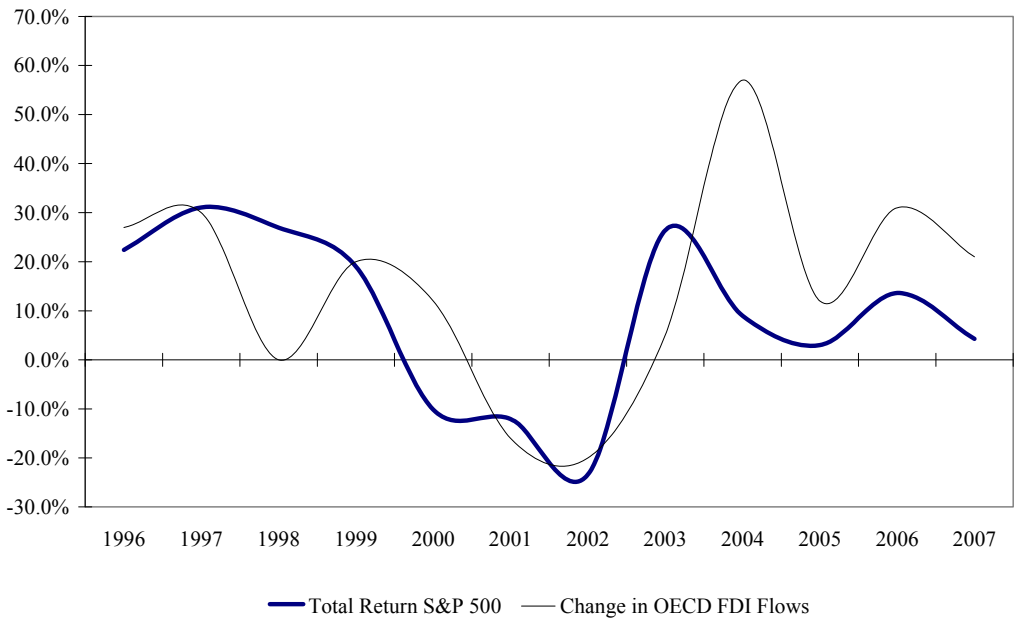

Figure 1-4 Change in FDI Flows and S&P 500 Returns

Most FDI has been seen traditionally as the exclusive venture of large, established firms with capacity for financing foreign expansion. However, more than 97% of firms in the OECD in 2007 were classified as small or medium size enterprises (SME) with revenues of less than $65M (Altman & Sabato, 2007). The typical SME now has a more sophisticated financial management system and access to a wider set of capital funding options than the 'domestic' giants that launched the large post-war FDI expansion 60 years ago. Moreover, Fama and French show that the issuing of new shares is in fact commonplace in US firms and not necessarily restrained by firm size (Fama & French, 2005). They find that from 1993 to 2002, over 86% of firms in their study issued new equity. Similarly, Gatchev et al show that small firms, high growth firms, and firms with profit short falls tend to raise more capital externally by issuing new equities (Gatchev et al., 2009). This trend may be linked to changes in regulations which govern the issue of new shares particularly in the US and EU which makes it easier for firms to issue shares in

shorter time frames as compared to pre-planned seasoned equity offerings (SEO) (Autore et al., 2008).

Overall, parent firms should prefer equity as the primary source of capital to fund new FDI projects, but in fact most firms outside the US and UK generally prefer bank financing (i.e., debt or borrowing) for their internal growth programs because of their closely held ownership structures (Stulz, 2007). Consider the composition of outward FDI from the US (the largest global FDI investor) between 1987 and 2007: reinvested earnings (59%), equity (36%) and debt (5%) (UNCTAD, 2009). In other words, 87% of *new capital flows* to FDI from the US were funded with new equity. Likewise, Razin and Sadka also find from 1995 to 2004, over 60% of the total global FDI capital transactions are financed by issuing new equity shares to foreign subsidiaries (Razin & Sadka, 2007a). However, when we look at the *external* capital raised by larger international corporations outside the US and UK we see they overwhelmingly prefer new debt. For example, in a study of the largest global corporations from 1990 to 2001, it was shown that over 87% of actual new capital was raised from the issuance of debt, and only 9% was raised from new equity shares (Henderson et al., 2006). In other words, while equities may be preferred to fund the internal needs of FDI (i.e., capital flows to FDI), debt and leverage is more commonly associated with the funding from external sources.

The 'cheap' capital hypothesis leaves several issues for further exploration. First, the effects of commercial interest rates (i.e., the cost of borrowing) are not directly taken into account in the Baker et al model. While we can see that high market values and stock cross-listings have empirical linkages with higher levels of

aggregated FDI flows; in practice, most firms actually prefer to fund FDI with debt because it is easier to control the repatriation of earnings and maximize cross-border tax advantages (Shapiro, 2010). Interestingly, we also see the issuance of corporate debt is often timed with availability of low-interest rates (Barry et al., 2008) suggesting some gaps in the periods between sources of 'cheap' capital which must be bridged to sustain a continuous program of FDI. Secondly, the capital raised by the sale of over-valued stock is also subject to an internal, competitive allocation process in large firms where the external flow of new capital to the parent may not be simultaneous with internal capital flows to FDI.

More importantly, what stock market 'over-valuation' as indicated by market-to-book and PE ratios actually signals is the investor's *expectations of future growth*. It is this expectation of growth in future earnings that motivates investors to pay a "premium" or "over-valued" price for the firm's shares. So, it is possible that the FDI which is linked with over-valuation in the parent's source markets as seen in Baker et al simply reflects the increase in ex ante investments demanding more external capital rather than 'cheap' capital that is seeking (ex post) a foreign investment home opportunistically. In either case, expectations about interest rates and asset prices must be linked to significant commitments of corporate capital to FDI.

The link between capital markets and FDI should also be impacted by the dynamic shocks which typically accompany global business cycles. In this context, a firm's financial capacity may have a disproportionate influence on the FDI funding decision when new capital is "cheap" and the firm has a high level of funding

liquidity (i.e., little practical constraint in raising capital). This can lead to a partial decoupling of the economic motives for foreign market entry when funding new FDI opportunities under certain dynamic market conditions. By decoupling, we mean that speculation on future interest rates or asset price shocks may have an over-riding influence in the FDI funding decision so that the traditional economic motives may become secondary or discounted substantially in favour of 'financially engineered' FDI projects. This decoupling may be triggered by asset pricing bubbles or non-market clearing conditions that limits the number of suitable FDI opportunities in a concentrated foreign market. In practical terms, this may mean that firms with greater financial capacity and expertise may be better suited to increase diversification, seek non-core FDI, or tolerate higher operational risk in their FDI projects. It may also make them more disposed to manage multiple FDI opportunities like a portfolio of investments rather than as the strategic vehicles for exploiting cross-border ownership advantage.

Investment Theory and FDI

Within the long-standing theory of investment (Keynes, 1951; Jorgenson, 1963; Precious, 1987), interest rates and the rate of investment have a strong reciprocal relationship. Paradoxically, this directly contrasts the received traditional theory of foreign direct investment that largely discounts the importance of interest rates altogether. We argue that the linkage between these two investment theories is governed by the dynamic relationship between the internal and external capital markets of multinational firms. To explore this linkage, we need to examine the capital flows and investments of foreign subsidiaries as independent, profit

maximizing entities whose capital demands and opportunities for growth may at times conflict with those of their parents or other competing subsidiaries.

The role of expectations and uncertainty on future asset prices has long been a central concept within investment theory (Keynes, 1951). In planning for high growth that is typical of new FDI projects, subsidiaries cannot simply adjust their levels of capital stock instantaneously to new target levels. Firms must plan the funding for large FDI projects that is likely to make capital flow in larger increments or "lumps" with higher sensitivity to anticipated changes in interest rates. Furthermore, wage costs and fixed asset prices will also have a part in controlling capital adjustment costs (Precious, 1987). So new capital flows are more likely to flow in response to near-term expectations of growth, asset prices and interest rates that are reflected in current and recent economic trends. In contrast, new capital investments must also take into account future expectations of growth; possible changes in foreign risk exposures; the availability of suitable FDI projects; and the other aspects of irreversible investments (Desai et al., 2004; Antrás et al., 2009).

Thus, the FDI funding decision and capital flows to FDI are far from a "one and done" product of a static market entry strategy, but a dynamic process which must take into account the cost of adjusting capital stock, the expectation of future asset prices, changes in interest rates, and the expectation of future growth.

Research Questions

As we have argued, FDI capital flows are linked with capital market rates over the long term. However, new, net capital flows are more likely to fund near-term financing needs (i.e., planned or budgeted expenditures within a one year period) and are more likely to be affected by the expectations of current growth and changes in current asset prices and interest rates. We also know that firms with stronger financial capacity are better positioned to exploit near-term interest rate opportunities. This leads us to a simple set of questions about the flow of new, (secondary) capital flows to foreign subsidiaries:

R1-4: New, net capital flows are correlated with expectations about current growth, market interest rates, and the firm's financing capacity.

As new capital flows are likely to fund short-term demands for capital, the traditional economic motives for FDI that govern the market entry and location decision, may not be necessarily linked with the funding of long-term growth and expansion[6]. In contrast, it is new *capital investments* that are necessary to provide increased capacity to support growing market share. They also require detailed planning and must anticipate the costly adjustment of capital stock. This leads us to a simple test about the flow of new, capital investments within foreign subsidiaries:

R2-4: New capital investments are correlated with expectations about future growth and the firm's financial capacity.

[6] Growth and expansion are related to the changes in capital stock. Growth implies the firm is able to achieve a stable increase in output of revenues without additional capital investment. In contrast, expansion signifies an increase in capital investment or capital stock needed to support higher output.

Modelling Capital Movements

The basic types of capital flows to FDI are equity capital, debt or intra-company loans, and reinvested earnings. Equity and debt are more typically designated as 'new capital' as they are actual flows of real capital to the foreign subsidiary. Reinvested earnings are those profits or earnings generated by the subsidiary which the parent 'reinvests' by allowing the foreign subsidiary to retain them rather than repatriating them back to the parent. FDI flows may also be further classified as primary or secondary capital flows. Primary capital flows are those funds that originated from the market-entry decision process to fund the start-up of a "Greenfield" operation or purchase a going concern. Secondary capital flows are those flows that occur subsequent to the initial capitalization of the foreign subsidiary and include capital investments in fixed assets and to some lesser extent, exchanges of assets or shares between subsidiaries.

In the case of primary capital flows to mergers and acquisitions (M&A), most of what are designated as 'FDI' for M&A are not really *foreign direct investment* at all; that is, they do not represent any foreign or direct investment in the host economy or even in a foreign subsidiary. These capital flows are the purchase price paid to the foreign sellers of the foreign subsidiary to pay for the change in ownership control. These funds may or may not be reinvested in the seller's host country.

Secondary capital flows are also more likely to equal or exceed the primary capital flows over a typical 20-year horizon. More importantly, secondary capital flows are also more likely to represent the bulk of the actual economic investment in a host economy. This may be illustrated by the mixed results which the research

literature reports between FDI and positive externalities in host economies (Carkovic & Levine, 2005). Primary FDI flows often represent the acquisition of land or property assets, and start-up costs that are likely to have little short-term economic impact on the host economy. In contrast, the secondary flows tend to increase over time as the foreign enterprise grows and expands. Furthermore, the higher returns to scale which result in lower average costs tend to occur later in the business cycle when output, productivity and capital investments are higher (Aharonovitz & Miller, 2010).

The current literature on the modelling of capital flows is largely based on transactional or balance of accounts methods of capital stock at the country-level. To model firm-level capital flows directly between parents and subsidiaries requires the integration of both country-level and firm-level variables. As a starting point, the Baker et al model provides a simple, static, country-level model linked with firm-level financial data of capital flows linked with the parent's source country equity market and a composite measure of country-level economic factors in Model 2.0 as follows:

Model 2.0 Capital Flows and FDI after Baker et al

The Baker et al model is essentially a demand function that links market-based asset prices with aggregated 'demand' flows to FDI given the reciprocal relationship between the firm's share price and its cost of equity capital. However, new capital flows may originate from debt or any combination of debt, equity or other liquid reserves. In addition, other firm-level factors may also condition the FDI response such as the firms' financing capacity and other market structure variables. The cheap 'equity' capital model proposed by Baker et al explains why aggregate FDI flows during periods of higher market valuations, but it does not explain why the larger portion of foreign subsidiaries assets are in fact funded by debt.

The funding of FDI transpires in different phases with distinct decision processes including market entry; growth; expansion, and market exit. As we noted above, the start-up or market entry costs are typically those funds needed to purchase new 'Greenfield' assets. The funding of subsequent growth and expansion requires new (i.e., secondary) capital flows or "new capital injections" to fund the increases in working capital (i.e., capital needed to pay for increasing operating expenses) required for higher levels of output. We distinguish the term 'expansion' as the increase in the firm's productive asset base through new capital investments such as new equipment, laboratories or other physical plant assets. On the other hand, *growth* reflects an increase in output with the current level of capital stock, implying an increase in the returns to scale. Moreover, new capital flows do not necessarily represent any actual 'investment', but can be used to cover profit losses or changes in capital structure. In contrast, capital investments or the increase in the level of capital stock have a more direct effect on the host economy since it signals the demand for

more labour and other related capital purchases which are more likely to be sourced from the host economy.

Our examination of capital flows and capital investments within the multinational firm requires some detailed accounting of the transactions between the parents and their foreign subsidiaries. Unfortunately, trying to model all of the mechanical accounting transactions would be nearly impossible. First, there are heterogeneous lags in the chain of transactions of months or even years that can lapse over different accounting periods, and vary over local accounting standards. Secondly, there are idiosyncratic differences in the linkages. For example, not all firms will issue new public equity shares in response to high market valuations but may also issue them to employees or other non-public transactions. Thirdly, the linkages may not necessarily be linear due to market rate shocks, internal allocation methods, or tax issues. For example, newer firms with higher growth prospects may have higher working capital requirements and may divert more capital to pay growth related expenses. In addition, it is not possible to distinguish within our data whether new debt comes from the parent or from local credit sources. In many cases, inter-company loans in the form of debt are found in subsidiaries within host economies where there are constraints in the host country's credit markets (Desai et al., 2004). For our purposes, we are simply modelling 'external' capital flows that are those which flow in excess of the available cash at the subsidiary.

Model 2.1 New Capital Flows to Foreign Subsidiaries

We develop an empirical, autoregressive, dynamic panel model from the literature to explain the drivers of new capital flows to foreign subsidiaries.

Following the work of Razin and Sadka, we modify the Baker et al model for new capital flows to include annual sales growth as the proxy for firm-level output and provide additional firm-level controls (Razin & Sadka, 2007a). The capital market factors provide the other proxies for the cost of capital as a function of current asset prices or their indirect effect on future interest rates. We add explanatory variables for the firm's market structure to link capital flows with the economic drivers of FDI.

Defined Variables

The dependent variable in Model 2.1 is the new, net capital flows of debt and equity to the foreign subsidiaries measured in constant, US dollars. In contrast to the model of Baker et al, we expressly exclude retained earnings as there are no actual capital flows in these cases. We define our primary explanatory variable as the rate of sales growth. Sales growth is a key driver of capital demand because it signals higher requirements for working capital and increases in variable inputs (i.e., labour and raw materials). It is also a capital driver in new firms in early stages of growth which have high cash demands and lower profits (Gatchev et al., 2009).

We designate our market structure variables as; (a) firm size which is a proxy for economies of scales; (b) the relative market share of the firm in comparison with its NACE industry total market share in the sample (See Appendix for listing of NACE classifications); (c) the host Gross Domestic Product (GDP) which is a proxy of market size; and (d) the annual growth rate in the host's GDP as a measure of changing market demand. We also include the firm's capital intensity given by the total assets divided by the annual sales as a measure of the relative barriers to entry

and also as a proxy of capital risk and the reliance on debt financing (Harris, 1988). We include host inflation rate as a signal of current growth and expectations about current asset prices which are typically correlated with inflation, particularly with respect to durable goods needed for physical expansion.

The capital market variables include our global benchmark measure for capital market rates using the S&P 500 total market return as we have seen in Figure 1-4. This rate also serves as a proxy for the cost of equity capital. The total return is calculated by the year over year change in the share price and any dividends paid, which makes it a basic measure of current global asset prices. The price to earnings (PE) ratio is our measure of market 'over' valuation; however, what the PE ratio also communicates is the expectation of future growth. For new capital flows, we include the PE ratios for the parent's home market as well as the global benchmark PE ratio for the S&P 500 as proxies for the market-to-book variable in the Baker et al model. The PE ratio also provides a link with investment theory, since expectations of future asset prices and growth have an effect on the rate of investment (Precious, 1985).

The London Inter-Bank Overnight Rate (LIBOR) is provided as a proxy measure of the global benchmark of the interest rate for borrowing. We also provide the parents and the subsidiary's Altman Z credit score as a proxy for financial capacity, financial expertise or managerial effectiveness (Altman, 2007; Altman et al., 2004). The control variables include the parent firm's size in total assets so that we control for capital flows simply as result of the overall size of the enterprise; and the subsidiary's profitability since new capital flows may not only signal new investment but also the need to fund profit losses. We modify the basic demand

model of Baker et al with these additional exogenous variables in a simple reduced form model in Model 2.0 as follows:

$$FDI_{it} = \alpha + \beta FDI_{it-1} + \beta g_{it} + \beta \phi_{it} + \beta \varphi_t + \beta \gamma_{it} + \eta_i + \varepsilon_{it} \qquad (2.1)$$

FDI = new capital flows ($M)
g ≡ growth rate of sales
ϕ ≡ matrix of market structure drivers
φ ≡ matrix of capital market drivers
γ ≡ matrix of firm-level controls
η ≡ fixed individual effect

Model 2.1 New Capital Flows to FDI

Model 3.1 New Capital Investments by Foreign Subsidiaries

We develop an empirical, autoregressive dynamic panel model from the literature to explain the key drivers of capital investments made by foreign subsidiaries. Initially, we began with the same explanatory variables as Model 2.1; however, we substituted variables where the decision process which drives new capital for financing and new capital for investment is necessarily different. In model 3.1, we use a modified investment function where sales growth is the measure for total firm output. Precious provides an investment model based on the Cobb-Douglas production function and drawn on the earlier work of Keynes and Jorgensen as given in Model 3.0 (Precious, 1987).

Model 3.0 The Cobb-Douglas Production Function

According to Precious, the following equation shows that the firm sets their rate of investment in order to maximize their future expected discounted cash flows from capital investments and factor inputs as shown in Model 3.1:

$$\max V(0) = \int_0^{\infty} \{F(K,L) - wL - p_1 C(I)\} e^{-rt} \qquad (3.1)$$

$V =$ discounted cash flow
$F(K,L) \equiv$ production function
$wL \equiv$ wage adjustment costs
$p_1 C(I) \equiv$ capital adjustment costs

Model 3.1 Cash-flow Maximizing Investment

We reorder and modify Model 3.1 with additional exogenous variables for market structure and capital market factors and label this as Model 3.2. The dependent variable in Model 3.2 is the annual change in capital stock or the new, net capital investment. In contrast to Model 3.1, we specify the sales growth rate rather than a static production function as a driver of capital investments as it also transmits expectations about current growth and the requirements for short-term liquid assets or cash needed to fund working capital.

The additional market structure variables include those variables that are more likely to be related to growth and higher demand for products and services including: firm size, market share, capital intensity, and the annual growth rate in the host's GDP as measure of host market demand. We include changes in host wages as the linkage between the capital and labour ratio as given in the investment function that shows wage increases can have an effect on rates of capital investment (Precious, 1987).

The capital market variables share some common variables with Model 2.1. We include both the parent and subsidiaries Altman Z credit score as a proxy for financial capacity. The PE ratio of the parents' home or source country stock market and benchmark S&P 500 PE ratio are provided as proxies for the expectation of future growth and market valuation. We also include the LIBOR as a measure of the global benchmark on debt interest rates.

The control variables include the subsidiaries firm's size in total assets so that we control for capital investment regardless of the overall size of the enterprise. We also include controls for changes in leverage as we find on inspection of the descriptive features that the majority of the firms in the sample finance their assets with debt. Finally, we include a control for external capital demand, which is the demand for capital in excess of the firm's available cash, to control for firms investing with their own capital (Rajan & Zingales, 2001). This gives a model for firm-level capital investment as shown in Model 3.2:

$$FDI^{\Delta K}_{it} = \alpha + \beta FDI^{\Delta K}_{it-1} + \beta g_{it} + \beta \phi_{it} + \beta \varphi_t + \beta \gamma_{it} + \eta_i + \varepsilon_{it} \quad (3.2)$$

$FDI^{\Delta K}$ = change in capital stock (investment)
$g \equiv$ growth rate of sales
$\phi \equiv$ matrix of market structure drivers
$\varphi \equiv$ matrix of capital market drivers
$\gamma \equiv$ matrix of firm-level controls
$\eta \equiv$ fixed individual effect

Model 3.2 New Capital Investments by Foreign Subsidiaries

Data Set

The data set for this study is comprised of an unbalanced panel of 6,969 firms from 22 countries in the OECD. Our initial sample drew about 2.0 million firms from ORBIS® based on the availability of basic financial and demographical data for the period of 2000 to 2007. We exclude all non-industrial firms such as banking or government services. The sample was then subjected to a screening process for the minimum availability of 50% of data points for key balance sheet and revenue data elements and a minimum annual revenue requirement of $5M. This sample pool was then winsorized to control extreme outliers for firms with year over year changes of more than +/- 1000% in the key financial ratios such as the current ratio. The final sample firm count was 6,969 subsidiaries and matched parents (13,938 total firms). In the descriptive statistics, we have aggregated firms by revenues: small firms < $65M; large firms > $65M and < $1B; and very large firms > $1B.

For this study, we require multinational parents to have at least 1 foreign subsidiary listed in the ORBIS® database that has foreign operations outside the source country, and has no other parent company ownership. Foreign subsidiaries must have at least 1 parent firm listed in the database that owns not less than 50% of the subsidiary's outstanding shares. Also, all variables for the parent's economic and financial data are matched for each observation period so that only one sample is drawn as opposed to regressing separate models for parents and subsidiaries. Additional data from other sources include the price to earnings ratio for each of the OECD countries from the Morgan Stanley global database, and the country risk ratings and host country economic factors are taken from the World Bank.

Estimation Method

The construction of these models presents several challenges following an examination of the structure and features of our working data set. First, we should expect some endogeneity in most of our firm-level explanatory variables, given that they are linked with common revenue generating activities and production or demand functions and therefore are also likely to suffer from serial correlation. To handle these problems, we employ the two-step 'system' generalized methods of moments (GMM) estimators (Arellano & Bover, 1995; Blundell & Bond, 1998). These methods are frequently used with unbalanced panels with endogenous explanatory variables and heteroskedasticity in the error terms[7]. The two-step estimator is less sensitive to the larger number of internal instruments that are present due to the larger number of explanatory variables in the models. [8] Additionally, we use the natural log of the dependent variable and some of the explanatory variables in the case where we identified non-linearity in their responses.

[7] The 'difference' GMM estimator can purge fixed effects by differencing, but this also removes the constant term. The 'system' estimator uses both differencing and lagging in levels to provide instrument orthogonality and preserve the constant for econometric projections. Moreover, the instruments provided in the difference method are also known to be weak and not suitable for more strongly endogenous variables. One-step estimation has also been reported to have some bias in coefficient if the number of instruments is too high so in this case we chose the two-step method.

[8] The two-step system GMM method has some reported downward bias in the standard errors that may be weakened for the purposes of drawing inferences. We apply the Windmeijer correction to the standard errors to improve the reliability of our models for statistical inference (Windmeijer, 2005). We report the second order auto correlation results as first order autocorrelation is expected and it presence is uninformative. We employ the forward orthogonal deviations in the estimates, which helps the unbalanced gaps in the data set. We also report the Hansen test for exogeneity of the instrument matrices for the two-step estimation methods. We should also note that the firm count for each regression result would be lower than the total firm count in the sample as the system uses use observations in the sample for internal instruments.

Results

Descriptive Statistics for Chapter Four

The descriptive statistics for the sample are shown in Table 1-4. In looking at the firms in the sample, we see that over 60% of the foreign subsidiaries are small or medium enterprises (SME) that is with annual sales under $65M. Moreover, larger subsidiaries have proportionally larger capital flows and capital investments that suggest that deeper financing capacity may have a stronger effect on firm growth than economies of scale alone. On average, about 27% of new capital flows were funded from equity which also reflects the higher weighting of international firms in the sample who prefer bank financing as discussed above. Consequently, most all of the foreign subsidiaries have high leverage ratios; that is, they overwhelmingly fund foreign operations with debt, and more importantly, they have much higher leverage ratios than their parent's ratio. This may reduce the risk to the parent's shareholders by using more host credit which is discussed in Chapter Five (Desai et al., 2008).

On average, the new capital flows were about 4% of the average total asset base each year and the new capital investments were about 8% of the total asset base each year that suggests about half of the new capital investments are funded by new capital flows with the rest coming from local funds. It is also evident that larger firms have relatively higher rates of growth associated with significantly higher rates of new capital flows and capital investments.

Descriptive Statistics Means	Sample	Small	Large	V. Large
Firm Count	7,219	4,354	2,590	275
Subsidiary Sales ($M)*	207.7	25.7	220.0	2,949.0
Subsidiary Sales Growth*	18.0%	15.0%	21.0%	37.7%
Profitability	6.3%	6.3%	6.1%	7.7%
Subsidiary Profit Growth*	1.6%	1.4%	1.9%	2.4%
Total Foreign Owned Assets	237.1	28.7	220.0	3,664.3
New Capital Investments*	17.7	1.2	10.7	344.4
New Capital Investment	7.5%	4.1%	4.9%	9.4%
New Debt Flows	54.8	5.2	34.3	942.2
New Equity Flows	20.1	3.3	26.1	267.6
Total New Capital Flows	74.9	8.5	60.4	1,209.8
FDI Rate % (Flows / FOA)/year	3.9%	3.7%	3.4%	4.1%
Debt Ratio	0.68	0.68	0.69	0.71
Parent Debt Ratio	0.51	0.49	0.52	0.54
Subsidiary Capital Intensity	1.2	1.3	1.2	1.6

(*) annual averages

Table 1-4 Descriptive Statistics for Chapter Four

Estimation Results for Model 2.1

The result of estimation for Model 2.1 appears in Table 2-4. The lagged dependent variable is both large and significant showing prior year flows have an effect on current year capital flows, a consequence of annual budgeting processes designed to normalize capital demands. This suggests a smooth and continuous funding activity in response to the demand for capital to fund current growth, or in a few cases to fund profit losses.

Variable	Name	Description	Coefficient / *z-values*	Elasticity
Dependant Variable (ln)	**New Capital Flows**	FDI (Secondary)		
Lagged Dep. Variable (ln)			1.221 24.95	11.0%
Firm-Level Determinants	Growth	Revenues	0.356 4.01	0.10%
Market Structure Factors	Firm Size	Economies of Scale	-1.83e-07 -2.43	-0.06%
	Market Share	Relative NACE Share	23.216 2.37	0.03%
	Host GDP (ln)	Size of Economy	-0.031 -0.64	
	GDP Growth (ln)	Growth Rate	0.038 .058	
	Capital Intensity	Barriers to Entry	0.097 2.72	0.15%
	Inflation	Host Asset Prices	14.266 2.81	0.32%
Capital Market Factors	S&P 500 Total Return (*)	Global Asset Prices	1.789 3.88	0.22%
	Parent Market PE	Future Growth	-0.061 -0.35	
	S&P 500 PE	Future Growth	0.045 2.26	1.01%
	Parents' Altman Credit Score	Financing Capacity	0.008 1.75	
	Firm's Altman Credit Score	Financing Capacity	0.188 3.35	0.63%
	LIBOR	Cost of Borrowing	64.613 2.17	0.15%
Controls	Parent Size	Revenues	-6.26e-09 -2.86	-0.04%
	Firm Profitability	Operating Profits	-1.242 -2.56	-0.02%
Intercept			-3.287 -2.02	
Wald chi2		Joint Significance	0.000	
Autocorrelation Test AR(2)			0.383	
Hansen Test for Exogeneity			0.584	

Table 2-4 Estimation of Model 2.1

The primary explanatory variable is the sales growth rate, which is small but significant with an elasticity of 0.10 %. This may reflect the fact that most normal *growth* is actually funded by retained earnings in profitable firms. We also find a relatively weak but significant correlation with the benchmark for the S&P 500 total return with an elasticity 0.22%, so that a 1% increase in global asset prices is linked with a 0.22% increase in capital investments. This smaller elasticity is most likely the

result of the variety of different firm types in the sample, as we should naturally expect industry effects to be significant for both capital flows and capital investments. What is interesting and important is that this result is significant across multiple industries and across 22 countries. It has been established within the literature that there are strong co-movements between the capital market rates of most of the industrialized countries (Berben & Jansen, 2005). Likewise, there appears to be significant co-movement of asset prices and capital flows to FDI across our highly diversified sample. (See Figure 2-4 shown in whole USD)

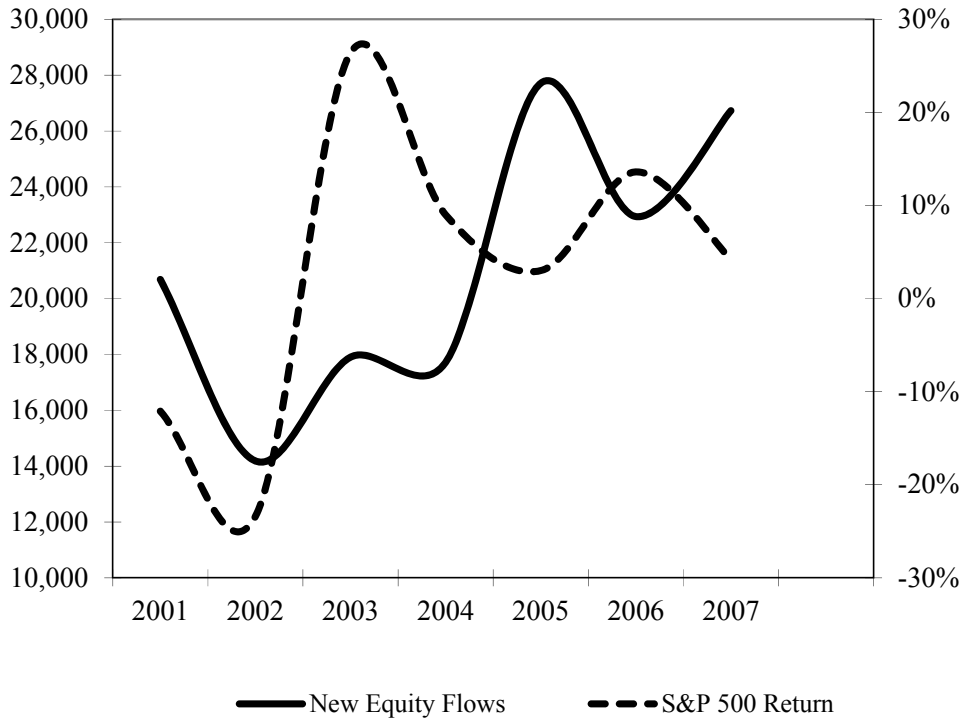

Figure 2-4 New Equity Capital Flows and S&P 500 Returns

The correlation between capital flows and the parent's market PE ratio was not found to be significant, but the correlation with the global benchmark PE ratio was significant in suggesting a link with the expectation about broadly generalized

prospects for future growth. In Baker et al, the aggregate capital flows correlate with the parent's market-to-book ratios, which is a similar measure of market 'over' valuation to PE ratios. This absence of a significant correlation is the result of decomposing capital movements into its constituent parts; that is the actual capital flows and retained earnings. When we only test new capital movements rather than firm accounts aggregated at the national level, the 'over-valued' PE ratios in the parent's markets may not necessarily be strongly linked to 'FDI' like those found in Baker et al.[9] This is because new capital flows also finance *current* capital demands like inventories, working capital and other near-term financing activities that do not necessarily link with economic investment. In contrast, the subsidiary's financial strength was indeed found to be correlated with new capital flows with an elasticity of 0.63% suggesting that the firms with high debt capacity have stronger capital flows.

The two most consistent economic determinants of FDI in the research literature are host GDP and growth in host GDP (Chakrabarti, 2001). It is interesting to see that neither the total host GDP nor the growth in host GDP is correlated with new capital flows. This is because new capital flows often fund 'financing' activities and not necessarily any real economic investment. Moreover, firm size, as a proxy for economies of scale has a small, negative correlation and is the result of the over-weighting of small firms. However, the largest correlation of all the market structure variables is the values for host inflation with an elasticity of 0.32% that signals a linkage with expectations about both current growth in output and asset prices, particularly the price of physical assets in the host economy.

[9] There is likely to be simultaneity issue from aggregating retained earnings in the Baker et al models; that is, higher retained earnings may be also driving the higher market values in the Baker et al model.

New capital flows were also positive and weakly correlated with the LIBOR; however, given the 5% drop in the LIBOR from 6% to 1% in 2002, this weakness may be reflecting an asymmetry in the debt flows (or borrowing 'shock') which began after the rates fell to their lowest level in 2003 (See Figure 3-4 shown in USD). Finally, all our controls were all significant but with very small elasticities.

We should also consider the general availability and access to commercial credit in an efficient capital funding process (Currie & Morris, 2002). The common measure of commercial credit availability or liquidity is the interest rate spread between risk-free securities (i.e., government bonds) and the prevailing commercial interest rates to corporations such as the LIBOR, and also known as the 'TED' spread[10]. If the spread in this rate increases, it indicates a drop in credit market liquidity as investors move their capital to the safety of risk-free securities. During the period of our study, this spread remained about 1%, suggesting that in spite of a market driven asset-price shock in 2000, the liquidity in the credit markets remained relatively stable and most firms had access to commercial credit.

[10] TED spread meant originally the 'treasury bill and euro-dollar' spread.

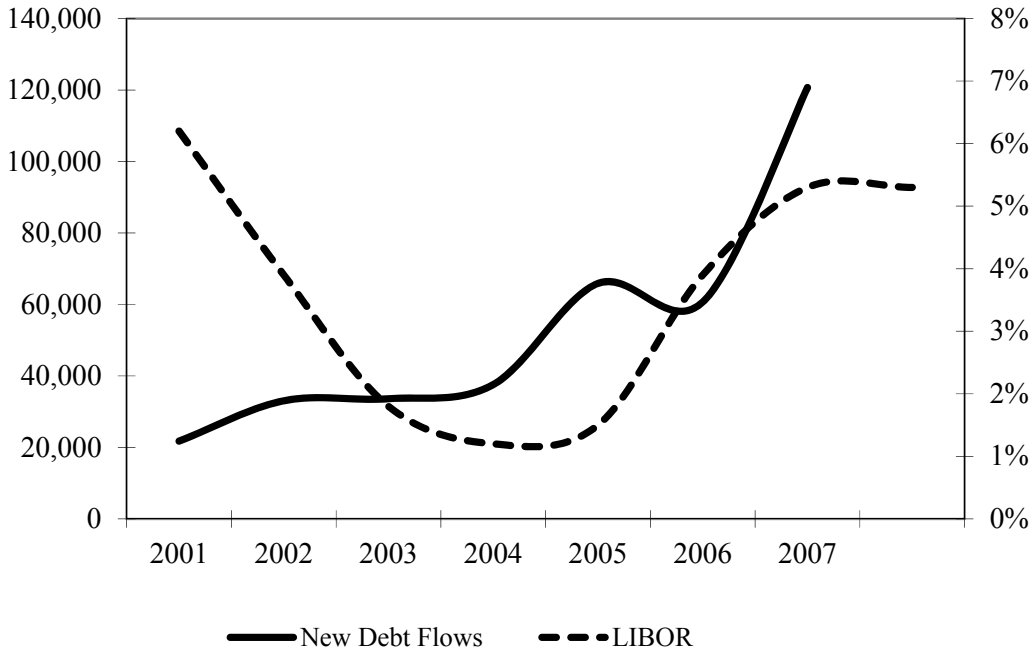

Figure 3-4 New Debt Flows to FDI and LIBOR

Estimation Results for Model 3.2

The results of the estimation of Model 3.2 are shown in Table 3-6. In this table, we see that prior year capital investments *do not* correlate with the current year levels. This is confirmed by the large, asymmetrical flows in capital investments in the data set that tend to occur in large "lumps" every 2 to 3 years (See Figure 4-4). This is likely to be linked with the long planning cycles and in the inability of firms to adjust, instantaneously, their capital stock levels to new target levels.

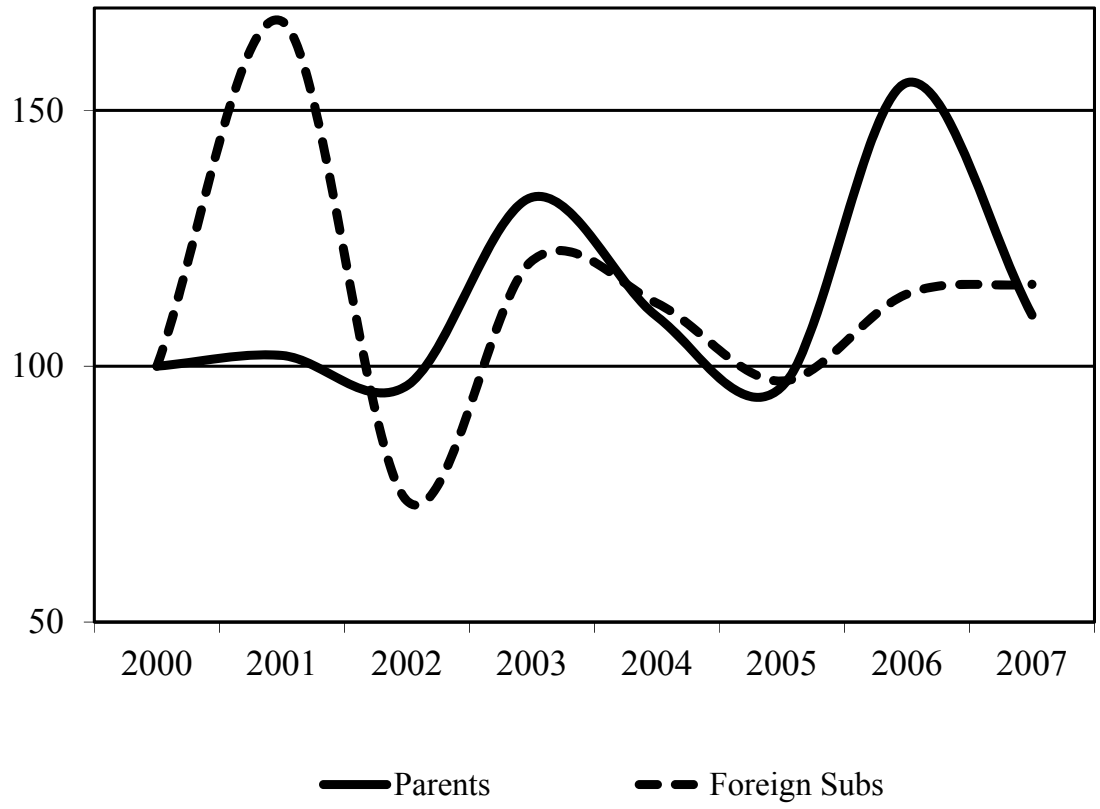

Figure 4-4 Capital Investments of Parents and Affiliates

Variable	Name	Description	Coefficient / *z-values*	Elasticity
Dependant Variable	**New Capital Investment (ln)**	FDI (Secondary)		
Lagged Dep. Variable			-0.161 -0.42	
Firm-Level Determinants	Growth	Revenues	0.392 2.24	0.09%
Market Structure Factors	Firm Size	Economies of Scale	-1.48e-07 -1.76	
	Market Share (ln)	NACE Sector Concentration	0.154 1.91 (1)	0.15%
	Growth Host GDP	Growth in Market	33.464 2.81	1.04%
	Capital Intensity	Barriers to Entry	0.028 0.57	
	Change in Host Wages	Substitution of Capital	-0.060 -0.04	
Capital Market Factors	S&P 500 PE	Future Growth	0.059 1.90(1)	1.29%
	Parent Market PE+	Future Growth	0.267 2.33	4.56%
	Parent's Altman Credit Score (ln)	Financing Capacity	0.192 2.35	0.19%
	Firm's Altman Credit Score	Financing Capacity	0.024 0.41	
	LIBOR	Cost of Borrowing	-9.966 -0.10	
Controls	Change in Leverage	Control	0.015 2.37	-0.00%
	External Capital Demand	Capital Investment in Excess of Cash	8.96e-07 3.39	0.05%
	Asset Base	Total Assets	-1.28e-07 -2.28	-1.06%
Intercept		Constant	-8.234 -2.58	
Wald chi2	p-value	Joint Significance	0.000	
Autocorrelation Test AR(2)	p-value		0.947	
Hansen Test for Exogeneity	p-value		0.157	
(1) Significance 0.056				

Table 3-4 Estimation of Model 3.2

Large fixed capital investments are by nature, irreversible and require capital funding strategies to handle expectations in future financing constraints (Caggese, 2007). The correlation of new capital investments with the sales growth rate and market share were positive but small contributors to expectations about current levels

of growth on investment. The correlation with the parent's credit score was small but also significant.

Capital investments were collinear with the global benchmark for asset prices (i.e., the S&P total return) and not reported in Table 3-4. However, looking at Figure 5-4, where we map the capital investments with the S&P 500 total return, we see a strong co-movement. Moreover, we can compare the firm-level capital investments in Figure 5-4 with the global changes in OECD FDI flows as seen in Figure 1-4. We see a strong parallel between capital flows and asset prices world-wide thus showing the linkage between capital flows and capital investments. On the other hand, the most significant driver of new capital investments is the parent's market PE ratio, which has a highly significant correlation with an elasticity of 4.5%. The correlation with the global PE ratio with an elasticity of 1.29% but with a slightly lower significance of $p = 0.056$. These are both signals of future growth expectations and market liquidity. While we cannot distinguish whether or not this linkage is entirely direct, (i.e., the parents issue over-valued stock that directly funds the purchase of new capital investment) we can see that only half of new capital investments are being funded from internal subsidiary funds. In either case, it strongly suggests the arbitrage mechanism of Baker et al or a similar "wealth effect" afforded by high valuations in the parent's home stock market.

The rate of capital investment was also related to growth in the Host GDP with an elasticity of 1.04% suggesting that expectations about current economic growth also support capital investments. Thus in contrast to Baker et al, it is new capital investments rather than new capital flows which appear to be linked with 'over' valued markets. This also suggests that 'cheap' capital is more likely to flow to

investment activities rather than 'financing' activities. Therefore, we can infer some support of the 'cheap' capital hypothesis exactly where it ought to be found, in correlation with actual physical, economic investment in a foreign economy.

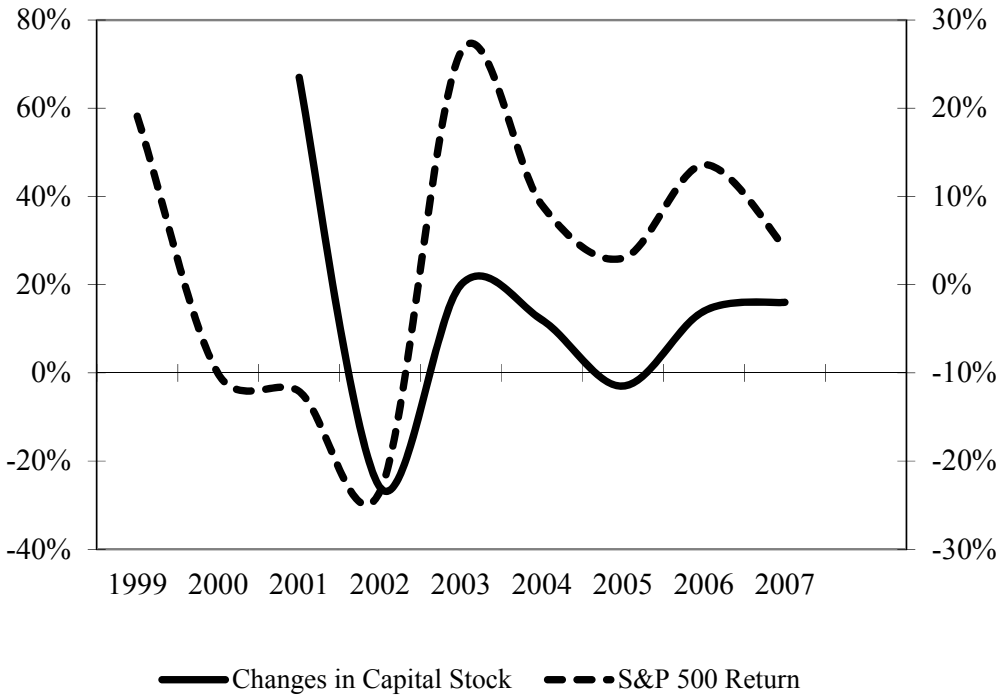

Figure 5-4 Capital Investment in FDI and S&P 500

The correlation with the LIBOR was not significant and with a negative coefficient due to the irregular timing of capital flows and the LIBOR shock as seen in Figure 3-4. Finally, our controls were significant but smaller than we would expect perhaps due to the differences in the number of different industrial sectors in the sample. The correlation of excess capital demand is significant in that it shows that there are external funding flows supporting the new capital investments, not just reinvested earnings.

We also observe that within the data set the rates of capital investments tend to be smaller and smoother within industries with lower capital intensity such as Retail or Manufacturing over the sample period as seen in Figure 6-4[11].

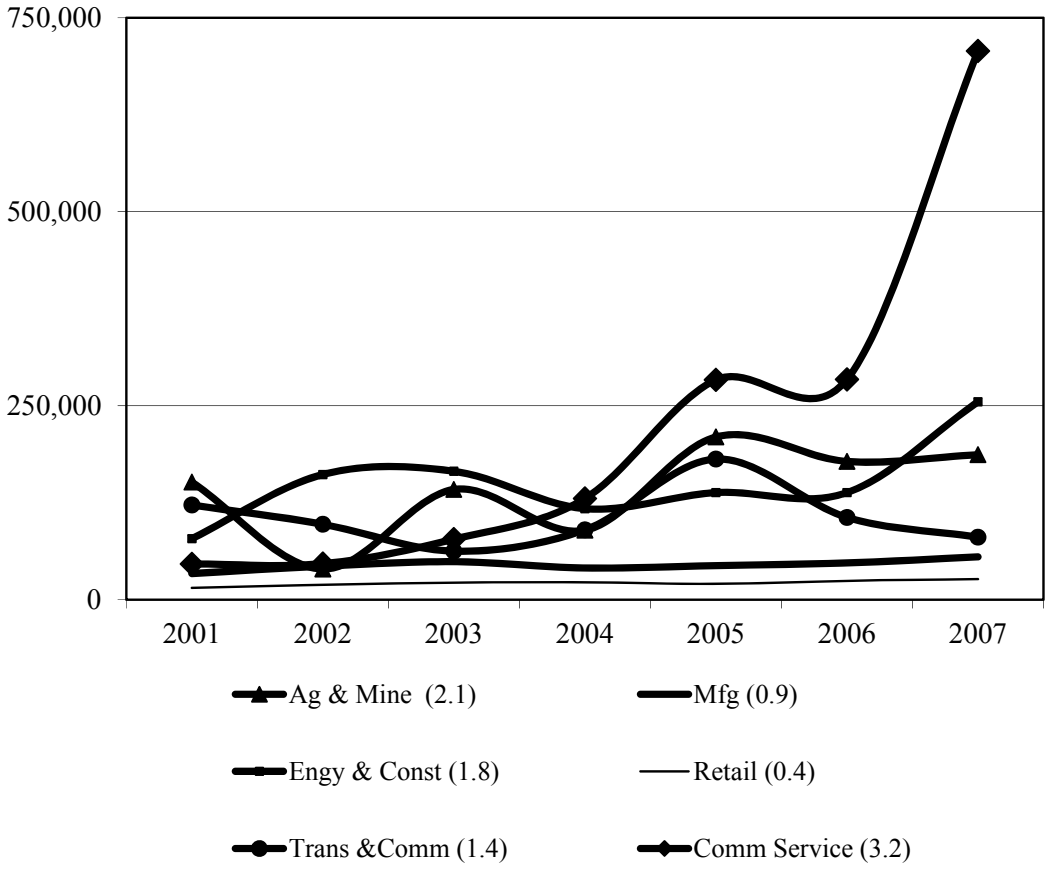

Figure 6-4 Capital Investment in NACE Industries

[11] Capital flows in whole USD and the capital intensities are in brackets.

Comparison of the Estimates Models 2.1 and 3.2

The basic difference between Models 2.1 and 3.2 is the differences in the effects of expectations on the rate of investment as given in the general investment theory (Keynes, 1951; Precious, 1987). A comparison of the key elasticities of these two models appears in Table 4-4. In the case of Model 2.1, the expectations of near-term changes in output levels associated with current growth in host demand, and the changes in current asset prices (i.e., via the inflation proxy) have a stronger influence on current capital flows. In contrast, some generalized expectations about ***future*** growth in the general business cycle may be reflected in the correlation of new capital flows with the Global S&P 500 PE ratio which should not be as strong as the parent's market PE ratio. This is because parents are likely to hold their most significant connections with their respective capital markets in their home country. In contrast, Model 3.2 showed us that prior year effects of capital investment are irrelevant as are wages and price levels, but future expectations of growth are linked with the parent's home market PE ratio are highly correlated. This is consistent with our argument that new capital flows are more likely to fund current, near-term financing activities whereas new capital investments fund fixed asset investment in long-term, foreign economic activity.

Economic Signal	Signal Strength	Variable of Interest	New Capital Flows	New Capital Investments
			Model 2.1	Model 3.2
Future Growth Expectations	Stronger	Parent Market PE Ratio		4.54%
	Weaker	Global Market PE Ratio	1.01%	1.29%
Current Price Levels	Weaker	S&P 500 Total Return	0.22%	
	Stronger	Host Inflation	0.32%	

Table 4-4 Comparison of Elasticities for Capital Flows and Investments

Chapter Summary

While economic motives and determinants of FDI govern the market entry decision and primary capital flows to FDI, capital markets and the foreign subsidiary's market structure have an influence on funding the growth and expansion of FDI. We find some limited evidence to support the Baker et al arbitrage theory that multinational firms may exploit market over-valuation to support *new capital investment* in foreign economic activities across a diverse sample of foreign subsidiaries in multiple industries and 22 countries in the OECD. We also find support for our research questions that new capital flows to foreign subsidiaries are linked to expectations of current growth through correlation with of current asset prices where a 1% increase in total market return of the S&P 500 is correlated with a 0.22% increase in new capital flows. We also find support for our research question that capital investment are also linked more strongly with expectations of *future growth* where an increase of 1% in the parent's market PE ratio is correlated with a 4.5% increase in capital investment. The correlation of capital investment and future

growth expectations reflects the longer planning cycles of irreversible, discontinuous investments which are more sensitive to interest rate risk.

Our findings stress a meaningful difference between the different components of capital flows for FDI. We show that new capital flows are a measure of the investment in the growth of the foreign enterprise that may support an increase in the returns to scale, whereas new capital investment measures investment in the expansion of foreign economic activities with an increase in capital stock. With the secular trends in the global financial markets for asset price bubbles followed by deflationary asset price crashes, the linkage between capital markets and FDI will play a critical role in developing the capacity for future economic recovery cycles. Market bubbles are not only cyclical, but also a predictable feature of open market economies. Firms that are able to buffer and exploit these cycles can more vigorously exploit their financial market capacity as a competitive advantage. Finally, we see that a final 'theory' of foreign direct investment should not be considered complete until it includes the basic underpinnings of the traditional investment theory where the role of interest rates and future expectations of asset prices is fully integrated.

Areas for further research may include the exploration of the impact on FDI from the changes in national monetary policies from the worldwide recession of 2009. With more national governments redirecting fiscal policy to support domestic economic conditions and the severe constraints in commercial credit markets, it is unclear whether multinationals will be inclined to do more or less leveraged or market-driven FDI when the current economic cycle fully recovers.

CHAPTER FIVE CAPITAL STRUCTURE AND STRATEGY

The different motives of foreign direct investment seek to exploit varying advantages and competencies in foreign markets. The firm's basic entry motive is linked with an operating strategy with a unique set of business risks. Subsidiaries balance the added financial risk of using higher leverage to support growth with the business risks that attend these operating strategies to maximize their risk to return ratio. Financial leverage in the foreign subsidiary provides both higher returns and some added shareholder protection through risk sharing with host creditors. We find support for a modified, dynamic trade-off model in which the capital structure of foreign subsidiaries is linked with their operating strategy and the risk factors in the subsidiary's host environment.

Introduction

The foreign subsidiaries of the world's largest corporations engage in almost 50% of world trade and about 60% of the assets of these foreign subsidiaries are financed by debt (UNCTAD, 2009). Funding the steady growth in global FDI with increasing levels of debt has also brought ever-higher levels of financial risk to global shareholders. Financial risk is created by the firm's use of interest-bearing debt or *leverage*, which is the use of debt to fund investment. This financial risk is borne primarily by the firm's equity shareholders (Karma & Sander, 2006). On the other hand, the financial risk created by the use of leverage also provides a type of asset substitution where the equity holders transfer wealth to themselves through the use of their creditor's capital (Jensen & Meckling, 1976). In contrast, *business risk* is a general term for all non-financial risks which exists in the firm's operating environment regardless of whether it uses leverage or not. For example, labour strikes or geographical areas prone to natural disasters such as floods are general business risks. Foreign subsidiaries must balance both financial and business risk in order to maximize their risk and return profile.

We investigate how financial risk and business risk act as opposing forces in the foreign subsidiary's capital structure, which in turn is linked to the firm's operating strategy. Desai, Foley and Hines have shown that multinationals frequently use higher leverage (i.e., assume greater financial risk) within their foreign subsidiaries as a means of mitigating foreign political risk (i.e., another type of business risk) to protect the parent's shareholders (Desai et al., 2008). This naturally assumes that a significant portion of the subsidiary's debt is guaranteed by local sources, thereby shifting financial risk to the host creditors. With the market crashes

of 2000 and 2008, and the credit crash of 2009, many international firms which were dependent on access to bank financing and lines of credit were faced with raising capital with substantially more restrictive terms. Given than most foreign subsidiaries outside the US and UK are financed by debt and bank financing, there is a new and important research agenda in developing a framework which explains more fully how foreign subsidiaries manage financial risk in an environment of scarce business credit. We develop the linkage between the motives for different types of foreign direct investment (FDI), their basic operating strategies, and the related business risk factors that motivate the use of leverage as risk mitigating strategy.

Multinationals often choose a mode of entry into foreign markets which balances both the cost and risk associated with the host market structure (Johanson & Vahlne, 2009). The various motives and entry modes for foreign direct investment necessarily create differences in the alignment of the subsidiary's resources within these foreign market opportunities that increases the parent's risk exposure. Driffield and Love provide a simple and robust model to mapping the basic motives for FDI onto firm and sectoral level characteristics based on the interaction between two critical resources: namely, labour and technology (Driffield & Love, 2007). These FDI motivations can be linked with a basic operating strategy that anticipates differing business risk exposures within the host environment.

We draw on different streams of literature in international business, economics, and finance to build a framework for modeling the foreign subsidiary's capital structure. We use this to develop a risk-return model from the current

literature on dynamic capital structure trade-off models. We demonstrate how specific FDI motivations are linked with specific business risk factors in the host environment and how the subsidiary's capital structure or leverage responds to those risks. We show that subsidiaries have leverage ratios in excess of their parent's levels that are modified by the business risk factors in the firm's market structure. We contribute to the research literature in business finance by developing the determinants of capital structure for foreign subsidiaries with a broad empirical investigation of firm-level subsidiary accounts from 38 OECD and emerging countries using contemporary econometric estimation methods.

Capital Structure Concepts in the Literature

Capital structure theory has wide and universal treatment in the literature since the seminal work of Modigliani and Miller (Modigliani & Miller, 1958). Since that time, several theories appear to persist in the literature: namely, the pecking order, trade-off, and agency theories. A brief discussion of these theories follows. First, Myers argued that firms prefer to use capital based on a *qualitative* rationale or a 'pecking order' tied to their beliefs about the costs and risks associated for each type of capital (Myers, 1977). Myers argued that firms would use cash in preference to debt or equity under certain conditions, but that tax deductible interest payments also make debt preferable to equity capital under other conditions. More recently, there is a growing body of literature which recognizes the limited capacity of the pecking order theory to explain capital structure choice under highly dynamic market conditions (Fama & French, 2002).

In contrast to the pecking order theory, the original *static trade-off theories* (Kraus & Litzenberger, 1973) and (Myers, 1984) argued that firms trade the higher risk of bankruptcy cost and the tax benefits of higher debt against the higher financial risk of leverage which provides higher rates of returns. The static trade-off theory also argues that tangible assets can be used as collateral and therefore firms with higher growth opportunities would tend to borrow less since as growth prospects cannot be efficiently securitized or collateralized. One of the deficits of the static trade-off model is that it predicted higher profitability with leverage which has since been largely discounted in the literature.[12] Fama and French provide a comparison of the pecking order and static trade-off theories and show the significant limitations in their explanatory power (Fama & French, 2002).

More recently, the development of *dynamic trade-off models* have been advanced which attempt to correct for many of the short-comings in the static model and provide greater reliability in explaining capital structure decisions under dynamic market conditions (Hovakimian & Titman, 2002). Finally, the agency theory of capital structure (Jensen, 1986) argues that debt is a disciplinary instrument used to motivate managers to remain profitable instead of deploying capital into less constructive outlets (e.g., using excess free cash for "empire building"). It has somewhat less explanatory power in modeling capital structure, but has a strong, intuitive appeal.

It is a widely held, stylized fact within financial theory that the use of excess leverage is positively related to higher levels of operating risks (Myers, 1984). For

[12] Firms often have higher return on sales with higher use of leverage but with lower return on assets.

example, foreign subsidiaries in countries with higher political risk will have higher leverage than other similar foreign subsidiaries with lower risks (Desai et al., 2004). In contrast, multinational parents are more likely to reduce their own leverage in response to foreign risk (Desai et al., 2008). This means that foreign subsidiaries in higher risk environments may have leverage ratios that *exceed their parents leverage* ratios. Moreover, this higher level of both operating and financial risk commands a risk premium from the firm's investors (Brigham & Erhardt, 2002). In the case of foreign subsidiaries, the parent firm or its stockholders will demand a risk premium for the added risk of foreign investment that we call the *FDI risk premium*. This would be the difference in the return on equity of the parent and the foreign subsidiary; that is, the premium paid for investing the shareholder's equity in foreign risk.

A subsidiary's capital structure with excess leverage, (i.e., in higher proportion to the parents leverage ratio) which contains more non-guaranteed debt allows more financial risk to be shifted to local creditors and away from the parent's shareholders. This provides lower financial risk for the same level of returns. This capital structure modification improves the risk and return performance of the combined parent-subsidiary portfolio. For example, a parent firm with a 50% debt ratio, and a subsidiary with a 68% debt ratio has a higher proportional share of financial risk than its parent does. If 50% of debt is free of guarantees by the parent firm by using more unsecured debt or trade credit, there has been a significant shift of financial risk from the parent shareholders to the host creditors, thus improving the parent's overall risk-return ratio (See Figure 1-5).

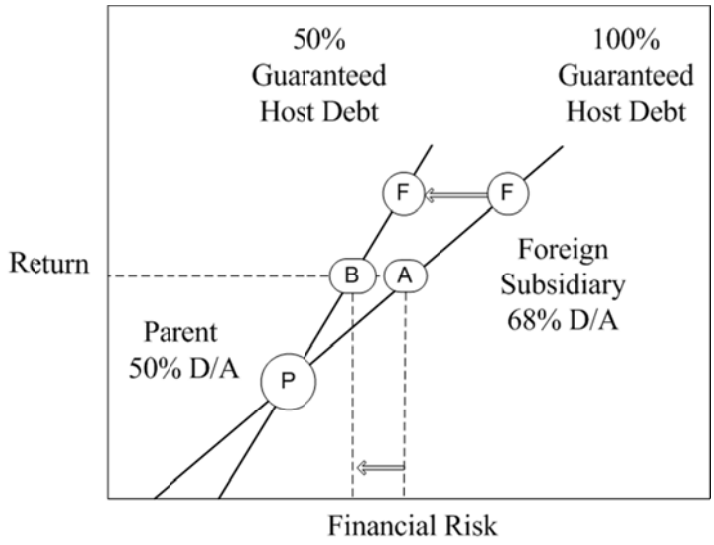

Figure 1-5 Capital Structure and Financial Risk

The limited number of studies on modeling capital structure within the foreign subsidiary is based on country-level and industry-level data with only a handful of firm-level investigations largely due to the limited availability of accurate subsidiary-level data (Kolasinski, 2009). Moreover, modeling foreign subsidiaries with the static trade-off model is complicated by the role of excess leverage that may also be used to externalize financial risk on local sources of debt capital and therefore lower the parent's shareholders exposure to foreign financial risk.

Firms in some emerging economies may prefer the use of debt over equity simply because debt capital is not encumbered with high expectations of dividend payouts or share price growth which are typically found in more developed countries (Delcoure, 2007). Further, firms outside the US and UK generally have very close ownership structures with fewer 'blocks' or groups of shareholders which naturally incline them to use more debt or bank financing than raising new equity capital (Stulz, 2007). This means that most multinational parents outside the US and UK

will have a greater challenge in balancing their highly leveraged operations with the business risks in the host economy where host credit constraints are significantly higher.

Business Risk and FDI

Business Risk and Diversification

The most basic method of mitigating business risk in an enterprise with global operations is to diversify its product segments and services across different markets or industries. Firm's which diversify into different business activities which are unrelated to its core business are said to be using a *portfolio approach* to manage risk (Rugman, 1976). Diversification may come through foreign investments in different countries or regions (geographical), different industry sectors, or different product-lines. However, product-line diversification in recent studies shows only a weak relationship with modification of capital structure which would suggest it has limited use as a financial risk mitigation strategy (Singh et al., 2003). In some cases, a multinational may successfully combine both geographical and product diversification as a strategy to lower overall risk of default (Chkir & Cosset, 2001). Moreover, there appears to be a non-linear relationship between geographical diversification and performance where more highly diversified firms may eventually achieve poorer performance over longer time periods as the excess diversification leads to greater inefficiencies (Geringer et al., 1989) and (Palich et al., 2000). Thus, in many respects, diversification is not a very efficient or practical mitigation measure for dynamic business risks.

Diversification is also frequently motivated by a lack of growth opportunities in the firm's core industry (Campa & Kedia, 2002). This may result in more capital being transferred from less profitable core business activities to more highly profitable non-core businesses (Doukas & Kan, 2008). For example, a study of US firms from 1980 to 1992, over 60% of new (i.e., Greenfield) foreign direct investments were related to non-core business activities. Moreover, many of these non-core Greenfield investments were found to have some negative effect on shareholder returns (Doukas & Lang, 2003). Furthermore, enterprise-wide diversification strategies are cumbersome, costly, and slow to implement or reverse. Highly levered foreign operating strategies need risk mitigation measures that anticipate how business risk factors link to the dynamic conditions of the host market.

Operating Strategy and Business Risk

The determinants of FDI are one of the most widely studied areas in international business, but generally, they address those business risks that impede access or control of market share, or the exploitation of ownership advantage. The market entry decision that frames the first expectation of business risk is part of the firm's market internalization process. In this process, the parent seeks to align its profit objectives in an imperfect foreign market with the resources it can exploit in the host economy through ownership or control of operating assets (Buckley & Casson, 1976). Each type of market entry exposes the firm to different business risks in the nascent foreign operation that must be mitigated through managerial controls or by risk diversification. Blonigen summarizes the research on the economic

determinants of FDI which include: labour costs; access to market share; exchange rates; openness to FDI; and tax shelters (Blonigen, 2005). The research literature has recently expanded to consider financial factors such as the availability of low-cost equity capital (Baker et al., 2008) and the firms' overall financial strength as financial determinants of FDI (Forssbaeck & Oxelheim, 2008). In contrast, Chakrabarti's study of the literature shows that only a single economic determinant of FDI is uniformly consistent in the literature; namely, market size or GDP (Chakrabarti, 2001). Each of these 'determinants' of FDI has some direct corresponding business risk. For example, FDI motivated by access to local labour pools is naturally coupled with the risk of labour strikes or training programs to provide workers with basic skills.

As the economic determinants of FDI such as market size, market growth, access to low-cost labour, exchange rates, etc. motivate the various entry modes of FDI and the primary or initial capital funding decision, they may be unrelated to the actual business risks that follow entry where the majority of capital flows are likely to occur. In the IB literature, market entry modes are thought to provide most of the business risk mitigation through the form or structure of asset ownership such as direct investment or joint venture (JV) as opposed to exporting or licensing. However, business risks also have a significant impact on direct investment as well. What the IB theories often lack is a framework that identifies the basic differences in profit maximization strategies of foreign subsidiaries and how those link with different business risk factors. To build a rationale for developing a dynamic trade-off model of capital structure for foreign subsidiaries that contemplates business risk

factors, we need to provide a framework for characterizing the different FDI motivations and their attendant business risks.

Driffield and Love have developed a taxonomy whereby the parent firms seek to exploit the differences in two critical resources in the host economy: comparative labour costs, and the availability of technological resources which impacts nearly all classes and industrial segments of FDI (Driffield & Love, 2007). They categorize FDI motivations into 4 types. The Type 1 firms seek to exploit markets where the host labour costs are comparatively lower and host technological resources are greater than in the source country. In this category, firms seek to exploit host conditions where they have some form of comparative *location advantage*. The Type 2 firms are those in which the host labour costs are relatively higher as are the availability of technological resource making these firms more likely to be engaged in some aspects of *technology seeking.* That is, they seek to exploit spillovers from host country competitors and other adjacent industries. The Type 3 firms are those where host labour costs are comparatively lower as are the availability of technological resources, thus firms would more likely be pursuing some form of *efficiency seeking*. Finally, the Type 4 firms are those where hosts labour costs are comparatively higher and technological resources are comparatively lower than the source country so firms may pursue some form of competitive *ownership advantage*. While this taxonomy is intended to provide a tool for describing market entry and common economic factors for motivating FDI, it can also serve as a simplified framework for understanding the business risk components in foreign operations.

Linking Business Risk with FDI Motivations

Expectations of Risk in FDI

Foreign direct investments are a comparatively higher risk strategy than exporting, licensing and other less capital-intensive market entry modes and require a flexible strategy which can cope with the higher uncertainties of operating in a foreign economy (Buckley & Casson, 1998). This expectation of risk in FDI affects both the market entry and sustaining funding decisions of the inside investor (i.e., the managers of the firm) and the outside investors (i.e., the shareholders or investors) who have direct ownership and potential risk of loss of capital. The inside and outside investors of the firm must agree on some level of acceptable foreign risk or the firm's growth potential will be limited (Stulz, 2007). Like other major, irreversible investments, FDI requires an active and continuous risk-management strategy to balance the dynamic trade-offs between risk factors to achieve long-term superior returns (Andersen, 2008). Thus, the parent's overall FDI strategy reflects its choices about how it allocates capital and aligns resources with the dynamic risks in the host economy.

Earlier studies showed that firms with more extensive international experience sought out higher risk countries as a competitive advantage to less experienced firms (Davidson, 1980). Furthermore, the foreign subsidiaries of larger parents are often better positioned to assume more risk in the host environments since they can rely on their parents for supporting resources (Poynter & White, 1984). For example, foreign subsidiaries often borrow more from their parents if they are in countries where there are weaker capital markets, and in host economies where there are limited or no

common law court practices (Desai et al., 2004). In contrast, FDI in developing countries may also represent an opportunity for local sources of capital to engage in risk sharing investment with local foreign subsidiaries where they would otherwise have limited investment prospects (Albuquerque, 2003).

The modification of the foreign subsidiary's capital structure in conjunction with the experience or the expectation of risk has been empirically supported in the literature. As many foreign subsidiaries have the ability to self-fund their capital requirements through retained earnings, their capital structure often reflects more about the local host risk factors than the parent's exposure to risk (Shao, 1997). Moreover, multinationals have been shown to use higher subsidiary leverage; that is, they are willing to accept a higher level of financial risk where there is higher political risk in the host environment (Henisz, 2002) and (Desai et al., 2008). Other studies have shown how foreign subsidiaries modify their capital structure to mitigate tax policy risk (Smith, 1997) or in response to a major foreign currency risk experience like the Asian financial crisis of 1990's (Allayannis et al., 2003). To develop a risk-adjusted capital structure or leverage model, we need a basic framework for linking operating risk with basic market structure of the firm.

Linking Business Risk with the FDI Taxonomy

The four FDI motivations given by Driffield et al can provide a simple framework for understanding the potential business risk factors in a capital structure trade-off model. Each of the FDI motives may be linked with a unique operating

strategy that reflects the subsidiary's basic approach to maximizing profit in an imperfect market. A summary of these factors are shown in Table 1-5.

FDI Type	Comparative Host Advantage	Basic Operating Strategy	Key Resource Dependency	Significant Risk Factors			Explanatory Variables of Interest	Risk Return Ratio	Overall Operating Risk
				Capital Risks (Firm)	Operating Risks (Market)	Economic Risk (Country)			
Location Advantage Type 1	Lower Labour / Higher Tech	Value Addition	Factor Markets		Technological Scale Effects	Location Specific Risks	GDP Growth Country Risk	22.6%	Low
Technology Seeking Type 2	Higher Labour / Higher Tech	Resource Conversion	Competitor's Intellectual Property	Capital Intensity (1/MPK)	Efficient IP Transfer Asset Efficiency		MPK Asset Utilization	10.6%	Moderate
Efficiency Seeking Type 3	Lower Labour / Lower Tech	Cost Reduction	Basic Labour		Labour Costs Volume Scale Effects		Wage Risk Revenue Growth	7.7%	High
Ownership Advantage Type 4	Higher Labour / Lower Tech	Pricing Power	Intellectual Property			Market Share	GDP Growth	21.3%	Low

Table 1-5 Business Risk and FDI Types

Two of these operating strategies may also be called *high value-added* strategies as they are based on some form of *comparative or competitive advantage* (Kogut, 1985), whereas *low value-added* strategies may rely more heavily on scale

effects or cost control. We rank the FDI types in order of their overall risk as value-adding operating strategies, beginning with the higher risk types.

Efficiency-seeking firms (Type 3) have higher operating risk based on their low value-added strategy. They often rely on scale effects to reduce cost margins on commodities and other low valued-added products in more mature stages of production where profit margins narrow considerably. They are also more likely to be sensitive to host labour rates and revenue growth, which are the drivers of volume-related economies of scale. Their basic operating strategy is *cost reduction or control*. Consequently, core subsidiaries (i.e., subsidiaries operating in the same basic industry as the parent) may not necessarily have higher excess returns over the parent's core business activity because of transfer pricing effects. The business risk factors for this type might include strong collective bargaining units; poor educational infrastructure; high transportation costs; and generally poor market demand conditions. Efficiency-seeking firms are generally more sensitive to external factors in the host economy such as *risks in wage costs and revenue growth*.

Technology-seeking firms (Type 2) have moderate operating risk as they can also a have a limited value-added strategy. These firms require some redundancy of capital investment and training to facilitate the absorption of knowledge and skill spillovers from the host economy that make them sensitive to capital investment risk. We could say their basic operating strategy is *resource conversion;* that is; they seek to obtain competitive technologies through spillovers within the host economy. In other words, they seek to obtain new technologies without having to

invest internally in these technologies themselves. The risks that Type 2 firms are exposed to include: limited absorptive capacity for technology transfers, and high capital investment in under-utilized assets used to transfer and emulate technology from the host environment. Technology-seeking firms are likely to be more sensitive to factors over which they have some limited control, in particular, the level of capital investment and *capital risks* relating to the *productive utilization of assets*.

Location-advantaged firms (Type 1) have moderate to low overall risk as an operating strategy as it is based on a high value-added strategy. They may often rely on basic labour savings combined with access to technological spillovers or infrastructure. The Type 1 firms often have an internal competency that allows them to exploit scale effects within a technological framework. Their basic operating strategy is *value addition* through combined scale effects in both cost and technology (Kogut, 1985). The risk factors for the Type 1 firms might include reliable factor markets and limited market growth potential, both of which affect the ability to achieve technological scale effects. Location-advantaged firms are likely to be more sensitive to *operating risks* that are linked with *location specific risks* that affect the ability to perform within the host economy.

Ownership-advantaged firms (Type 4) have the lowest operating risk as they are based on a high value-added capacity combined with some competitive advantage. Their ability to control market share through firm-specific advantages reflects an operating strategy based on *pricing power*. The business risk factors associated with these firms might include uncontrolled spillover of the firm's

intellectual property to host competitors; high volatility in the host business cycles or GDP; or any other factor that impairs access or control of host market share. However, the ownership-advantaged firms are also more likely to have better tolerance for host risk factors than other types, as they possess high pricing power (i.e., inelastic pricing). The Type 4 firms represent the most desirable type of FDI operating strategy; however, since they already possess pricing power advantage in the host market, the core subsidiaries are unlikely to have much substantially higher excess returns than their parents. Ownership-advantaged firms are more likely to be sensitive to the risks that affect the stability of their *market share in the host economy.*

Debt Maturity and Financial Risk

Capital structure has another important dimension that affects the firm's foreign risk mitigation strategy; this is the ratio of long-term to short-term debt, or the firm's *debt maturity ratio*. Long-term debt is more frequently issued at fixed rates with maturities over 5 years, whereas short-term debt typically matures in shorter periods, often in less than 1 year. There are different risk factors associated with debt maturity that impact the firm's target leverage ratio. First, consider that the foreign subsidiary's primary creditor is the parent firm and not external bondholders or creditors. Many larger parents have the ability to provide low-interest or interest-free inter-company loans where capital is unavailable from the host economy. This generally means most foreign subsidiaries have very *low liquidity risk*; that is, they generally have little risk of not being able to obtain

financing or refinancing of debt with the parents back-stopping their borrowing capacity.

The primary sources of interest-bearing debt for non-financial firms includes *public debt* where the corporation sells bonds (e.g., it borrows from bondholders) and pays interest on the loan, and *bank debt* where firms borrow from commercial or investment banks. Larger public firms also have better access to public debt and may often use it in higher proportions than smaller firms do. Firms with higher creditworthiness tend to use more short-term debt (e.g., commercial paper) or borrow from banks with short-term loans since their liquidity risk is also low. In contrast, firms with higher credit risk issue more longer maturity public debt or take out more collateral-backed bank loans (Diamond, 1991). Likewise, banks can require collateral, set higher interest rate payments or repayment terms that are more restrictive or limit the debt maturity of higher credit risk firms. Consequently, using public debt is much more preferable to managers as it is less actionable (i.e., limited by the bondholders) (Berger et al., 2005).

In the case of the foreign subsidiary, the shorter debt maturity structure can also serve to lower financial risk. Firms with high growth opportunities may choose more short-term debt as a refinancing strategy which limits gains to the host creditors on new projects (Barclay & Smith, 1995). Shorter debt maturities are also not as sensitive to some business risks because they must be repaid quicker and often at higher interest rates (Johnson, 2003). However, some foreign subsidiaries may obtain short-term financing simply because the host creditors themselves have shorter structured debt maturities. For example, Valev shows that 66% of the

international banking debt provided to foreign countries with higher country risk have a debt maturity of less than one year (Valev, 2007).

Parents may also use more short-term debt than domestic firms because of the higher agency costs involved in foreign operations (Doukas & Pantzalis, 2003). Furthermore, foreign subsidiaries may also be incentivized to use more *trade credit* (i.e., the working capital provided by host suppliers who supply products on credit terms) to fund near term obligations, which further decreases their overall debt maturity. More importantly, this short-term trade debt is much less likely to be guaranteed by the parent firm. Thus, some combination of the these factors may motivate the foreign subsidiary to have more short-term debt as a risk-sharing strategy which has the effect of concentrating more financial risk on host creditors.

Mitigating Financial Risk in Foreign Direct Investments

Empirical studies show that political risk in the host environment is correlated with higher volatility in the foreign subsidiary's returns (Desai et al., 2008). Moreover, Kolasinski shows that firms seek to protect their common shareholders and other profitable divisions from a foreign subsidiary with higher operating risk by increasing its use of leverage (Kolasinski, 2009). Kolasinski also finds that subsidiaries with higher operating risk will tend to use more non-guaranteed debt (i.e., debt not collateralized or backed by the parent) which adds protection to the parent's shareholders.

The business risk factors that the parent firm would seek to mitigate can also vary across different countries or industries. For example, the telecommunication and transportation industries have large fixed investments in hosts economies which are more irreversible or difficult to redeploy and therefore have higher leverage as a result of exposure to local political risk factors (Desai et al., 2008). Likewise, many firms in countries without a common law legal system will also tend to have higher overall leverage (Lopez-Iturriaga & Rodriguez-Sanz, 2008).

FDI, as a direct investment activity reflects some aspects of irreversibility and the inherent risk in an irreversible investment necessitates some form of contemporaneous risk reduction or diversification. Irreversible investments require the investor to make a trade-off between the expected future returns and the value of waiting for additional information which may lower its risk (Bernanke, 1983). Moreover, FDI like other large, irreversible investments are more likely to be irregular or "lumpy" in size or scale and with different periodicity (Pindyck, 1988) as confirmed in Chapter Four. For example, capital flows to FDI may be highly opportunistic as a result of cyclical availability of low-cost capital (Baker et al., 2008). FDI may also be part of a sustained program of foreign investment that anticipates future business cycles. In any case, FDI that is largely comprised of illiquid fixed assets are prone to some unique business risk factors that cannot be insured, mitigated with diversification, or reduced with managerial controls.

The irregularity or 'lumpiness' of FDI opportunities requires a flexible form of business risk mitigation which is more suitable for discontinuous investment cycles. We argue that the use of excess or high leverage particularly with a high

composition of short-term debt in the foreign subsidiary provides a financial risk-reduction vehicle which may be more cost effective, easier to control, and simpler to implement than other forms of risk reduction or mitigation such as insurance, geographical or product diversification. Moreover, the increased use of short-term debt forces a discipline of higher excess returns to provide shareholders with a foreign risk premium. Excess or high subsidiary leverage may also serve other financial risk reduction functions such as a hedge against high inflation in some host countries, or as a vehicle to 'park' or hold surplus capital reserves in the form of inter-company loans for later repatriation under more favorable tax conditions (Krull, 2004).

Research Questions

The following research questions seek to explain how foreign subsidiaries modify their leverage to compensate for changes in their business risk experience that attends their operating strategy which can be tested using our data set:

Firms with a high valued-added operating strategy and location-specific comparative advantage are more sensitive to operating risks associated with the host location:

R1-5: Type 1 firms modify their leverage for operating risks linked with location-specific risks

Firms with a low value-added operating strategy and that rely on capturing technological spillover effects from the host economy are more sensitive to fixed asset investments and asset utilization:

R2-5: Type 2 firms modify their leverage for capital risks related to the productive use of assets

Firms with a low value-added operating strategy focusing on cost reduction and cost control are more sensitive to basic labour factors and stability in revenue growth that drive economies of scale:

R3-5: Type 3 firms modify their leverage for wage risks and revenue growth

Firms with high value-added operating strategies that have competitive pricing advantage are more sensitive to market growth and competitive restraints in the host economy:

R4-5: Type 4 modify their leverage for market share risk in the host economy

Modeling Capital Structure and Business Risk

We model the foreign subsidiary's leverage directly from the subsidiary's balance sheet and test the responses to different business risk factors. Model 4.0 is a dynamic, autoregressive panel model that characterizes the differences in the types of FDI and identifies responses to risk factors.

$$Lev_{it} = \alpha + \beta Lev_{it-1} + \beta\phi_{it} + \beta\gamma_{it} + (D_{FDI}) + (D_{NACE}) + \eta_i + \varepsilon_{it} \quad (4.0)$$

Lev = debt to asset ratio
$\phi \equiv$ matrix of risk components
$\gamma \equiv$ matrix of controls
D_{FDI} = FDI type dummy (4.1, 4.4, 4.5, 4.6, 4.7)
D_{NACE} = NACE classification dummy (4.2)
$\eta \equiv$ fixed individual effect

Model 4.0 Capital Structure and Risk Factors

We develop the capital structure model specification with some explanatory variables and risk factors as found in (Rajan & Zingales, 1995) and (Flannery & Rangan, 2006) and (Frank & Goyal, 2009). We must however, make some modifications for our study of foreign subsidiaries. First, most foreign subsidiaries do not have separate outstanding shares available for public purchase, individual share prices, or distinct market debt values. The equity in the subsidiary's balance sheet may be the residual of inter-company transactions and not necessarily a proportional share of the parent's actual market equity. Therefore, we are constrained to the use of *book leverage* or the debt-to-asset ratio as our primary measure of leverage. The dependent variable, the debt-to-asset ratio, tends to be backward-looking as opposed to the firm's market-to-book ratios of debt which are affected more directly by market volatility and future price expectations which are contained in market debt ratios (Barclay et al., 2006). This may lead the model to reflect more about historic responses to *risk experience* and firm performance rather than future expectations of risk. This assumes an *ex post* relationship between leverage adjustment and risk experience.

The key explanatory variables are listed in Table 2-5. We intentionally exclude some other factors noted in the literature on capital structure including; a finance-deficit variable as most subsidiaries do not raise external equity market capital directly, but through their parents and some local banking creditors (Frank & Goyal, 2009). We also exclude R&D expenses as the accounting for R&D expense varies too widely and is reported only infrequently in our data sample. We specify controls for: (a) the industry median leverage for the subsidiary's NACE classification, (b) earnings before tax and interest (EBIT), and (c) the log of the firm's total assets as a measure of firm size. The model is estimated in constant, pre-tax US dollars.

Defined Variables

We have stated that business risks are the non-financial risks which can affect all types of FDI such as: high inflation; poor operating plans; high employee turnover; low growth in GDP; wage stability; anti-competitive pricing; and general political instability (Doff, 2008). We broadly define business risk for this study into three categories: (a) capital risk, (b) operating risk, and (c) economic risk.

(a) Capital risk is the potential for the loss of the investment principle. It is measured by capital ratios and credit ratings. It is also generally under the direct control of the firm. We define the firm's *capital risk* as the product of the firm's *capital intensity* and *default risk* (i.e., following the basic concept of risk measurement as the impact of future loss multiplied by the probability it will occur). Capital intensity is the ratio of total assets to revenue (i.e., the amount of

capital needed to produce 1 dollar of revenue) which can also reflect the future risk to income stability (Barton & Gordon, 1988). Its reciprocal value is directly related to the *marginal productivity of capital* (MPK). It also provides a broad, relative measure of capital risk and as a proxy for the reliance on debt financing (Harris, 1994). For this study, we define the firm's *default risk* as the reciprocal of the firm's Altman's Z credit score (Altman & Sabato, 2007). We also specify the *tangible asset ratio,* which is the ratio of fixed assets to total assets, as a proxy for the ability of the firm to adapt the changing market conditions. Firms with large fixed capital investments in machinery or technologies may be slower to respond quickly to changing market dynamics.

(b) Operating risk is the risk of loss (e.g., to profits or revenues) due to failed or inadequate resources, plans or external events (Jarrow, 2008). In the case of the foreign subsidiary, these risks impair the ability to perform in the host environment and are not entirely under the control of the firm and not always directly measurable. They include risk factors such as collective bargaining agreements or ineffective marketing campaigns. However, we can approximate operating risk indirectly through aggregate performance variables such as revenue growth rates, asset utilization and volatility in returns (Rubinstein, 1973). Revenue *growth rates* may be a proxy measure of the risk to the firm's ability to achieving scale effects. Moreover, high revenue growth rates can be a major source of operating risk as it signals the requirement for higher levels in working capital investment. *Volatility in returns,* which we define as the three-year moving average of the standard deviation of return on assets is also measure of ability to adapt to

changing market dynamics. We also specify the return on assets (ROA) as measure of asset utilization, and as a broad indicator of operating efficiency.

(c) Economic risks are the general systemic risks in the host economy such as inflation which are measured directly and which have significant effects on FDI (Meldrum, 2000). *Volatility in wages* measures the risk of high wage instability in the host economy and is defined as the three-year moving average of the standard deviation of the per capita wages in each host economy. In a similar fashion, we also measure *volatility in the host growth in GDP* as a measure of the *risk of market demand* that is also a proxy for risk to market share since a contraction in GDP would be a growth risk to most non-monopolistic competitors. We also provide a similar measure of host inflation risk with the *volatility in inflation rates*. We specify the firm's *IRCG Country Risk* composite rating in which a higher score indicates *lower* country risk.

Our calculation for the firm's *risk-return ratio* is a relative measure (i.e., properly speaking it is the *ratio of returns to risk* as a higher numerical value is more desirable) and is obtained by dividing the FDI risk premium by the firm's capital risk. Finally, we define the subsidiary's *excess leverage ratio* as the percentage of leverage of the foreign subsidiary that exceeds the parents leverage ratio, as a proxy measure for foreign business risk-mitigation.

Data Set

The data set for this study is comprised of an unbalanced panel set of 7,219 foreign subsidiaries (or a total of about 14,400 parent and affiliate firms as some parents have multiple subsidiaries in the data set) from 38 countries, 22 from the OECD, and 16 from the developing world. Our initial sample drew about 2.0 million firms from ORBIS® based on the availability of basic financial and demographical data for the period of 2000 to 2007. We excluded all non-industrial firms such as banking or government services. The sample was then subjected to a screening process for the minimum availability of 50% of the key data points for the balance sheet and income statement, and minimum annual revenues of $5M. This also eliminated firms that either entered or exited the sample during the sample period and so reduces survivor bias. This sample pool was then winsorized to control extreme outliers for firms with year over year changes of more than +/- 1000% in the key financial ratios such as debt-to-asset and return on assets.

For this study, we also require the multinational parents to have at least 1 foreign subsidiary listed in the ORBIS® database that has foreign operations outside the source country, and has no other parent company ownership. Foreign subsidiaries must have at least 1 parent firm listed in the database that owns not less than 50% of the subsidiary's outstanding shares. Additional data from other sources include the country risk ratings and host country economic factors taken from the World Bank. These selection criteria resulted in a final sample of 7,219 firms. The sample has 4,354 small and medium subsidiaries (with annual revenues of < $65M), 2,590 large subsidiaries (> $65M and < $1.0B), and 275 very large subsidiaries (> $1.0B).

Estimation Method

In choosing an estimator, our preliminary inspection of the sample data with fixed effects estimation showed the significant presence of endogeneity and autocorrelation that would violate the assumptions of a fixed effect or instrumental variable method. In this instance, we found few suitably strong external instruments that are consistent across different firm categories and industries. As such, we employ the one-step 'system' generalized methods of moments (GMM) estimator for panel data (Arellano & Bond, 1991; Arellano & Bover, 1995; Blundell & Bond, 1998). [13]

Results

We divide the 7,219 subsidiaries into three subgroups for descriptive analysis: (a) by FDI types, (b) by the NACE industrial classification and the FDI types within each industry, and (c) by core and non-core subsidiaries.

Descriptive Statistics for Chapter Five

A table 2-5 and 3-5 summarizes the important descriptive statistics for the data set. Some of the notable risk features of the different FDI types with each in industrial classification which are supported by the data are discussed below.

[13] This method is suitable for unbalanced panels with endogenous explanatory variables and heteroskedasticity in the error terms. The 'system' estimator uses both differencing and lagging in levels to provide instrument orthogonality and preserve the constant for econometric projections. The one-step estimation method has also been reported to have some bias in coefficient if the number of instrument counts is too high. In this case, our instruments do not exceed 13% of the firm count so we can use the one-step estimator. We also apply a robust error correction to improve the inferential reliability, and we also report the Hansen test for exogeneity of the instrument matrices. We use the forward orthogonal deviations, which increases the observation count available for estimation in panel data sets with gaps.

		Location Advantaged FDI 01	Technology Seeking FDI 02	Efficiency Seeking FDI 03	Ownership Advantaged FDI 04
Capital Risk	Tangible Asset Ratio	0.26	0.31	0.24	0.30
	Capital Intensity	1.49	1.88	1.60	1.68
	Default Risk	0.52	0.25	0.30	0.30
	Capital Risk	.82	.88	.64	.92
Operating Risk Components	Asset Utilization ROA	7.0%	6.5%	7.1%	8.3%
	Revenue Growth	15.0%	21.6%	19.8%	23.0%
	Volatility in Returns	0.07	0.06	0.04	0.05
Economic Risk Components	Wage Volatility	0.0009	0.0012	0.0009	0.0016
	GDP Growth Volatility	0.0088	0.0106	0.0098	0.0111
	Inflation Volatility	0.0046	0.0088	0.0057	0.0132
	Country Risk (%)	0.68	0.72	0.61	0.71
	Parent Country Risk (%)	0.73	0.66	0.73	0.70
	Host Risk – higher/(lower)	6.8%	(9.0%)	16.4%	(1.4%)
Debt Maturity and Liquidity	Long-Term Debt	11.7%	15.9%	12.0%	14.2%
	Short-Term Debt	55.9%	52.1%	57.1%	54.2%
	Current Ratio	1.75	1.74	1.64	1.61
Leverage Ratios	Industry Median Leverage	0.68	0.70	0.68	0.69
	Parent Leverage	0.48	0.53	0.55	0.47
	Subsidiary Leverage	0.67	0.68	0.69	0.68
	Excess Leverage	39.5%	27.3%	25.4%	44.6%
Return on Equity	ROE	26.6%	26.6%	27.7%	37.3%
	Parent ROE	9.8%	17.0%	23.6%	17.0%
	FDI Risk Premium	18.6%	9.3%	4.9%	19.6%
	Risk / Return Ratio	22.6%	10.5%	7.7%	21.3%

Table 2-5 Descriptive Statistics of Chapter Five

The average FDI risk premium for all firms in the sample is 13.3% while the average excess leverage is 35.2%. About 12.8% of total assets were financed with long-term debt and 55.4% with short-term debt with the balance funded by equity. In contrast, the parent's average short-term debt was 42.4% for OECD parents and 34.5% for developing world parents. Overall, these foreign subsidiaries have substantially higher debt ratios and much shorter debt maturities than their parents that suggest highly leveraged growth and financial risk mitigation by using more short-term debt.

Type 1 Location Advantaged. This type has the highest average risk-return ratio of 22.6% that is supported by having a very high FDI risk premium of 18.6%. Type 1 has the lowest capital intensity ratio of 1.49 that stresses high marginal productivity of capital of 67%. The host country risk rating was 6.8% higher risk than that of the parent country suggest some location specific risks is part of their operating strategy and interestingly, these firms also have the lowest annual rate of revenue growth of 15.0%. These suggest firms are dependent on growth and operating efficiency to maximize profits with location specific business risk.

Type 2 Technology Seeking. The Type 2 firms have a modest risk return ratio of 10.5% as well as a moderate FDI risk premium of 9.3%. The host country risk ratings are 9.0% *better* (i.e., they have lower risk) *than* the parent's source country which is consistent with the strategic motivations underlying this type that is seeking to exploit technological spillovers in the host economy. They use only 27.3% excess leverage which is somewhat lower than average. In contrast, they have the highest capital intensity of 1.88 and lowest asset utilization of 6.5% which

shows some sensitivity to capital investment risk. This seems consistent with this type's operating strategy of absorbing technologies and skills from the host environment or competitors where redundancy in assets may be needed to transfer knowledge.

Type 3 Efficiency Seeking. The Type 3 firms have the lowest risk-return ratio of 7.7% (i.e., the lowest financial return for the risk taken) and also the lowest FDI risk premium of 4.9% coupled with the highest comparative country risk that is 16.4% higher risk than the parent's source country. The higher revenue growth rate of 19.8% together with the lower performance values suggests the importance of growth and economies of scale in maintaining profitability for this type. Although they use a modest level of excess leverage of 25.4%, they also have a higher short-term debt ratio of 57.1% that may attenuate the risk of growth on leverage because it is less sensitive to some types of business risk. Type 3 is over-weighted with manufacturing and retail firms which comprise 41.6% and 33.1% of the sample respectively and which may be more sensitive to market demand risk where they are supplying goods and services directly into the host economy.

Type 4 Ownership Advantaged. The Type 4 firms have a very good overall risk-return ratio of 21.3% in spite of having a high capital risk value of 0.92 since they have the highest FDI risk premium of 19.6%. Although Type 4 has very high revenue growth of 23.0% that suggests elevated operating risk, it is coupled with superior return-on-equity of 37.3% and the highest asset utilization of 8.3% (i.e., the return on assets). In contrast, Type 4 firms have the highest excess leverage averaging 44.6% that is affected by the transportation and communication firms

within this sample that both have an average excess leverage over 50%. These data points reflect the features of an operating strategy supported by pricing power, but also suggest that market share and price stability may be significant risk factors for sustained performance.

Descriptive Statistics of the NACE Industrial Classifications

Industry specific characteristics have a strong influence on the process of internalization and the alignment of firm resources within the host economy (Buckley & Casson, 1976). There are also unique industry characteristics within each of the FDI types in our sample. We subgroup the descriptive statistics by the standard NACE industry classifications and discuss the unique features of the FDI types within these subgroups. The comparative analysis shows the FDI taxonomy of Driffield et al is useful in differentiating features that would otherwise be overlooked by using only an industrial classification alone. The descriptive statistics of these groupings is shown in Table 3-5.

	Firms	NACE 01	NACE 15	NACE 30	NACE 40	NACE 60	NACE 70
All Firms							
Firm Count	7,219	154	2,975	302	2,278	492	1,018
ROE	26.3%	51.5%	18.7%	25.8%	31.7%	17.2%	37.5%
ROA	6.8%	16.9%	6.0%	5.4%	7.7%	3.8%	7.4%
Capital Intensity	1.68	2.36	1.26	2.39	1.26	1.87	3.46
Tangible Assets	27.4%	49.5%	32.0%	31.4%	18.7%	30.3%	27.1%
Revenue Growth	18.0%	30.7%	15.5%	27.7%	17.2%	18.4%	22.2%
Excess Leverage	35.2%	4.8%	25.1%	35.3%	44.3%	38.5%	42.6%
FDI Risk Premium	13.3%	23.4%	12.9%	10.6%	17.4%	3.2%	10.4%
Type 1 FDI							
Firm Count	1,354	22	535	62	462	116	157
ROE	26.6%	35.5%	23.3%	31.8%	30.6%	13.8%	32.9%
ROA	7.0%	14.4%	6.6%	4.7%	8.3%	3.3%	6.8%
Capital Intensity	1.68	2.31	1.10	1.88	1.04	2.18	3.41
Tangible Assets	26.4%	50.7%	32.0%	34.6%	16.3%	26.4%	30.4%
Revenue Growth	15.0%	19.4%	13.2%	28.0%	13.8%	16.2%	18.2%
Excess Leverage	39.5%	(7.7%)	25.6%	32.1%	54.1%	46.5%	58.5%
FDI Risk Premium	18.6%	24.1%	14.6%	14.6%	26.3%	1.9%	23.2%
Type 2 FDI							
Firm Count	274	10	71	29	92	40	32
ROE	26.6%	37.7%	25.9%	37.2%	28.5%	28.6%	6.7%
ROA	6.5%	12.1%	6.6%	5.9%	6.9%	4.8%	5.6%
Capital Intensity	1.88	1.93	1.35	3.39	1.25	2.20	3.14
Tangible Assets	31.6%	30.4%	32.8%	46.2%	21.1%	41.1%	23.9%
Revenue Growth	21.6%	54.3%	13.8%	26.3%	16.6%	80.7%	34.8%
Excess Leverage	27.3%	(1.3%)	21.7%	20.9%	31.2%	22.8%	56.5%
FDI Risk Premium	9.3%	7.0%	12.6%	22.3%	9.0%	235.0%	-9.3%
Type 3 FDI							
Firm Count	1,193	11	497	63	396	81	145
ROE	27.7%	19.2%	20.9%	24.9%	33.0%	19.3%	43.7%
ROA	7.1%	11.9%	6.7%	6.5%	7.3%	5.1%	8.9%
Capital Intensity	1.60	2.09	1.35	1.52	1.28	1.70	3.29
Tangible Assets	24.9%	53.4%	32.1%	19.2%	16.5%	28.3%	21.0%
Revenue Growth	19.8%	22.3%	16.2%	22.7%	23.2%	19.4%	21.3%
Excess Leverage	25.4%	(4.0%)	22.7%	14.2%	37.6%	20.9%	19.7%
FDI Risk Premium	4.9%	(22.7%)	10.5%	7.6%	2.1%	4.1%	-6.0%
Type 4 FDI							
Firm Count	550	13	184	50	194	32	77
ROE	37.3%	77.3%	35.1%	11.6%	48.9%	21.1%	29.9%
ROA	8.3%	12.7%	8.1%	9.1%	9.8%	5.5%	7.5%
Capital Intensity	1.68	1.79	1.36	2.30	1.32	2.24	2.70
Tangible Assets	30.3%	40.1%	36.0%	41.8%	20.0%	35.6%	31.5%
Revenue Growth	23.0%	20.3%	23.1%	31.8%	14.1%	22.0%	40.8%
Excess Leverage	44.6%	26.1%	28.0%	64.9%	52.6%	65.4%	46.2%
FDI Risk Premium	19.6%	68.5%	14.4%	2.8%	28.7%	-2.7%	21.5%

Table 3-5 Descriptive Statistics for Industry and FDI Types

NACE 01 Agriculture and Mining. The firm count for this subgroup is 154 or 2.1% of the sample, the smallest subgroup overall. Within this subgroup, we find the lowest overall use of excess leverage averaging only 4.8% across all FDI types. This subgroup has a very high tangible asset ratio of 49.5% and a high capital intensity of 2.36. This limited use of excess leverage may be related to the fact that land-based resources, an important risk factor for this group cannot be expropriated, although access to those resources can be restricted or withheld. This subgroup has the highest return on equity of 51.5% and the highest FDI risk premium of 23.4%.

NACE 15 Manufacturing. The firm count for this subgroup is 2,975 or 41.2% of the sample and the largest of the subgroups. The capital intensity of these firms averages 1.26 and is consistently low across all the FDI types and typical of industries with higher labour inputs. Within this subgroup, there is a consistent use of excess leverage with the average being 25.1%. This subgroup has a lower than average return on equity of 18.7% and modest FDI risk premium of 12.9%.

NACE 30 Energy and Construction. The firm count for this subgroup is 302 or 4.1% of the sample. This group has wide range of the use of excess leverage across the different FDI types ranging from 14.2% to 64.9%. In contrast, these firms have a much higher average capital intensities of 2.39.

NACE 40 Retail. The firm count for this subgroup is 2,278 or 31.5% of the sample. In this subgroup is the highest overall use of excess leverage of 44.3%. As we should expect with retail businesses, this subgroup has the lowest tangible asset

ratio of 18.7% and likewise consistently low capital intensity ratios of 1.26. In comparison, this subgroup has a high return on equity of 31.7% and a good FDI risk premium of 17.4%.

NACE 60 Transportation and Communication. The firm count for this subgroup is 492 or 6.8% of the sample. Within this subgroup, we see a high range of excess leverage averaging 38.5%. This subgroup has the lowest return on equity of 17.1% and the lowest asset utilization of 3.8% and the lowest FDI risk premium of 3.2% that reflects the highly competitive nature of this industry.

NACE 70 Communication Services. The firm count for this subgroup is 1,018 or 14.1% of the sample. There is a very high use of excess leverage in this subgroup of 42.6% due likely to the highly competitive, technological obsolescence sensitivity of this industry. This subgroup has the highest capital intensity of any industrial class at 3.46 and a very high return on equity of 37.5%.

Descriptive Statistics for Core and Non-Core Subsidiaries

In Table 4-5, we provide additional descriptive statistics for core and non-core subsidiaries, and the differences in the FDI types within these subgroups. This sub-sample of 3,371 firms is truncated from the main sample due to gaps in the NACE classification data in the sample. Generally, the core subsidiaries represent 37.3% of the sample which roughly agrees with Doukas and Lang's findings (Doukas & Lang, 2003). The Type 4 firms have the highest core ratio of 41.5% and high growth of 27.1% which agrees with Doukas and Kan that core firms with high

growth invest in more core activities (Doukas & Kan, 2008). Overall, the non-core FDI types show higher capital risk, higher risk-return, and higher excess leverage ratios than the core subsidiaries. As noted above, the FDI risk premiums for all core subsidiaries except FDI Type 1 are slightly negative, meaning the core subsidiary's return on equity is a percent lower than its parents return; that is, *core or intra-industry FDI does not provide a significant FDI risk premium*. Likewise, core subsidiaries also use much lower excess leverage as we should expect given that these subsidiaries are operating in the same basic industry as the parent and therefore less exposed to unique or unanticipated risk factors.

		All Types	FDI 01	FDI 02	FDI 03	FDI 04
Firm Count	Core	1,256	448	94	486	228
	Non-Core	2,115	906	180	707	322
	Subtotal	3,371	1,354	274	1,193	550
Core Ratio		37.3%	33.1%	34.3% 40	.7%	41.5%
Excess Leverage Ratio	Core	23.2%	29.8%	25.4% 15	.1%	29.2%
	Non-Core	40.0%	21.1%	29.3% 34	.8%	55.7%
ROE	Core	20.3%	21.7%	15.1% 21	.8%	16.5%
	Non-Core	29.0%	32.7%	31.9% 31	.9%	51.9%
Revenue Growth	Core	20.0%	14.9%	27.5% 19	.9%	27.1%
	Non-Core	18.7%	15.0%	18.4% 19	.7%	20.2%
FDI Risk Premium	Core	4.1%	18.3%	-1.0%	-4.2%	-1.0%
	Non-Core	18.8%	18.7%	15.0% 11	.4%	34.3%
Capital Risk	Core	0.60	0.43	0.91	0.53	0.94
	Non-Core	0.77	1.01	0.86	0.73	0.91
Risk-Return Ratio	Core	6.8%	42.5%	-1.0%	-7.9%	-1.0%
	Non-Core	23.7%	18.5%	17.4% 15	.6%	37.6%

Table 4-5 Descriptive Statistics for Core and Non-Core Subsidiaries

Estimation Results for Model 4.1 and 4.2

We employ a fixed effect estimation with the FDI type and NACE classification dummy variables to Model 4.0 to compare the descriptive value of these taxonomies, and we label these Models 4.1 and 4.2 respectively. These models compare the ability of the typologies to identify the determinants of capital structure as shown in Table 5-5. The overall result for the total sample (i.e., all FDI types) shows a within-group R value of 0.41 for our Model 4.1 specification, but with a strong endogeneity of (0.31). In contrast, our estimates of the industrial subgroups show a within-group R values of 0.29, as compared to the 0.27 for the FDI taxonomy. Both groups have significant endogeneity of 0.23 and 0.24 making the fixed effect models inappropriate for inference about capital structure. However, it does suggest that the two taxonomies have a similar capacity in the identification of risk factors.

Subgroup	Firms	R-Within	R-Between	R-Overall	cor x, u_i	Rho	Constant
Model 4.0	7,219	0.4175	0.3921	0.2875	(0.3178)	0.7685	10.98
Model 4.1							
FDI 01	1,354	0.6057	0.7546	0.4563	(0.7307)	0.9264	5.96
FDI 02	272	0.2359	0.1822	0.1822	0.1191	0.6938	1.72
FDI 03	1,193	0.1210	0.1191	0.1164	0.0505	0.6808	1.14
FDI 04	539	0.1329	0.0874	0.0972	(0.0251)	0.6861	1.93
Averages		0.2739	0.2858	0.2130	0.2314	0.7468	2.68
Model 4.2							
NACE 01	153	0.1702	0.1510	0.1409	0.1014	0.6748	4.67
NACE 15	2,968	0.6108	0.3175	0.4562	0.0527	0.6097	6.78
NACE 30	300	0.3679	0.4724	0.4199	0.2069	0.5389	1.85
NACE 40	2,276	0.0912	0.1584	0.1227	0.1461	0.6810	2.27
NACE 60	489	0.1383	0.3693	0.2321	0.2756	0.5868	4.35
NACE 70	1,012	0.4174	0.7346	0.3765	(0.7087)	0.8455	3.11
Averages		0.2993	0.3672	0.2914	0.2486	0.6561	3.83

Table 5-5 Fixed Effect Estimation Comparisons of Models 4.1 and 4.2

Estimation Results for Model 4.3

The results for Model 4.3 for all the FDI types have significant Wald statistics, intercepts, and Hansen tests for exogeneity of the internal instruments provided by the GMM estimator and also provides reasonable correction for autocorrelation (Arellano & Bond, 1991). While the Hansen tests are all significant, the Type 3 value is somewhat lower than expected. This is due to the complexities of the instrumentation matrixes and over-controlling for different

variables within each FDI type so that the same econometric model can be applied to all sample groups.

		FDI Type	FDI 01	FDI 02	FDI 03	FDI 04
Model		4.3	4.4	4.5	4.6	4.7
		All	Location Advantaged	Technology Seeking	Efficiency Seeking	Ownership Advantaged
			R1-5	R2-5 R3-5		R4-5
Firm Count		7,219	1,354	274	1,193	550
Leverage	Lagged Dependent Variable	**0.713** **11.75** **[0.713%]**	**0.632** **6.71** **[0.636%]**	**0.693** **17.54** **[0.702%]**	**1.102** **9.52** **[1.117%]**	**0.612** **6.36** **[0.620%]**
Capital Risks	Tangible Assets Ratio	**-0.421** **-3.08** **[-0.168%]**	**-0.116** **-3.37** **[-0.045%]**	**-0.179** **-2.89** **[-0.083%]**	-0.003 -0.10	**-0.067** **-3.82** **[-0.028%]**
	Capital Intensity	0.000 0.57	-0.000 -1.58	**0.007** **2.00** **[0.022%]**	0.000 1.35	0.000 0.41
	Default Risk	-0.015 -0.44	-0.027 -0.99	0.001 0.49	-0.001 -0.48	-0.027 -1.12
Operating Risks	Asset Utilization ROA	**-1.438** **-3.00** **[-0.145%]**	**-1.650** **-5.70** **[-0.174%]**	**-1.69** **-2.60** **[-0.159%]**	**-0.231** **-4.41** **[-0.023%]**	**-0.434** **-5.56** **[-0.055%]**
	Revenue Growth	**0.014** **2.12** **[0.003%]**	**0.066** **4.78** **[0.014%]**	**0.121** **2.63** **[0.029%]**	**0.230** **3.36** **[0.546%]**	0.000 0.26
	Volatility in Returns	0.225 0.75	0.179 0.82	-0.403 -1.03	-0.104 -1.25	-0.109 -.095
Economic Risks	Volatility in Wages	5.832 1.32	**14.272** **2.15** **[0.021%]**	7.607 0.94	**30.839** **2.74** **[0.044%]**	**14.084** **2.69** **[0.032%]**
	Volatility in Host GDP Growth	-0.469 -0.77	**-3.657** **-3.76** **[-0.044%]**	0.030 0.06	-0.812 -1.46	**-5.462** **-2.37** **[-0.083%]**
	Volatility in Host Inflation	**0.952** **2.42** **[0.008%]**	**2.137** **2.25** **[0.014%]**	0.504 1.22	-0.477 -0.70	0.201 1.57
	ICRG Country Risk Rating	0.009 1.60	**0.020** **2.56** **[0.024%]**	-0.011 -0.89	0.041 1.85	-0.000 -0.12
Controls	Industry Median Leverage	-0.187 -1.75	-0.078 -0.54	-0.161 -0.69	**-0.312** **-2.61**	**0.222** **2.14**
	Profit	**1.83e-07** **2.55**	**1.56-e07** **2.55**	1.91e-07 1.38	**1.52e-07** **2.19**	**6.51e-08** **0.88**
	Firm Size	**0.014** **3.43**	0.002 .048	-0.001 -0.20	**-0.005** **-2.49**	0.001 .037
Intercept	Constant	**0.347** **2.57**	**0.401** **3.19**	**0.474** **2.09**	**0.137** **2.84**	**0.197** **2.38**
Joint Significance	Wald Statistic	0.000	0.000	0.000	0.000	0.000
Autocorrelation	AR(2) p-value	0.880	0.251	0.491	0.756	0.332
Instrument Exogeneity	Hansen p-value	0.185	0.148	0.149	0.070	0.786

Coefficients above and z-values below significant elasticities [brackets]

Table 6-5 Estimation of Models 4.3 to 4.7

The lagged dependent variable is significant for Model 4.3 and all other models and with elasticities ranging from 0.62% to 1.11% suggesting prior year levels have a greater influence on current-year capital structure levels that is more than any other factor. The annual percentage adjustment of the firm's capital structure is a dynamic process where firms typically adjust about 20% per year toward their target capital structure levels (Flannery & Rangan, 2006). Thus, the prior year levels and the gap between the firm's current and target levels of capital structure are the most significant determinants of capital structure. We should also therefore expect the elasticities of the other factors that affect capital structure levels to be relatively small within a very large, diverse sample if the firms are *at or near their target capital structure levels*. Indeed, the average elasticity of all the significant risk factors in the estimation results is about 0.10%. In other words, only a fraction of the total annual change in capital structure may be modified in response to risk experience in any one year, but the cumulative response may be substantially higher over longer periods. Furthermore, there are also multiple industries within each FDI type and we should expect some industry-specific effects of varying degrees that may cancel out stronger responses. That these elasticities, albeit small, are significant across several thousand firms, multiple industries and 38 countries signifies the common sensitivity that business risk factors have on modification of capital structure on a diverse, international sample of firms.

The results show a negative correlation between leverage and asset utilization (ROA) that is also a measure of profitability for all models as predicted in the literature. There is also a positive relation between leverage and an increase in the volatility of inflation, that is higher response to the *risk of inflation* than

absolute inflation levels. Indeed, higher leverage may be desirable in host markets with higher inflation as it devalues the real value of debt if denominated in local currencies. The results also show a positive correlation between leverage and firm size which is also consistent with the literature (Fama & French, 2002). All of the models have positive correlation of leverage and revenue growth. This is in contrast to the static trade-off theory which predicts actual growth should reduce leverage (Frank & Goyal, 2009). This is because foreign subsidiaries may also use higher leverage for financial risk mitigation, and because growth in most industrial firms often requires higher levels of working capital that is funded by short-term debt. All the controls in the aggregate Model 4.3 were significant except for median leverage, which was significant at a confidence value of $p = 0.080$.

Estimation Results for Model 4.4

In Table 6-5, our model for research question R1-5 is labeled 'Location Advantage Type 1.' The firm count for the Type 1 firms is 1,354 or 18.7% of the sample. The location-advantaged firms with their value-added strategy should demonstrate sensitivity in modification of capital structure in response to operating risks that are location specific. The estimation results for Type 1 firms shows significant correlations for two operating risk factors: revenue growth, and asset utilization (or RTS) with elasticities of 0.014% and -0.174% respectively. With higher revenue growth, more operating assets and working capital create higher demand for higher levels of short-term leverage. In contrast, as asset utilization or returns to scale increases, the level of operating risk falls, as does the level of leverage needed to fund operations. Type 1 also has the only significant response

to the IRCG country risk with an elasticity of 0.024%, which in this case is positive, indicating a slightly higher use of leverage in *lower risk countries*. This would appear on first glance to conflict with Desai et al (i.e., firms should have more leverage in countries with higher political risks). However, most all our FDI types do *have significantly higher leverage ratios* than their parents with the exception of a few firms in the NACE 01 industrial class. That Type 1 firms have higher *relative* leverage in countries with lower risk reflects that these countries may simply have a more stable economic or financial risk in comparison to other countries in the sample. Further, these Type 1 firms have the lowest default risk rating and are likely to get better credit terms meaning they have deeper capacity for debt.

The link between operating risk and location may be seen in the sensitivity to the volatility in host GDP growth that signals a dependence of stable host economic conditions. In this case, the negative elasticities of -0.08% would suggest an unexpected result in that higher GDP growth risk results in *lower* leverage, however, there is a global recession in the sample from 2001 to 2003 where GDP growth rates contracted significantly from 3% to 1% overall thus influencing the sign of the coefficient. The Type 1 firms have the lowest capital intensity of all FDI types of 1.49 (Table 3-5) or in other terms, a 67% marginal productivity of capital (MPK)which means they require the least amount of capital to produce a dollar of revenue, another feature of the operating strategy that centers on scale effects in technologies. These results provide some support for the R1-5 research question that the Type 1 firms modify leverage with increased sensitivity to operating risks associated with location specific conditions.

Estimation Results for Model 4.5

In Table 6-5, our model for research question R2-5 is labeled 'Technology Seeking Type 2.' The firm count for Type 2 firms is 274 or 3.7% of the sample. The technology-seeking firms that rely on the conversion of host resources should modify their leverage in response to capital risks relating to their productive use of assets. The estimation results for Type 2 shows significant correlations with two of the three capital risk components. The leverage response to tangible assets has a negative elasticity of -0.08% that like Type 1 firms also suggests that a large, redundant fixed asset base required to absorb technology from the host economy may be a risk factor. Indeed, outsized tangible or fixed assets can impair the rapid adaptation to changing market conditions. The leverage response to changes in capital intensity is fairly weak at 0.02%; however, these firms already have the highest capital intensity of 1.88 of all FDI types. There is also a stronger, negative correlation with asset utilization with an elasticity of -0.159%. These results might be stronger if the firm count were larger; however, they lend some limited support to our R2-5 research question that Type 2 firms modify their leverage in response to capital risks associated with efficiencies in the productive asset base.

Estimation Results for Model 4.6

In Table 6-5, our model for research question R3-5 is labeled 'Efficiency Seeking Type 3.' The firm count for Type 3 firms is 1,193 or 16.5% of the sample. The efficiency-seeking firms with their cost control operating strategy should show a modification of leverage in response to labour risk and scale effects as a function of market demand. The estimation results for Type 3 show the strongest correlation

between leverage and revenue growth with an elasticity of 0.54% (the largest elasticity in the estimation results), and a positive correlation to volatility in wages with an elasticity of 0.04%. This reinforces the argument that Type 3 firms are more dependent on labour and economies of scale and supports the R3-5 research question that Type 3 firms modify their leverage in response to wage and growth risks.

Estimation Results for Model 4.7

In Table 6-5, our model for research question R4-5 is labeled 'Ownership Advantaged Type 4.' The firm count for the Type 4 firms is 550 or 7.6% of the sample. The ownership-advantaged firms that have significant pricing power are more likely to depend on market share demand in the host economy for profitable growth and modify their leverage accordingly. The estimation results for Type 4 shows a negative correlation between leverage and volatility in host GDP growth of -0.08% as similarly noted in Type 1 above. The Type 4 model also shows a weakly positive correlation with wage volatility with an elasticity of 0.02%. Firms with intellectual property may be able to command their market share with pricing power, but they also may have some dependency on labour factors to build those products and Type 4 has a high percentage of manufacturing and retail firms (see Table 3-5). These results support the R4-5 research question that Type 4 firms modify their leverage in response to elevated risk in factors that affect market share.

Risk Elasticities and the Risk-Return Ratio

In an alternative comparison of the FDI type models in Table 7-5, we also find an important and significant link between the elasticities that measure the response of capital structure to business risk factors and the risk-return ratios of the FDI types. First, if we take the average total of the absolute values of the statistically significant elasticities for the risk factors, we have a value that represents the relative impact of all business risk factors on capital structure as seen in Item 1 of Table 7-5.[14] As we should expect, firms with higher uses of leverage (Item 2) have higher or more favorable risk-return ratios (Item 3). In a seeming contradiction to the notion that risk and return are positively correlated, firms with higher risk profiles as measured by their higher responses to business risk factors (Item 1), have significantly lower (i.e., poorer) risk-return ratios (Item 3). In other words, the higher risk FDI types (i.e., efficiency and technology seeking) have poorer risk return ratios. This is in part because we are using the *excess return on equity* provided by the subsidiary for the risk-return ratio and not the total return on equity. Restated, while higher leverage provides higher returns, higher risk environments in themselves do not provide better returns. Higher returns require some form of competitive advantage regardless of what business risk is present.

The higher financial risk of excess leverage in the foreign subsidiary can reduce risk on the parent to the extent which it is free from guarantees from the parents. If we consider that most of the excess leverage is comprised of short-term obligations and trade credit, we can see that excess leverage provides both higher returns for the subsidiary and lower financial risk for the parent.

[14] We multiply by 100 to covert to basis points for clarity of presentation.

Item		All Firms	FDI 01	FDI 02	FDI 03	FDI 04
			Location Advantaged	Technology Seeking	Efficiency Seeking	Ownership Advantaged
1	Mean Elasticities for all Risk Factors (Basis Points)	81	48	73	152	39
2	Excess Leverage	35.2%	39.5%	27.3%	25.4%	44.6%
3	Risk-Return Ratio	15.5%	22.6%	10.6%	7.7%	21.3%

Table 7-5 Comparison of different FDI Types in Models 4.4 to 4.6

Chapter Summary

We have investigated how foreign subsidiaries have unique operating strategies and how they modify their leverage to mitigate foreign business risks in the host environment. On average, the firms in our sample modified their capital structure by 0.08% for every 1% increase in a typical business risk factor each year. The small relative size of these risk elasticities is due to: (a) firms adjust only a fraction of their capital structure each year toward their target, (b) firms that are at or near their target capital structure ratios have very small adjustments, and (c) industry effects vary widely across different strategic groupings in the sample. In a cross-examination of our results, we also find that the FDI types that have higher average elasticities of response to business risk factors in the host economy also have lower average risk-return ratios confirming the linkages between business risk,

leverage and operating strategy. Our findings agree with those of Desai et al, in that we find that foreign subsidiaries use an average of 35.2% more leverage than their parent firms do. The use of excess leverage varies slightly with respect to firm size: for small and medium subsidiaries, 36.5%; for large subsidiaries, 29.2%; and 30.7% for very large subsidiaries. These firms also provided an average foreign investment risk premium on their shareholders equity of 13.3%. Moreover, we find the non-core foreign subsidiaries have generally higher risk premiums of 18.0%, which reflects an FDI strategy based on differential rates of return.

We also find foreign subsidiaries have consistently shorter debt maturities averaging about 20% more short-term debt than their parents do. This further demonstrates the role of capital structure in the mitigation of foreign risk. We find support for the use of a modified, dynamic trade-off model in developing the determinants of capital structure within foreign subsidiaries in explaining the response of risk factors in the capital structure decisions. The empirical results provide a contribution to capital structure theory in the area of parent and subsidiary firms where foreign risk links with firm-level operating conditions.

Several key areas could serve as grounds for further research. For example, the dynamics of short-term debt in foreign markets, the effects of private equity funding, and the influence of ownership structure need further investigation. For example, foreign creditors or private equity holders may have an influence on the structure of the debt maturity ratio through unique covenants.

CHAPTER SIX PROFIT AND GROWTH MAXIMIZATION

Sustaining long-term growth is a serious challenge for the multinational firm. The growth provided by foreign subsidiaries relies on an efficient operating strategy that aligns the firm's resources with its market structure. However, foreign market risk demands a risk premium that must be generated to compensate the investor's exposure to foreign market risk. To provide adequate funding for growth, firms must trade off reinvestment and generating short-term returns. We find that the linkage between growth and shareholder returns relies on how the foreign subsidiary modifies its profit maximization strategy to achieve alignment with its host market condition. We find superior shareholder returns from the foreign subsidiaries results from stable growth maximization with high asset efficiency.

Introduction

Do multinational firms pursue growth at the expense of shareholder value, or does growth result from an effective profit maximizing strategy? Foreign direct investments (FDI) are the vehicles through which the multinational can achieve its growth objectives necessary to attract external investment capital. The top 500 public multinationals control over 50% of the world's international trade (Cohen, 2007). This makes the topic of growth and shareholder value important in understanding the link between FDI and global economic activity. In a recent study of corporate growth, Laurie et al found that the average annual revenue growth rate of firms was 28% at the time of entry into the Global Fortune 50, which fell precipitously to an average of 2% in the remaining years after entry (Laurie et al., 2006). These trends point to the basic challenge of the multinational firm; namely, how to sustain long-run, profitable growth while delivering competitive shareholder returns in the short-run. Surprisingly, only a few empirical studies have focused on the firm-level dynamics of the growth of foreign affiliates (Belderbos & Zou, 2007).

The importance of sustaining firm growth is particularly important in highly industrialized economies with low, secular GDP growth, high structural unemployment and restrictive industrial policies (Canals, 2000). Moreover, much of the growth in productivity in industrialized countries is the result of the growth of its very large firms (Solvay et al., 2007). Further to this point, a survey in 2001 of multinationals found that only 6% of firms were able to achieve growth primarily through *organic growth alone*; that is, through internal growth initiatives and investment rather than by mergers and acquisitions (McGrath, 2007). Moreover, most of the empirical research on the impact of mergers and acquisitions (M&A) on

shareholder value strongly suggests that M&A is either value neutral or value destroying (Hitt et al., 1991). Similarly, Zook and Allen report that fewer than 14% of firms succeed in sustaining both growth in revenues and growth in profits (Zook & Allen, 2000). Thus, sustainable, profitable growth is the exception to the rule in many industries.

Sustainable, long-term growth is becoming the most serious strategic challenge for the multinational firm. In a study of more than 1,000 US companies, Foster and Kaplan found that the firm's longevity does not always correlate with performance, and moreover, that the life span of public corporations is getting increasingly shorter. At the current rate, they estimate that the average life of a corporation in the S&P 500 in 2020 will be less than 10 years (Foster & Kaplan, 2001). These conditions of lower rates of corporate survival may also drive demand for near-term earnings and an incentive for firms to pursue short-term growth maximization rather than lower returns from long-term strategic investment more typically needed to build long-term shareholder value. However, when growth itself becomes the over-arching strategy without a profit constraint, shareholder value may ultimately be diminished in the long-run (Ramezani et al., 2002).

We examine the linkage between growth and the shareholder value created by foreign subsidiaries for their parent firms as the final link between capital markets and FDI. We build on the current literature within international business and strategic management to show how the multinational firm modifies the profit maximization strategy of their foreign subsidiaries in response to the dynamics in its market structure to achieve a balance of high growth and high rates of return. We

build on the very limited studies of firm-level research of subsidiary growth and performance with our empirical investigation of matched parent and subsidiary accounts from 7,219 foreign subsidiaries in 30 countries in the OCED and developing world with contemporary econometric estimation methods. We contribute to the literature on the determinants of firm growth and the optimization of the profit maximization strategy in the special case of the foreign subsidiary.

Growth and Shareholder Value in the Research Literature

The research literature on firm-level foreign subsidiary growth and performance is relatively small compared to the extensive, country-level or industry-based literature on the economic motivations to exploit foreign markets through FDI. However, growth and performance research at the multinational parent-level has extensive significant treatment in the literature and provides context for developing our model of subsidiary growth. For example, the total return on the shares of US multinationals generally outperformed the overall returns for the S&P 500 index (Mikhail & Shawky, 1979). In a later example, multinationals were shown to have higher returns because of the growth opportunities of their foreign subsidiaries (Bodnar & Weintrop, 1997). Similarly, the multinational's performance is generally thought to be more profitable than their domestic counter parts because of their access to wider, international market demand (Gomes & Ramaswamy, 1999).

Multinationals were often viewed in the earlier literature as an alternative to holding foreign financial assets as a means of portfolio diversification as a result of the foreign market exposure of their subsidiaries (Mathur & Hanagan, 1983). In

contrast, it was later shown that generally investors did not value the multinational for their ability to provide risk diversification, tax havens or transfer pricing (Morck & Yeung, 1991). Further, the findings of subsequent studies showed that more highly diversified firms traded at a discount (i.e., their share prices were lower) than more focused businesses (Lang & Stulz, 1994). More recently, it has been shown that the managers of multinationals are much better at foreign investment project selection and targeting acquisitions than their domestic country counterparts which improves the delivery of higher returns for the shareholders (Razin & Sadka, 2007b). Thus, diversification strategies are more likely to mitigate risks to the top-line revenues and market share by modifying the profit maximization strategy of the firm.

Business diversification may often be a strategic choice which results from low growth opportunities in the firm's core business activities (Campa & Kedia, 2002) and (Mackey & Barney, 2006). Moreover, a 'diversification discount' may result from poor cross-subsidization of internal growth opportunities (Billett & Mauer, 2003). For example, large firms with many diverse business units tend to allocate more capital resources to high performers, and if low performers are not divested, the diversification costs are likely to be higher (Rajan & Servaes, 2000). On the other hand, geographic diversification may actually improve shareholder value when it is focused on core business activities (Doukas & Lang, 2003). Finally, while industry or business model diversification may reduce the near-term share price, it does not necessarily result in the destruction of real long-term value creation (Villalonga, 2004). Thus, we can argue that the pressure for top-line revenue growth, which often drives diversification can be a factor that can affect the multinational's profit maximization strategy.

The relationship between firm growth and shareholder value has few direct empirical studies at the firm level and no significant treatment at the foreign subsidiary level. Berry's study of US firms shows that shareholders provide more rewards to firms that engage in FDI with higher knowledge intensity (Berry, 2006). Likewise, investment in new, "Greenfield" FDI is more generally rewarded by shareholders; whereas M&A is often penalized because of excessive control premiums paid by the acquiring firms (Lopez-Duarte & Garcia-Canal, 2007). But the managerial preference for strong revenue growth provides an incentive to seek M&A in unrelated or non-core activities which can result in lower shareholder value (Doukas & Lang, 2003). These findings suggests that a regular program of FDI projects may be viewed by the external shareholder as part of the multinational's long-term growth strategy from which they may expect to participate in its future streams of revenues.

More critically, the pursuit of excessive growth can create an opportunistic mindset that focuses resources on short-term profit-maximizing investments with higher cash returns (Bhattacharya, 2008). In summary, while growth is a high priority for the multinational parent, it has not been adequately modeled for the foreign subsidiary where the critical source of its overall growth is generated.

Endogenous Growth in Foreign Subsidiaries

In building an economic model to explain the factors of growth in foreign subsidiaries, we should consider both internal firm-level and external (country or industry-level) drivers of growth. The internal drivers include capital investment or

R&D; and the external drivers include host country economic growth, market share, and price inflation. In contrast, the most significant external economic driver of investment in FDI is total market size or country GDP; and in second place is the growth in host country GDP (Chakrabarti, 2001). In the OECD, normal growth in GDP is commonly associated with monetary inflation, but it can also signal increasing demand in the host economy for goods and services. However, the linkage of inflation and growth in GDP may not be particularly strong. For example, a 40-year study of the US economy shows only weak co-movement of inflation and GDP (Maria-Dolores & Vazquez, 2008). Similarly, a modest rate of inflation does not appear to have a significant negative effect on future GDP growth (Arai et al., 2004). Thus, we could argue that FDI would achieve higher growth in host economies with modest and stable inflation and GDP growth, and we should expect some reasonable pro-cyclicality with respect to revenue growth and host GDP growth in competitive foreign subsidiaries.

The foreign subsidiary's market share is also affected by its external market structure that in turn, affects its capacity for growth. There is a significant thread of research in the strategic management literature which links the firm's market share with its profitably (Laverty, 2001). Firms that have a higher portion of market share have more pricing power and can maintain market share in the presence of competition if it is coupled with the capacity to sustain growth over time. Greater market share does not necessarily indicate greater internal efficiencies and the link between scale effects and market share may not strong (Allen & Hagin, 1989). In contrast, foreign subsidiaries are more likely to have a distinct form of competitive or comparative advantage that provides higher rates of return even under relative price

discounting pressures in the host market. For example, Gschwandtner shows that profits persist and are sustained above the ability of new entrants to readily capture in highly concentrated industries where there is also high growth (Gschwandtner, 2005).

The internal or firm-level factors that support firm growth include managerial capacity; marketing campaigns; R&D programs; firm size; economies of scale; and productivity. The earliest treatment of firm growth in the strategic management literature argued that firms must maintain excess resources in their managerial capacity in order to increase growth rates (Penrose, 1959). In contrast, Geroski argues that firm growth rates are largely random and are more the result of technological and economic shocks (Geroski, 2005). Similarly, Buckley and Casson argue that the firm's internal investment in R&D, new technologies and product innovations are critical to firm growth (Buckley & Casson, 1976).

Firm size is also treated extensively in the literature as a critical growth factor where it is commonly believed to facilitate economies of scale. However, the empirical results for this commonly stylized fact are widely inconsistent. For example, in a study of the world's largest firms, Buckley et al showed only a weak relationship between firm size and growth but strong dependence on industry-specific factors on growth (Buckley et al., 1978). However, it may also be the case that firm size may simply reflect the firm's effective market share, and except for those cases where foreign subsidiaries actually produce identical commodities or product substitutes for their host economy, their firm size is highly related to their market share.

Balancing Growth and Shareholder Value

The powerful market incentives which drive short-term earnings may also drive investments in high growth opportunities which may lead to the premature slowing of firm growth through over-investment and over-extension of resources (Mackey & Vlikangas, 2004). For example, firms with fewer growth opportunities are also more likely to be acquired by firms in non-core related industries to sustain their overall long-term growth objectives (Doukas & Kan, 2008). Moreover, the threat of hostile outside take over for firms with poor growth opportunities may create a moral hazard relationship between the firm's managers and shareholders (Tirole, 1988). Similarly, Olson and Van Bever discuss how firm growth may stall and decline through failures in strategic planning to realign firm resources into new products or markets (Olson & Van Bever, 2008). Thus, we argue that there should be an incentive for the foreign subsidiary to maintain some flexibility in its profit maximizing strategy that can balance growth and profit in the short-run and optimize capital costs and shareholder returns in the long-run.

Under dynamic market conditions and asymmetrical competitive responses, some firms may elect to maximize their sales or revenues by sacrificing some profit margins in the short-run. These firms are also known as *growth maximizers*, which is in contrast to profit maximizers who will always maximize their price and profit margins (Baumol, 1962). Growth or sales maximization is also more likely to be seen in industries that are more concentrated. In practical terms, many firms may seek to maximize growth with some minimum profit constraints with a *balanced growth strategy* by modifying their short-term pricing and investment policies.

The firm's pricing policy enables it to choose or change between growth and profit maximization, or to maximize growth with a minimum profit constraint. Although, switching between profit or growth maximization strategy is not an irreversible decision, investment policies are more irreversible and the long-run effect of switching between profit and growth maximization can also alter the market structure in concentrated markets. Thus, the firm's profit maximization strategy must be capable of adjusting for dynamic conditions to balance opportunities for growth with the shareholder's expectations.

Dynamic Profit Maximization

The central argument of industrial organization is that the firm's shareholders will want their managers to maximize future or expected profits. Also within this paradigm, the firm's external economic environment determines its market structure which affects the firm's conduct or strategy and performance (Scherer, 1970). In the case of the foreign subsidiary, there are several issues that add a layer of complexity to the development and deployment of the profit strategy including foreign exchange rates, volatility in international trade, and changing governmental policies. Thus, the foreign subsidiary's profit maximization strategy should be dynamic and share these common, competitive elements:

(a) market selection;

which is how the firm raises growth capital, which foreign markets will the firm enter, and in which entry mode or form or ownership;

(b) business model or operating strategy;

which is how the firm will organize its factors of production and manage risk to its operating factors and sources of capital;

(c) price discrimination;

which is how the firm will balance growth and profitability; and

(d) investment policy;

which is how the firm allocates capital investment resources to support future expansion.

A brief discussion of these four components follows.

(a) The market selection hypothesis requires that the firm be able to raise investment capital and generate positive profits in the target markets (Dutta & Radner, 1999). In the context of the FDI decision process, market selection must also address the choice of geographical location and mode of market entry such as direct investment or licensing.

(b) The economic motivations for market entry contemplate a general operating strategy of how the foreign subsidiary will organize its factors of production and generate profits. Driffield and Love provide a taxonomy where the basic economic motivations for FDI may be classified according to the comparative availability of two critical resources within the host market structure: labour and technological intensity or capacity (Driffield & Love, 2007). For example, a foreign

subsidiary which has lower labour cost and lower technological sophistication than in the parent's source or home country is more likely to have an *operating strategy* based on some type of *efficiency seeking*. There are also business risks which attend each type of operating strategy which in turn may be mitigated by adjustment of the foreign subsidiaries capital structure (Desai et al., 2008).

(c) Price discrimination or pricing policy is the primary feature of the firm's profit maximization strategy and largely influenced by its competitive market structure. For example, firms producing nearly identical commodities have virtually no ability to raise prices without the loss of volume. In the case of most foreign subsidiaries, most firms possess some pricing power at the margin. The notable exceptions are those core subsidiaries that are horizontal or intermediate producers that may produce no risk premium because of inter-company transfer pricing.

(d) The firm's investment policy determines how it will allocate resources for future expansion and growth with investments in R&D or capital equipment. It must also anticipate the costly adjustment of capital stock and the value of waiting for further information before committing to irreversible investments.

On the one hand, the market selection and operating strategy components of the business model or profit strategy are more irreversible features of the profit maximization strategy because they entail: (a) the choice of a relatively fixed foreign locations, and (b) significant investment in physical assets. They are also coupled at a relatively fixed point in the early FDI decision process. In contrast, pricing and investment policy are more fluid and reversible decisions that can be adjusted with

very near-term effects to the firm's dynamic market structure and performance feedback mechanisms. We shall focus on the foreign subsidiaries' operating strategy as a critical determinant of its short-run profit maximization strategy.

Operating Strategy of Foreign Subsidiaries

In the broadest terms, business strategy is the concept of how a firm dynamically adapts to changing markets, positions itself and its products in the market place, and aligns its resources with its strategic objectives (Teece, 2007). By comparison, the foreign subsidiary's operating strategy generally outlines how the firm organizes its factors of production; its scale, capital assets, and its external connections with other host factor markets. The firm's basic operating strategy also defines how it allocates internal resources in response to expected changes in the demand for its products and services. The foreign subsidiaries' operating strategy is by definition, closely linked with its profit maximization strategy since an efficient alignment of internal resources and external demand should result in profit-maximizing growth (Ke & Shuntian, 2007). However, not all foreign subsidiaries will have a short-run, profit-maximizing strategy. In some cases, they may serve in a subordinate or intermediate production role within the parents overall long-run profit-maximizing strategy (Tirole, 1988).

Within the earlier industrial organization theories, Porter provides a framework for clustering firms within industries according to their strategies which helps to define their common, competitive factors (Porter, 1981). He extends this concept to show that most firms pursue one of three basic strategies: cost control,

product differentiation, or a strategy focused on a firm-specific advantage (Porter, 1991). In a contemporary context, Driffield and Love provided a new taxonomy for grouping foreign subsidiaries by their basic economic motivations for market entry. This FDI taxonomy is based on the comparative availability of labour and technological infrastructure between the host (subsidiary) and source (parent) countries (Driffield & Love, 2007). The taxonomies of Porter and Driffield et al can be over-laid in the context of developing a basic scheme of operating strategies for the foreign subsidiary. For example: (a) the location-advantaged and technology-seeking FDI types are different forms of strategic focus which are segmented regionally, (b) the efficiency-seeking motive strongly parallels the cost control strategy, and (c) the ownership-advantaged firms are directly comparable with product differentiation strategies.

In providing further context, these operating strategies can be also grouped by their relative economic value; which are high value-added and low value-added strategies. High value-added strategies are based on some form of comparative or competitive advantage which are parallel with the location advantage and ownership-advantaged types of FDI respectively (Kogut, 1985). We discuss the observable factors within the Driffield and Love taxonomy of FDI types where the foreign subsidiaries operating strategy supports growth in response to increased demand.

Type 1 or location-advantaged firms seek to exploit markets where the host labour costs are comparably lower and host technological resources are greater as compared to the source country. In this category, firms seek to exploit host conditions where they have some form of comparative location advantage. These

firms rely on lower labour costs combined with use of technological scale effects or spillovers. The Type 1 firms have an internal competency that allows them to exploit scale effects or productivity initiatives within a technological framework. Their basic operating strategy may be classified as value-added production through combined scale effects in both cost and technology (Kogut, 1985). To support growth, these firms would tend to increase investment into new productive assets to support higher product demand. The combined effects of capital and labour productivity will result in a higher marginal productivity of capital and we should expect these firms to maximize growth with a profit constraint.

Type 2 or technology-seeking firms are found where the host labour costs are relatively higher as are the availability of technological resources. These firms are more likely to be engaged in some aspects of technology seeking to exploit spillovers from host country competitors and other adjacent industries. These firms require redundancy of capital investment and training to facilitate the absorption of knowledge and skill spillovers from the host economy that make them sensitive to higher capital investment risk. We could say their basic operating strategy is resource leveraging or conversion; that is; they seek to obtain competitive technologies through spillovers within the host economy. These spillovers are realized primarily through transferable skills which may be hired from the skilled labour pool and also through the access to advanced materials or intermediate products such as standardized electronic subcomponents (Love, 2003). To support growth in the short-run, these firms will necessarily invest in higher surplus or redundant fixed capital assets necessary to capture technological spillovers that may be transitory in nature. The assumption in this asset substitution model is that the

costs of surplus fixed assets are less than the cost of duplicating the competitor's intellectual property. We should expect these firms to maximize profits even though they may have to bare short-term investment losses during initial stages of operation.

Type 3 or efficiency-seeking firms are found where host labour costs are comparatively lower as are the availability of technological resources. These firms would more likely be pursuing some form of efficiency seeking. They rely on scale effects and organization of the product cycle to reduce cost margins on commodities and other low-valued products in more mature stages of production with lower profit margins. They are more likely to be sensitive to host labour costs that drive internal productivity or economies of scale. However, we should note that lower labour rates are not necessarily the same as total labour costs, as overall labour productivity may actually be lower in countries with lower overall wages (Narayan & Smyth, 2009). The Type 3 firms' basic operating strategy is total cost reduction or control. To support growth, these firms will organize the production cycle to minimize costs through economies of scale or productivity. We should expect these firms to be growth maximizers.

Type 4 or ownership advantage firms, are found where host labour costs are comparatively higher and technological resources are comparatively lower than the source country and these firms may more likely succeed with some form of competitive ownership advantage. Their ability to control market pricing through firm-specific advantage reflects an operating strategy of differentiation based on some proprietary technology or exclusive intellectual property. However, highly differentiated products by definition also have fewer substitutes and therefore

sustaining market demand is critical to growth. In the long-run these firms must maintain their product position in the market through increased investments in R&D, marketing, advertising or customer support services and other factor related to high value-added products and services.

Type 4 investments in sustaining market share are generally treated as operating expenses and not as tangible assets. For example, over 90% of R&D expenditures are expensed in the same year as they are incurred in most OCED countries (Hall & Reenen, 2000). Therefore, we would not necessarily see higher fixed asset investment but should expect higher rates of reinvestment of profits, or in the case of the foreign subsidiary, higher reinvested earnings. We should expect these firms to be profit maximizers. As summary of these operating strategies and FDI motives are shown in Table 1-6.

FDI Type / Motive	Operating Strategy	Growth Factors
Type 1 Location Advantaged FDI	Valued Added Production	Productive Assets
Type 2 Technology Seeking	Resource Conversion	Redundant Assets
Type 3 Efficiency Seeking	Cost Control	Asset / Labour Utilization
Type 4 Ownership Advantaged	Pricing Power / Proprietary Products	Reinvestment

Table 1-6 Drivers of Growth within the FDI Types

Research Questions

Foreign subsidiaries modify their profit maximization strategies for changes in their economic environment and market structures:

Type 1 firms rely on scale effects in cost and technology requiring continuous capital improvements in physical productive capacity to sustain growth:

H1-6: Growth in location-advantaged FDI is supported by investment in productive assets.

Type 2 firms will invest in redundant capacity to support absorption of technology:

H2-6: Growth in technology-seeking FDI necessitates investment in surplus capacity.

Type 3 firms will minimize cost of production to support growth rates:

H3-6: Growth in efficiency-seeking FDI is supported by improvements in productivity.

Type 4 firms will exploit product differentiation to support growth and maintain market demand through investments in intangibles such as, marketing, customer service and R&D:

H4-6: Growth in ownership-advantaged FDI is supported by higher rates of reinvestment.

Modeling Growth and Shareholder Value

Model 5.0 Growth in Sales/Revenues

We specify and multivariate, autoregressive dynamic panel model allowing for time varying and individual fixed effects for the annual change in revenues in Model 5.0:

$$g_{it} = \alpha + \beta g_{it,t-1} + \beta\phi_{it} + \beta\varphi_t + \beta\gamma_{it} + (\nu_t) + (D_{i,types-1}) + (D_{type}) + \eta_i + \varepsilon_{it} \qquad (5.0)$$

g = annual growth rate in sales
$\phi \equiv$ matrix of internal growth drivers
$\varphi \equiv$ matrix of external growth drivers
$\gamma \equiv$ matrix of firm-level controls
ν_t = time effect dummies 2000 - 2007
$D_{i,types-1}$ = FDI type effect dummies (5.1)
D_{types} = FDI type dummies (5.2, 5.3, 5.4, 5.5)
$\eta \equiv$ fixed individual effect

Model 5.0 Firm-Level Growth in Sales

Model 5.0 is a dynamic, aggregate model for all FDI types and those unclassified firms as well. The autoregressive model allows the cumulative effects of continuous production on productivity and internal efficiency are captured though the introduction of the lagged dependent variable (Islam, 1995). In addition, Model 5.0 contains 8 annual time dummies to control for changes over time such as the global GDP contraction across most OECD countries in 2000 – 2001. Thus, Model 5.0

identifies the drivers of growth that are common to all types of FDI regardless of time-varying effects. Model 5.1 controls for effects of the different FDI types by regressing growth on the FDI type dummies as independent explanatory regressors. To control for collinearity, we drop one of the four FDI type dummies in the model rather than regressing all four FDI types through the origin. We also constrain the sample to only those firms that have a known FDI type classification in the sample. This model compares the differences of the FDI types on growth. Models 5.2 to 5.5 regresses growth on the four FDI types separately, which explains which drivers are mostly likely to affect each of FDI type.

Model 6.0 Vector Autoregressions on Key Growth Drivers

To estimate the impact of a shock of the key growth factors on revenue growth, we specify an ordered, four-variable vector autoregressive model which allows for individual fixed effects and includes 4 of the significant growth drivers from the estimation of Model 5.0 including: capital investment, inflation, GDP and productivity in a reduced form as follows[15]:

$$z_{it} = \Gamma_0 + \Gamma_1 z_{it-2} + \eta_i + d_{c,t} + \varepsilon_t \qquad (6.0)$$

z = ordered, four-variable vector
Γ = matrix of coefficients
η = individual effect
d = linear projections on z
ε = white noise error

Model 6.0 Vector Autoregression of Growth Variables

[15] A more detailed explanation of the VAR process for panel data is provided in the Appendix.

Model 7.0 Linking Growth and Shareholder Value

We define shareholder value as the excess return generated by the foreign subsidiary. We specify purely descriptive three-factor, autoregressive, dynamic panel model of shareholder value (i.e., the FDI risk premium) allowing for individual fixed effects and controlling for profitability or asset efficiency (i.e., a weak proxy for returns to scale, as we do not have suitable data points for a true production function). The strategic intent of the model is to determine whether we can maximize shareholder value without a profit constraint.

$$f_{it} = \alpha + \beta f_{it-1} + \beta g_{it} + \beta \omega_{it} + \beta r_{it} + \eta_i + \varepsilon_{it} \qquad (7.0)$$

f = shareholder value as function of excess ROE or FDI risk premium
g ≡ annual growth rate in sales
$\omega \equiv$ volatility in annual rate of sales growth
$r \equiv$ asset efficiency (ROA)
$\eta \equiv$ fixed individual effect

Model 7.0 Foreign Risk Premium and Growth

Defined Variables

Firms can create new, external demand through marketing campaigns, increased selling activities such as advertising, investment in new products, R&D and so forth. However, most of these activities are largely opaque to the external shareholder, particularly with respect to the host market demand generating activities of foreign subsidiaries. From the shareholder's perspective, the primary variables of interest in assessing the relative value generated by the parent's investment in foreign market risk are the observable factors (i.e., those that are externally verifiable) which

support growth. We generally constrain our variables of interest to those most likely to be accessible to the shareholder (e.g., as available through annual reports, etc.).

Financial theory argues that managers should return any excess capital (i.e., any surplus liquid capital funds) to the shareholders if they cannot provide the minimum required rate of return on the shareholder's equity (Brigham & Erhardt, 2002). In other words, if a firm is not able to meet the market rate required by the investors that is comparable to return by the firms competitors, it should return its excess cash to the investors so they can invest in other alternatives. To measure shareholder value in the context of a foreign subsidiary, we must first recognize that with very few exceptions, most foreign subsidiaries do not have unique issues of public shares and therefore it is difficult to determine or estimate an accurate and distinct market-based value for each subsidiary. This leaves the use of a profit-based return as a primary measure of shareholder value such as the return on equity (ROE) as a sensible proxy. We should also be concerned whether the foreign subsidiary's return actually exceeds that of the parent. For example, a foreign subsidiary with a return on equity of 15% and the parent's return on equity of 10% in the same period would be providing a 5% premium on investment of the shareholder's equity in foreign risk.

We define this excess return *as the 'FDI risk premium' that is the primary measure of shareholder value for foreign investment* since it represents the premium paid for investing the shareholder's equity in foreign risk. We also specify the tangible asset ratio, which is the ratio of fixed assets to total assets as the measure of the firm's capital investment which also serves as a proxy for the ability of the firm

to adapt to changing market conditions. Firms with large fixed capital investments in machinery or production-based technologies may be slower to respond to rapid changes in market dynamics.

We define the firm's capital intensity as the total assets divided by annual revenues, which is the amount of capital required to produce a dollar of revenues which also can reflect the future risk to income stability (Barton & Gordon, 1988). The reciprocal of capital intensity (i.e., the annual sales divided by total assets) is an approximate measure of the firm's marginal productivity of capital (MPK) (Gilchrist & Himmelberg, 1998). We also define several proxy measures for firm-level functions and activities that are not directly observable in the data set. For this study, we define a proxy for managerial effectiveness by the use of the firm's Altman's Z credit score (Altman & Sabato, 2007). The raw data set does not decompose variable costs factors into discrete inputs such as labour and material, so we provide a proxy for the measurement of productivity that is given by the year-over-year change in the total cost of goods sold and total change in annual capital inputs adjusted for inflation. This composite measure captures the approximate, overall effects of productivity and economies of scale which affect the total cost basis of the firm's output. We specify the firm's log of total assets for firm size since in this sample, the unchanged (i.e., the level values) will impose linearity on the model. The annual return on sales is specified for a control for profitability.

Data Set

For this study we have prepared an unbalanced panel data of 7,219 foreign subsidiaries from 38 countries; 22 from the OECD, and 16 from the developing world. Of the 7,219 firms in the sample, 46% or 3,371 of the firms are coded for the type of FDI since they have complete country-level accounts that permit classification. Our initial sample required the availability of basic financial and demographical data for the period of 2000 to 2007. We excluded all non-industrial firms such as banking or government services. The sample was then subjected to a screening process for the minimum availability of 50% of the key data points for the balance sheet and income statement, and minimum annual revenues of $5M. This also eliminated firms that either entered or exited the sample during the sample period and so reduces survivor bias. This sample pool was then winsorized to control extreme outliers for firms with year over year changes of more than +/- 1000% in the key financial ratios such as debt-to-assets, and return on assets. For this study, we require multinational parents to have at least 1 foreign subsidiary listed in the ORBIS® database, which has foreign operations outside the source country, and has no other parent company ownership. Foreign subsidiaries must have at least 1 parent firm listed in the database, which owns not less than 50% of the subsidiary's outstanding shares. Additional data from other sources include the host country economic factors taken from the World Bank.

Estimation Method

Model 5.0 Dynamic Estimation of Growth Rates

In choosing an estimation method, we expect the presence of endogeneity and autocorrelation in these financial panel data sets that would violate the assumptions of fixed effects estimation. In this instance, we have few suitably strong external instruments that are consistent across industry or FDI types that could be used in an instrumental variable method. In addition, the likelihood of dynamic panel bias will require more complex instrumentation to be managed. We employ the one-step 'system' generalized methods of moments (GMM) estimator developed by Arellano, Bond, Bover and Blundell (Arellano & Bond, 1991; Arellano & Bover, 1995; Blundell & Bond, 1998). This method is suitable for unbalanced panels with endogenous explanatory variables and heteroskedasticity in the error terms.[16] In addition, since the sample contains a small market shock following the global financial recession in 2001-2002, we provide time dummies in Model 5.1 to control for changes over time for the aggregated model.

Model 6.0 VAR of Drivers of Growth

While the estimation of the parameters for our variables of interest tells us which factors are relatively important to growth, they do not tell us the impact or duration of a shock to those variables has over time. In the formulation of a profit maximizing strategy where we must trade off growth against possibly lower returns, we need to know the duration and amplitude of our prospective strategic alternatives.

[16] The 'system' estimator uses both differencing and lagging in levels to provide instrument orthogonality and preserve the constant for econometric projections. The one-step estimation method has been reported to have some bias in coefficient if the number of instrument is too high. In this case, our instruments do not exceed 5% of the sample firm count or total observation groups. We also apply a robust error correction to improve the inferential reliability, testing for second-order auto-correlation, and we also report the Hansen test for exogeneity of the instrument matrices. All models are estimated in constant, pre-tax US dollars.

For example, if we increase capital investment by 1%, when should we expect to see an improvement in the revenue growth rate and how long will it last? In this context, our panel estimators have little predictive power in forecasting future responses to our pricing or investment policy initiatives.

Vector autoregression (VAR) is an important tool in macroeconomic modeling but it generally requires a very large set of observations to provide efficient estimation. Moreover, it is relatively new in financial economics and only a handful of financial, firm-level panel data studies have employed this technique (Gilchrist & Himmelberg, 1998). VAR modeling is useful in estimating the effects of shocks on the response variable over time, and useful in examining the relationship between different explanatory variables. Holtz-Eakin, Newey, and Rosen developed an estimation method which allows panel data with fewer time periods and larger individual observations to be used in vector autoregressive estimations (Holtz-Eakin et al., 1988). This method uses pooled-cross sections that allow different lags in the coefficients to vary over time. It also allows for individual heterogeneity and does not require the absence of unit roots. This technique has been adapted for empirical investigations with the use of contemporary computer-based GMM estimation tools by Love and Ziccino for firm-level dynamic panel data sets (Love & Zicchino, 2006).

For Model 6.0, we specify an ordered, four-vector growth model with four explanatory variables from Model 5.0: capital investment; productivity; host GDP (as opposed to the host GDP growth rate in Model 5.0); and host inflation.[17] This

[17] We specify a 2 period lag order and the 5% impulse response bands shown in Figure 1-3 are estimated by Monte Carlo simulation of 200 recurrences. A further discussion of this technique is provided in the Appendix.

model is for all firms in the sample and not aggregated by firm type since we expect these factors of growth to be significant *for all* FDI types.

Model 7.0 Dynamic Estimation of Shareholder Value

Our specification for Model 7.0 is a simplified version of Model 5.0, as we want to have the broadest possible conditions to recover the shareholders return in a highly diverse sample. We specify a purely descriptive three-factor model for shareholder value. Our simple strategy for modeling shareholder value is to show *that growth without a profit constraint results in lower excess returns* to the shareholder. The dependent variable is the FDI risk premium, and our explanatory variables are the annual rate of growth in revenues and the 3-year moving average of the standard deviation in the rate of revenue growth as a measure of volatility. The firm's annual return on assets as measure of assets efficiency is used to control for profitability and more indirectly other dimensions of productivity such as returns to scale.

Results

Descriptive Statistics in Chapter Six

In Table 2-6, the total firm count in the aggregated sample of all FDI types is 7,219 firms, of which 3,371 or 46.6% are classified by their FDI types.

		FDI Type	FDI 01	FDI 02	FDI 03	FDI 04
		All	Location Advantaged	Technology Seeking	Efficiency Seeking	Ownership Advantaged
Firm Statistics	Firm Count	7,219	1,354	274	1,193	550
	Average Firm Size ($M)	$188M	$173M	$285M	$167M	$205M
	Leverage	.68	.69	.68	.69	.68
	Capital Intensity (MPK)	1.68 59.5%	1.49 67.1%	1.88 53.1%	1.60 62.5%	1.68 59.4%
	Tangible Assets Ratio	.27	.26	.31	.25	.30
	Credit Score	3.89	4.13	3.81	3.84	3.96
	Change in Profitability	148%	174%	482%	48%	436%
	Profitability	8.6%	8.4%	9.8%	8.5%	11.1%
	Productivity (Cost)	5.0%	3.7%	13.4%	3.4%	4.1%
	ROE	26.3%	26.6%	26.6%	27.7%	37.3%
	Parent ROE	16.5%	9.8%	17.0%	23.6%	17.0%
	FDI Risk Premium	13.3%	18.6%	9.3%	4.9%	19.6%
Host Economic Factors	GDP	1,320 B	1,620 B	1,150 B	1,060 B	632 B
	GDP Growth Rate	2.4%	2.5%	2.5%	2.4%	2.3%
	Inflation	2.5%	2.2%	2.3%	2.8%	2.6%
Growth Rates	All Firms	18.2%	15.2%	21.9%	20.0%	23.7%
	Very Large Firms	38.2%	17.7%	20.3%	29.8%	80.8%
	Large Firms	21.4%	18.2%	24.2%	24.6%	30.5%
	Small & Medium Firms	15.1%	13.3%	20.3%	16.4%	17.2%
	Core	20.4%	15.4%	28.3%	20.0%	28.0%
	Non-Core	17.7%	15.1%	18.6%	20.1%	20.6%

Table 2-6 Descriptive Statistics for Chapter Six

The most striking feature of the data set is that larger foreign subsidiaries have significantly higher rates of growth: 15.1% for small and medium; 21.4% for large; and 38.2% for very large subsidiaries, which also suggests a relationship between market share and growth. Generally, core subsidiaries have slightly higher growth rates of 20.4% compared to 17.7% for non-core subsidiaries. The average GDP growth rate of 2.4% and the modest inflation rates of 2.5% during the sample period appear to support growth in all the FDI types.

The count for the Type 1 location-advantaged is 1,354 firms or 18.7% of the total sample. They are located in the largest host economies averaging $1,620B. The results show a good growth in profitability of 174% and a very good FDI risk premium of 18.6%. This type also has the highest credit score of 4.13; an indication of how well these subsidiaries manage their internal resources with their external (i.e., locationally dependent) market structure.

The count for the Type 2 technology-seeking firms is 274 or 3.7% of the total sample. While the average annual cost productivity of all subsidiaries was 5.0%, the Type 2 technology-seeking firms have a higher productivity rate of 13.4%, a phenomenon of this type. In part, it is related to the simultaneous high growth rate in sales and profitability and as noted above, where host economies with high technological spillovers have strong impact on firm-level productivity. The average firm size for the Type 2 FDI is the largest, averaging $285M in annual revenues. They also have the highest capital intensity of 1.88, and the highest tangible asset ratio of 0.31 of all types. These factors together suggest a linkage between spillover effects, economies of scale and productivity that are consistent with the economic

motives of this FDI type. Type 2 also show the strongest growth in profitability of 482% (i.e., they are becoming more profitable over the sample period, but not necessarily more efficient).

The count for the Type 3 efficiency-seeking firms is 1,193 or 16.5% of the total sample. These subsidiaries have the smallest overall firm size averaging $167M and poorest growth in profitability of only 48%, which is to say they are becoming less profitable over time and provide the lowest FDI risk premium of only 4.9%.[18]

The count for the Type 4 ownership-advantaged firms is 550 or 7.6% of the total sample. These subsidiaries have the strongest growth rate of 23.7%, a very good growth in profitability of 436% and the highest FDI risk premium of 19.6%. They also tend to be located in smaller host economies averaging only $632B.

Estimation Results for Model 5.0

In Model 5.0 (shown in Table 3-6), the annual growth in revenues for the aggregated sample of all 7,219 firms with all known and unknown FDI types show the response to firm size; productivity; inflation; and managerial effectiveness (i.e., via the credit score proxy) while controlling for changes over time in the 8 year sample. The tests for autocorrelation and the exogeneity of the instrument matrixes are satisfactory and significant for all model variants.

[18] A 100% growth in profitability is a constant (unchanging) rate of profitability, 48% would indicate profitability is decreasing over the sample period.

		FDI Type		FDI 01	FDI 02	FDI 03	FDI 04
Model		5.0	5.1	5.2	5.3	5.4	5.5
FDI Category		All Firms	All coded Types	Location Advantaged	Technology Seeking	Efficiency Seeking	Ownership Advantaged
Firm Count In Sample		7,219	3,371	1,354	274	1,193	550
Revenues Growth Rate	Lagged dependent Variable	0.014 0.09	0.147 1.64	-0.082 -0.44	-0.219 -1.60	-0.115 -0.92	-0.161 -1.35
Internal Drivers	Capital Intensity	**-0.002** **-2.54**	**0.012** **2.33**	-0.002 -1.71	**-0.015** **-2.31**	0.003 1.44	-0.014 -1.73
	Capital Investment	0.215 1.09	**0.433** **2.15**	**0.760** **2.57**	**0.965** **2.04**	0.545 1.65	-0.125 -0.67
	Earnings Reinvestment	0.074 1.38	0.060 0.84	0.049 0.84	**0.427** **4.39**	-1.123 -1.48	**0.530** **2.50**
	Financial Leverage	0.035 1.63	0.049 0.62	**0.097** **2.21**	0.258 1.69	**0.474** **4.12**	0.024 0.23
	Credit Score	**0.018** **2.12**	**0.029** **2.50**	**0.039** **2.08**	0.021 1.66	**0.144** **4.36**	**0.012** **3.21**
	Productivity	**0.063** **4.20**	**0.039** **3.96**	**0.038** **3.15**	0.048 1.77	**0.192** **2.32**	0.027 1.24
External Drivers	Growth in Host GDP	2.597 1.82	**4.23** **4.64**	**3.288** **2.58**	-3.110 -1.13	**4.934** **2.02**	**10.106** **3.60**
	Wages % Host GDP	0.014 1.32	**0.066** **2.95**	**0.065** **3.37**	-0.088 -1.89	**0.106** **2.24**	**-0.353** **-2.73**
	Inflation	**1.735** **2.27**	**2.694** **2.30**	**2.475** **2.87**	0.936 0.70	**3.783** **2.40**	1.408 0.35
Controls	Firm Size	**0.032** **2.79**	0.010 0.79	0.008 0.57	-0.040 -1.32	0.037 1.93	0.035 1.05
	Profitability	-0.012 -1.55	-0.021 -1.57	-0.003 -0.64	0.061 1.20	-0.004 -0.47	-0.041 -0.80
FDI Effect Dummy	FDI 01		0.009 0.37				
	FDI 02		-0.076 -2.02				
	FDI 04		-0.017 -0.36				
Intercept	Constant		-0.632 -3.70	-0.677 -3.81	0.835 2.00	-1.262 -2.91	1.547 2.23
Time Dummies		Y	N	N	N	N	N
Auto correlation	AR(2) p-value	0.698	0.316	0.485	0.552	0.519	0.621
Instrument Exogeneity	Hansen p-value	0.826	0.582	0.558	0.491	0.767	0.125
Coefficients above and z-values below							

Table 3-6 Estimation of Models 5.0 to 5.5

Estimation Results for Model 5.1

Model 5.1 shown in Table 3-6 shows the different effects of the FDI types on firm growth through regressions on the FDI dummies as explanatory variables. In this instance, we have regressed on the FDI Types 1, 2 and 4 dummies; therefore, the constant in this model is the coefficient of the dropped FDI dummy for Type 3. The results show that controlling for FDI motives or types; growth in host GDP, inflation, capital investment, and productivity have a significant influence on growth. This is the basis for selection of our variables for Model 6.0.

Estimation Results for Model 5.2 to 5.5

Models 5.2 to 5.5 are shown in Table 3-6 are the four separate estimation results, one for each FDI type. All of these models have significant responses in both internal and external drivers of growth with the exception of the Type 2 technology-seeking firms. The Type 2 firms only shows growth in response to internal growth drivers that may indicate a partial decoupling of this firms growth with its external market structure. A likely result of this type growth being more dependent on spillover effects rather than by market competition. Models 5.2 to 5.5 have significant intercepts and satisfactory tests for autocorrelation and good exogeneity in the instrument matrixes.

Estimation Results for Model 5.2

In Model 5.2, the Type 1 location-advantaged firms show a positive response of growth to capital investment with an elasticity of 1.01%; to productivity with an

elasticity of 0.21%; and to host GDP growth of 0.49%. The elasticity of wages (as a percentage of host GDP) of 1.88% suggests growth is stronger in countries with relatively higher wages and may be likely the results of higher labour productivity. The elasticity of growth in response to inflation of 0.36% could suggest that the firm's prices may be more inelastic. The lower price elasticity in Type 1 would be consistent with firms with higher growth in profitability that reflects the ability to maintain prices in response to changes in demand. These results support our argument that the Type 1 firms support growth through increased capital investments linked with productive utilization of assets.

Estimation Results for Model 5.3

In Model 5.3, the Type 2 technology-seeking firms showed only limited responses to internal growth drivers. This may be partly due to the smaller sample size. However, the interpretation of the growth factors in this model is somewhat challenging as the economic motives inherent in this operating strategy are more complex. The response of growth to a 1% increase in fixed capital investment of 1.71% is strong. These firms have the highest capital intensity of all types of 1.88 (i.e., 12% higher than all other FDI types) suggesting that a relatively higher asset base are linked with the ability to capture technological spillovers from the host economy. The absence of any response to other internal and external drivers is also informative. The descriptive statistics show Type 2 firms have higher productivity and relatively larger firm sizes suggesting economies of scale are present; however, scale effects are not likely to be the sole causal drivers of growth but the result of obtaining technology-driven cost improvements from spillovers rather than from

internal funded sources. We find limited support for our argument that growth in Type 2 firm is supported by investment in surplus assets.

Estimation Results for Model 5.4

In Model 5.4, the Type 3 efficiency-seeking firms show growth in response to productivity, host GDP growth, and inflation. The response of growth to a 1% increase in productivity is 1.03% and the absence of significant growth in response to fixed asset investment suggests stronger dependencies on labour cost related effects. In contrast to Type 1, the elasticity of growth in response to inflation of 0.94% may indicate greater price elasticity (i.e., the lack of pricing power) and is more consistent with commodities that are associated with Type 3 production. The presence of some economies of scale are suggested in the weakly significant correlation between firm size and revenue growth (with confidence $p = 0.053$) with a small elasticity of 0.19% The elasticity of growth in response to host GDP growth of 1.01% also suggests a closer link between market structure and performance. This also shows that these firms are not all intermediate producers but have significant revenue generating capacity within the host economies. Like Type 1, the elasticity of growth in response to host wages as percentage of GDP is 2.09% suggest stronger growth in economies with relatively higher wages and suggesting some linkage with work force productivity. These results support our argument that Type 3 firms support growth with improvement through scale effects and higher productivity.

Estimation Results for Model 5.5

In Model 5.5, the Type 4 ownership-advantaged firms show a higher growth in response to growth in host GDP with an elasticity of 1.45%, more than any other type and an indicator of the link between growth and market structure. The elasticity of growth on the rate of internal investment of 0.70% is a significant response for this type given the absence of a response in fixed capital investment and high growth in rate of profitability (i.e., firms are becoming more profitable over the sample period). This suggests earnings are being reinvested in some unobservable, intangible activities such as product development, marketing plans, or R&D. Likewise, there are no responses of growth to productivity or inflation suggesting possibly that growth is linked more strongly with pricing power. This provides some conditional support of our argument that the Type 4 firms achieve growth by reinvesting in intangible activities in the development of market share and demand.

Differences in Growth and Profit Maximization

Finally, we can approximate the difference between growth and profit maximization by examining the elasticities in Table 4-6. Holding profitability constant to allow for changes in price elasticity of demand, a profit maximization strategy may be inferred by a positive elasticity of < 1% on the rate of reinvested earnings, which in this case is the rate of profit growth. In other words, for a 1% increase in rate of profit growth, there is less than 1% increase in the rate of sales

growth.[19] We can infer from the results in Table 4-6 that Type 2 and Type 4 are stronger profit maximizers and they have the only positive elasticities for reinvested earnings and the highest change in profits. Type 2 is profit maximizing but they may be sacrificing some returns to pay for the cost of capturing spillover effects from the host economy as they have the lowest marginal productivity of capital. The Type 4 firms are more strongly profit maximizing as we might expect. Type 3 does not have a significant reinvestment value but the negative sign of the coefficient indicates that is would be growth or revenue maximization as we might also expect. The reinvested earnings are not significant in Type 1 location-advantaged firms, but the coefficient sign and z values indicate it may be more growth maximizing with a profit constraint if we consider the positive change in their profitability.

[19] As the rate of profitability is increasing faster than the rate of sales growth, this would indicate profit maximization, as price increases were likely to be a factor in maintaining revenues. It could also be a result of a different composition of products and services with different profit margins.

1% Increase		Growth Response				
FDI Type		Time Effect Controlled	FDI 01	FDI 02	FDI 03	FDI 04
Category		All	Location Advantaged	Technology Seeking	Efficiency Seeking	Ownership Advantaged
Change in Profitability Rate		148%	174%	482%	48%	436%
Growth Rates		18.2%	15.2%	21.9%	20.0%	23.7%
Profit / Growth Maximization			Balanced(*)	Profit	Growth	Profit
Model		5.1	5.2	5.3	5.4	5.5
Firm-level Elasticity	Capital Intensity	-0.02%		-0.17%		
	Capital Investment		1.01%	1.71%		
	Reinvestment Rate			0.11%		0.70%
	Leverage		0.38%		0.47%	
	Productivity (Cost)	0.35%	0.21%		1.03%	
	Firm Size	0.18%				
Country-Level Elasticity	GDP Growth		0.49%		1.01%	1.45%
	Inflation	0.29%	0.36%		0.94%	
	Wages % GDP		1.88%		2.09%	-9.99%

(*) Growth Maximization with a Profit Constraint

Table 4-6 Significant Elasticities of Models 5.1 to 5.5

Estimation Results for Model 6.0

The results of the estimates for responses of growth to shocks for all FDI types are shown in the impulse-response diagrams in Figure 1-6. Productivity and host GDP have significant t-values with their effects on sales or revenue growth (See

Table A-1 in Appendix). A 1% productivity shock has a modest, short-term 1.5% effect on revenue growth of 1 to 3 years. A 1% host GDP shock has a moderate, negative effect of -4% on the sales growth rate over 1 to 2 years. The negative response of the growth rate of revenues is likely to be the result of higher price elasticity of demand. Recall, that the response variable is the revenue *growth rate*, which means that the rate of growth may decrease or slow, but not necessarily that that rate of growth will be negative. As the typical demand curve shifts in an expanding economy, price levels increase, which lowers total revenues until the supply curve shifts and restores price levels to equilibrium.

The t-values for capital investment and inflation are lower than expected, but largely due to the transformation of the data sets, that purges fixed effects. A 1% capital investment shock would result in a smooth response in revenues growth of 1% over a 1 to 3 year period. An inflation shock of 1% has a small, short-term effect about 2% over 1 to 2 years on the revenue growth rate.

Productivity and host GDP shocks are the most statistically significant factors in revenue growth as we would expect across a widely diverse sample of firms but we should also expect capital investments and inflation are also very likely to be significant for different groups within the sample. A review of the panel VAR estimation techniques and a table of coefficients are provided in the Appendix.

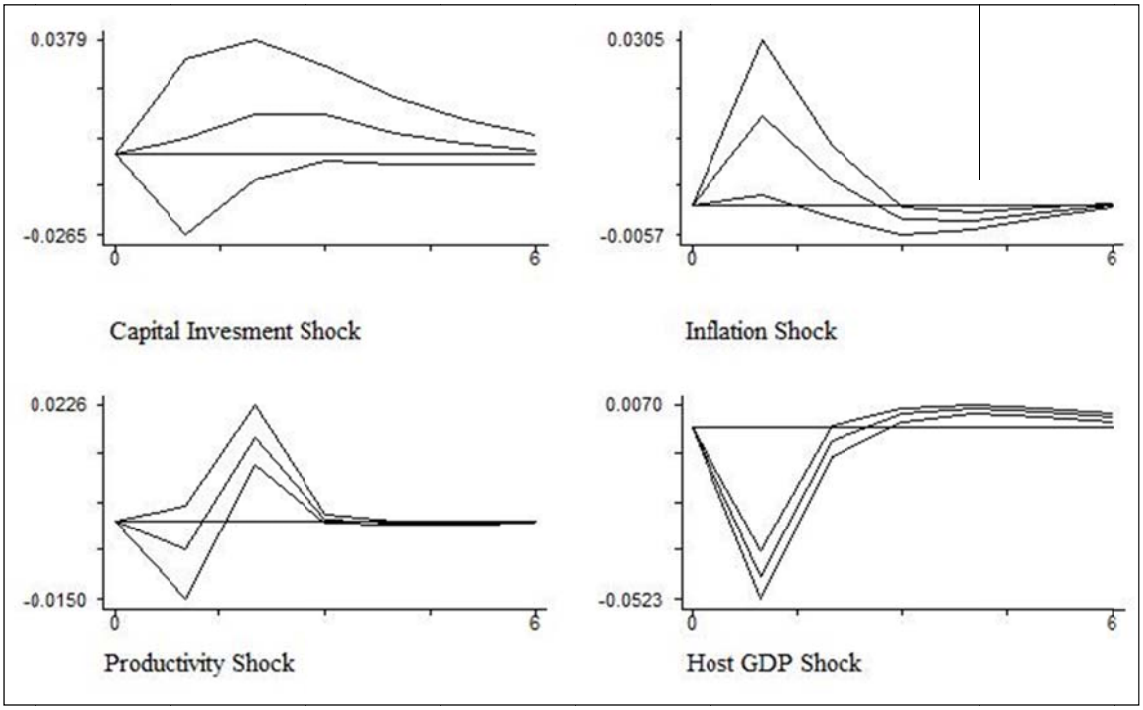

Figure 1-6 Impulse –Response on Growth Rates for all FDI Types

Estimation Results for Model 7.0

In Table 5-6, the estimation results for Model 7.0 shows a significant relationship between stable revenue growth, asset utilization and our measure of shareholder value as measured by the foreign subsidiary's excess return on equity or FDI risk premium for all FDI firm types. The model has a significant intercept, and satisfactory tests for autocorrelation and exogeneity of the instrument matrix. On average, a 1% increase in revenues growth provides 0.88% increase in excess returns (i.e., the FDI risk premium) and likewise a 1% increase in asset utilization results in 0.71% increase in excess returns. In contrast, an increase of 1.0 standard deviations in the volatility of sale results in -0.87% reduction in excess returns. These results show strong support for our argument that superior shareholder value is generated by

foreign subsidiaries that maximize the stable growth in revenues with good asset utilization.

		Coefficient	z-value	p	elasticity
Response	FDI Risk Premium				
Lagged Value	FDI Risk Premium	0.367	2.28	0.023	0.36%
Growth	Revenues Growth	0.861	2.35	0.019	0.88%
Volatility	Std. Dev. (ln) Growth	-0.138	-2.56	0.010	-0.87%
Control	Profitability (ROA)	1.529	3.24	0.001	0.71%
Intercept	Constant	-0.400	-2.69	0.007	
Autocorrelation	AR(2)			0.109	
Instrument Exogeneity	Hansen Test			0.774	

Table 5-6 Estimation of Model 7.0 Shareholder Value for all FDI Types

Ranking of Shareholder Value

Finally, in Table 6-6, we categorize our samples into two different groups for analysis of their shareholder performance based on the results of Model 7.0 with some arbitrary assignments of relative value. First we classify them by their FDI type, and secondly, by their NACE industrial classification codes. We also force rank the performance of our firms to categorize their relative, overall shareholder value based on a simple 6 point scale. We allocate 1 point for a below average volatility in revenues (i.e., high volatility in growth rates tend towards inefficient allocations of resources and lost productivity from higher learning curves); 2 points for higher than average growth rate in revenues; and 3 points for higher than average FDI risk premium, which is our basic measure of shareholder value. As we might

expect, the FDI types with high value-added operating strategies, Types 1 and 4 have higher shareholder value ratings of 4 and 5 respectively. In contrast, only NACE Classification 01 for agriculture and mining has a point rank of 5. This industry classification combines technological capacity with the capacity to exploit natural resources of host economies.

	Revenues Volatility	Revenues Growth	FDI Risk Premium	Shareholder Value Rank
	Low = 1 points	High = 2 points	High = 3 points	
FDI 01 Location Advantaged	Lower	Lower	Higher	4
FDI 02 Technology Seeking	Lower	Higher	Lower	3
FDI 03 Efficiency Seeking	Lower	Higher	Lower	3
FDI 04 Ownership Advantaged	Higher	Higher	Higher	5
NACE 01 Mining & Agriculture	Higher	Higher	Higher	5
NACE 15 Manufacturing	Higher	Lower	Lower	2
NACE 30 Energy & Construction	Lower	Higher	Lower	3
NACE 40 Retail	Lower	Lower	Lower	1
NACE 60 Transport & Communication	Lower	Lower	Lower	1
NACE 70 Communication Services	Lower	Higher	Lower	3

Table 6-6 Ranking of Shareholder Values

A comparison of the influence of volatility on the rates of growth within the NACE and FDI types is shown in Figure 2-6. A further comparison of the effect of growth rates on the foreign (FDI) risk premium is shown in Figure 3-6.[20] As we note

[20] The axis's of these charts is set to the mean of the sample data set.

in Table 4-5, about a third of the firms in the sample are core subsidiaries, which generate on average a small risk premium of 4.1%. On the other hand, the two-thirds majority of the firms in our sample that are non-core subsidiaries generate an average FDI risk premium of 18.7% (i.e., 18.7% above the ROE of the parent company). It is the non-core foreign subsidiaries which have inherently higher capital and operating risks and which should necessarily demand these higher risk premiums.

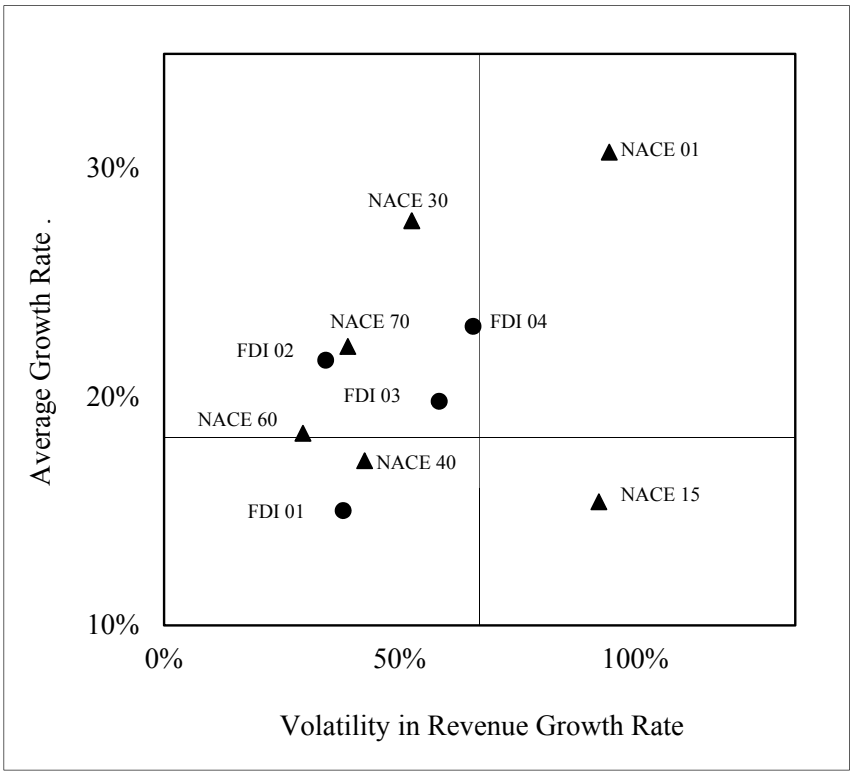

Figure 2-6 Volatility in Growth Rates

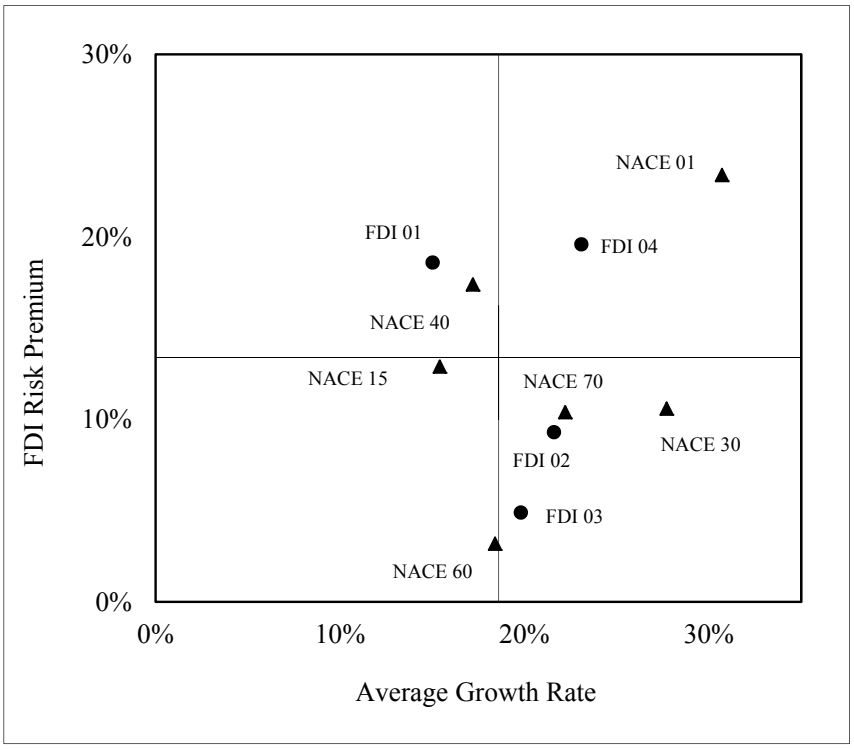

Figure 3-6 Shareholder Value (Risk Premium) and Growth Rates

Chapter Summary

We have provided a framework for evaluating the profit maximization strategies of foreign subsidiaries and their relationship to their basic operating strategy in foreign markets. This link is important in understanding how growth and shareholder expectations drive foreign investment that supports growth in the global economy.

We find that the average foreign subsidiary in this study provides their parent with a foreign equity risk premium of 13.3% and that this premium is supported by maintaining stable growth in revenues with good asset utilization. In our sample, larger firms have significantly higher rates of growth; likewise, core subsidiaries also have slightly higher rates of growth as opposed to non-core subsidiaries. We find general support for our argument that the firm's operating strategy is linked with its form of profit maximization. High value-added subsidiaries depend on higher levels of investment to sustain long-term growth whereas marginal cost producers must maintain improvements in productivity and constant alignment of their product cycles. In contrast, the technology-sourcing foreign subsidiaries face the challenge of lower marginal productivity of capital in the short-run with redundancy in asset investment needed to capture temporary gains from transient technological spillovers.

We also show through the key growth factors common to foreign subsidiaries that modest inflation, stable growth in host GDP, improvements in firm-level productivity all have positive, short-term impact on growth. Likewise, capital investment has a more selective short-term influence on growth that but is also linked more closely with the firm's operating strategy.

We further find that high value-added operating strategies linked with comparative and competitive advantages provide superior shareholder value than the classified as sourcing foreign technology and cost efficiency. In total, about 26% of the firms in this study showed superior, relative shareholder returns of >18% which is significantly higher than the best 10-year average of the S&P 500 of about 16%. Finally, we show that foreign subsidiaries have a profit maximization strategy that also allows them to adapt to changes in the host economic environment and market structures. We found the Type 4 ownership-advantaged firms to be stronger profit maximizing for this period, whereas the Type 3 efficiency-seeking firms are more likely to be growth or sales maximizing. The Type 1 firms that are location-advantaged are likely to be growth maximizers with a profit constraint, whereas Type 2 technology-seeking firms are more likely to be long-run profit maximizers with some short-term impairment of their asset returns and efficiency during the near-term absorption of technological spillovers.

There is a number of challenging areas for further research on the results presented here. In particular, we have focused on the observable, quantitative growth factors that concern the external shareholder in assessing the prospective value of foreign subsidiaries. There are a large number of *qualitative* internal factors from the strategic management viewpoint that are more difficult to assess empirically at the firm-level such as the effects of ownership structure, product marketing, price discrimination and R&D which affect the multinational's ability to sustain long-term growth in foreign markets.

CHAPTER SEVEN THESIS CONCLUSION

We have argued and demonstrated through empirical analysis and testing of our research questions that capital markets function as an integral component of the foreign subsidiary's market structure, that is, the source and costs of capital funding affects the strategic conduct of the firm. Capital markets affect the choice of funding, the timing of investments, the mitigation of foreign risk, and the expansion of FDI as well as the organization of their profit maximization strategy.

From our results, we can see that a more expansive approach to portfolio or arbitrage FDI theory can explain why the cost of capital and rates of return work in conjunction with the benefits of direct ownership when we consider that operating and profit strategies are linked with the firm's market structure. Thus, in contrast to some of the long-standing arguments against the portfolio theory of FDI, we can now argue that: (a) that multinationals finance FDI with foreign capital as a way of improving their risk and return performance (b) that although intra-industry or core FDI does not provide a significant risk premium, it does generally have higher rates of revenue growth, suggesting short-term rates of returns may be deferred in favor of successful, long-term competition in foreign markets, and (c) that multinationals may invest in a portfolio of different FDI types, which in combination with the benefits of direct ownership, can provide superior shareholder value.

In Chapter Four, the link between FDI and capital markets functions in the firm's market structure where expectations on asset prices, growth and interest rates affect the flow of new capital and capital investments made by foreign subsidiaries. In Chapter Five, the link between the FDI and capital markets functions in the firm's

use of leverage and shorter debt maturities that shift financial risk onto the host creditors. In Chapter Six, the link between FDI and capital markets functions by the modification of the firms profit maximizing strategy where high growth and profit maximization are linked to the firms operating strategy to generate a risk premium for investment of the parent firm's equity in foreign market risk.

Summary of Thesis Results

In Chapter Four, we found that contrary to most economic theories of FDI, interest rates (i.e., the effect of the cost of capital on rates of return) coupled with the expectation of future growth as measured by the market values in capital markets have an impact on new capital flows and new capital investments made by foreign subsidiaries. For every 1% increase in the total S&P 500 market return (i.e., a proxy for global assets prices), we have and increase in new capital flows of 0.22%. Likewise, with a 1% increase in the PE ratio of the parent home stock market (i.e., a measure of the future expectation of growth) results in a 4.5% increase in foreign capital investments.

In Chapter Five, we examined how foreign subsidiaries modify their capital structure in response to foreign business risk that is linked with their operating strategy. By increasing the foreign subsidiary's overall amount of leverage and reducing the maturity on their debt, these firms transfer more financial risk to the local host creditors. On average, a 1% increase in a typical risk business factor such as an increase in volatility of wages was correlated with an increase in their leverage by 0.08% in a given year. Although the business risk factors have relatively small

elasticities, it is because the largest component of the annual adjustment of capital structure by comparison is the gap between the target level and the current year level that accounts for the largest portion of the annual change in capital structure. Although these business risk elasticities are small, they are consistent across thousands of firms, in a wide range of industries and countries.

In Chapter Six, we demonstrated the link between the firms operating strategy and its capacity to generate the excess returns demanded by the shareholder for investing their equity in foreign risk. Here we see the unique features of the firm's operating strategy plays in the modification of the firm's profit maximization strategy. We find the FDI risk premium, the basic measure of the shareholder's return, is strongly correlated with stable growth in revenues and good asset utilization (i.e., growth maximization with a profit constraint). We show that holding profitability constant, for a 1% increase in the growth in revenue, the FDI risk premium increases by 0.88% while volatility in growth reduces the risk premium by about the same amount (-0.87%).

We have argued and given supporting empirical evidence that demonstrates the linkage between capital markets and the market structure of foreign subsidiaries is strongly linked with their operating strategy that follows their basic market entry motive as proposed by the FDI taxonomy of Driffield et al. We conclude the thesis with remarks that reflect on some of the significant challenges that the multinationals will face as changes in the structure and organization of global capital markets and global forms of capitalism evolve in the near future.

The most significant and logical consequence of a strong relationship between FDI and capital markets may be seen in the future impact of the equity risk premium will have on future global trade and investment. As Siegel has noted, the long-term equity risk premium (i.e., the rate of return of equities over that of risk-free investments, or the premium paid for investment in equity risk) may contract with the secular rise in the interest rates of risk-free securities resulting from fundamental shifts in global fiscal policy (Siegel, 2005). The rise in the rates of risk-free securities may be the result of more government debt being sold to the public or sovereign buyers to cover ever-increasing levels of social costs particularly in the OECD. This could result in investors moving away from investment in purely domestic firms needing to raise equity capital and moving towards multinationals with their FDI portfolios that pay higher-risk premiums in emerging markets. As the competition for limited private investment capital increases, firms may seek even more high-risk FDI projects to generate higher risk premiums.

Policy Implications of this Research

The total flow of capital and trade amongst the world's foreign subsidiaries is a formidable component in the global economy. As financial markets become ever more closely integrated, the aspirations and investment policies of corporations will become increasingly important to the future stability of the global financial system. As the fortunes of national sovereign governments rise and fall with their predilection for financing their social aspirations with ever more levels of public debt, the multinational corporation may become more visible in its capacity for allocation of domestic surplus capital in foreign markets. As a prospective social leveling

mechanism, the multinational may be less impaired with regional political constraints in its ability to allocate growth capital to impaired or under-developed regions or economies.

The prospect of increasing levels of industrial and socio-economic policy through more complex capital controls and trade policies is inevitable. Moreover, we also see the rise of a new form of state capitalism where state-owned multinationals compete in open markets to generate revenues for socio-political purposes as seen in China and Russia. These firms compete for market share with the foreign subsidiaries of multinationals based in free and open economies, and represent a serious potential for the impairment to free trade and market-based competition.

Sovereign governments in the last 50 years have amassed more than $40 trillion in global debt to finance social and defense programs thus increasing the probability that sovereign defaults may shift ever more weight for the allocation of surplus capital from national governments to corporations. The significant decoupling of the international business economies and national economies is becoming more evident. For example, the record high profits of US and many EU corporations in the last half of 2010 are coupled with the highest continuous unemployment rates since the Great Depression.

Ultimately, it may be the central planning and the fiscal discipline of the corporate boardroom rather than national legislatures that may have the greatest social impact on domestic capital formation and industrial policy. The regulation of foreign capital movements will present difficult policy questions and challenges for

national industrial policy makers as the global economy become more integrated. Some of the near-term policy questions would include:

1. With the increased risk of global inflation as a policy tool to devalue the worldwide global debt, will FDI become an inflation hedge or trap for investors seeking to protect their returns?

2. Will international trade policy be the mechanism that arrests the growth in FDI as more national governments reach for revenue streams through increased cross-border taxation or state capitalism?

3. Which host economies are more likely to become overly dependent on new inward FDI in the event of another massive global deflationary spiral?

4. Is the expropriation of foreign assets preferable to sovereign default for emerging economies caught in a deflationary spiral?

5. Would the increasing likelihood of the monetization of national indebtedness in the OECD result in a partial or permanent decoupling of the economies of multinationals from that of their source country?

Discussion and Opinion

A long-held, stylized fact in economics is that international capital flows will tend to move from socialist or command economies to open, capitalist economies.

This results from the demand for a risk premium for private investment capital. This trend was highly visible in the 1950's post-war period where investment capital fled the eastern bloc countries to the West. As the competition of state capitalism and free-market capitalism face-off in the next 20 years, we will undoubtedly see FDI as a linchpin that will channel and divert much of the international capital flows between these two economic systems.

Now, 50 years after Hymer's seminal work on FDI, we see that multinationals still seek to exploit ownership advantage or proprietary intellectual property and limit risk through direct ownership. We can also see the influence of capital markets where the cost and availability of credit and capital affects the timing and scope of FDI that make it a special case of portfolio theory. We can now restate Hymer's hypothesis in a contemporary context:

Portfolio theory and the ownership advantage of direct control are both necessary determinants of FDI but neither is sufficient alone to explain the capital flows and market entry choices of the foreign direct investor.

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APPENDIX 1 Estimation of Panel Vector Autoregressions

Vector autoregression (VAR) has a long history of application in varied macroeconomic problems for its usefulness in supporting policy decisions such as determining the effect of the length and duration of interest rate adjustments on unemployment. To a lesser extent, it has been used in financial time-series applications with similar problems such as interest rate shocks. Generally, the VAR estimation methods rely on a long time-series of variables, typically 15 to 20 years. This provides assurance that the secular trends can be distinguished and real statistical causality can be determined. In contrast, panel data sets are very useful in industrial economics as they contain a wide set of variables, which are often very rich in information but collected over shorter time periods, often less than 10 years. To bridge this gap, Holtz-Eakin, Newey and Rosen proposed a technique for transforming panel data for analysis with VAR (Holtz-Eakin et al., 1988).

Vector autoregression is simply an autoregressive process for a vector of stationary variables. Generally, there are three types of VAR used in economic modeling: *reduced form*, *recursive* and *structural equation modeling or SEM.* SEM combines economic theory and a system of equations, whereas recursive and reduced form VAR rely on inferences from known economic models for interpretation. We will briefly discuss the reduced form method used in Chapter Six for the analysis of growth rates.

In the reduced form VAR equations, each variable is expressed as its current and past value with a serially uncorrelated error term.[21] In Model 6.0, we have chosen four variables from our panel data estimates that show strong correlation with the rates of revenue growth: inflation; host GDP; productivity; and capital investment. Thus, there are 5 equations for estimation of the parameters.

A sequence of preparatory steps is required to transform the panel data to time-series that precede the estimation of the parameters and the creation of the impulse-response diagrams. First, to transform the wide and short panels to time series, the cross-sectional data is pooled. This normally relaxes the condition of stationarity. However, we initially time-demeaned the data to remove any random walk process. The data is then Helmert transformed to remove fixed effects. To control for endogeneity, the algorithms in our program uses GMM estimation to provide the internal orthogonal instruments (Love & Zicchino, 2006). In a typical VAR process, we would first test the number of lags to remove autocorrelation prior to estimation. In this instance, we specify 2 lags that are generally sufficient with the GMM estimator that is used in this case. In addition, for this method, there must be twice the number of time periods as the number of lags; in this case we specify 2 lags with 8 time periods.

This transformed data is then estimated with a GMM estimator for each lag and variable as shown in Table A-1. Finally, in the post-estimation process, the impulse-response diagrams are generated from these parameters using a Monte Carlo process of 200 iterations producing the data seen in Figure 1-6. Rather than the usual

[21] Vector Error Correction (VEC) is used for time-series with serial correlation in the error terms.

Granger causality test that follows the VAR post-estimation process, we see the standard errors and student t-values reported as familiar with GMM estimations that we can use as our basis of statistical inference.

One of the challenges with this technique as applied to this study is that while we are purging individual fixed effects before estimation, we are also likely purging some industry effects, which is why we see lower t- values in samples, which have mixed capital intensities. For example, capital investment will vary strongly in industry groups as evidenced by the varied responses to capital investment by the different FDI types as seen in Table 3-6. In contrast, we see strong responses between productivity (i.e., input cost productivity as opposed to factor productivity) and host GDP that are not necessarily constrained by the externalities of any specific industry. Given the strong weighting of OCED countries in the data set, these results also confirm the linkage between inflation and GDP in the global business cycles which appears to have strong influence on growth in foreign affiliates (Chauvet & Yu, 2006).

Dependent Variable: Sales Growth				
	Lag	Coefficient	Std Error	t- value
Sales Growth	1	-.01639691	.01066031	**-1.53**
Capital Investment	1	.00166426	.28732245	0.00
Inflation	1	2.4144449	2.1285311	1.13
Productivity	1	-.00631554	.00656095	-0.96
Host GDP	1	-5.308e-13	5.226e-14	**-10.15**
Sales Growth	2	-.00476223	.00339961	-1.40
Capital Investment	2	.07911883	.09389353	0.84
Inflation	2	-.89276621	.80150541	-1.11
Productivity	2	.01708077	.00411875	**4.14**
Host GDP	2	4.393e-13	4.631e-14	**9.48**
Dependent Variable: Capital Investment				
Sales Growth	1	.00069333	.00115596	0.59
Capital Investment	1	.65333512	.02642647	**24.72**
Inflation	1	.08934188	.14531537	0.61
Productivity	1	8.352e-06	.00028875	0.02
Host GDP	1	-3.624e-15	8.567e-15	-0.42
Sales Growth	2	-.00068773	.0004411	-1.55
Capital Investment	2	.02022921	.01351731	1.49
Inflation	2	.04614788	.08558051	0.53
Productivity	2	-.00042811	.00025713	-1.66
Host GDP	2	3.275e-15	7.580e-15	0.43
Dependent Variable: Inflation				
Sales Growth	1	-.00005145	.00006697	-0.76
Capital Investment	1	-.00408894	.00256456	-1.59
Inflation	1	.65002857	.02357809	**27.56**
Productivity	1	6.764e-06	.00001217	0.55
Host GDP	1	-2.016e-14	5.364e-16	**-37.58**
Sales Growth	2	-.00001114	.00002232	-0.49
Capital Investment	2	-.00076874	.00060504	-1.27
Inflation	2	-.16613974	.0188467	**-8.81**
Productivity	2	5.309e-06	.0000172	0.30
Host GDP	2	1.623e-14	4.750e-16	**34.16**
Dependent Variable: Productivity				
Sales Growth	1	-.00494061	.00732489	-0.67
Capital Investment	1	.86039811	.90731959	0.94
Inflation	1	-.50653047	.61976945	-0.81
Productivity	1	-.00329751	.00957076	-0.34
Host GDP	1	-8.277e-15	1.132e-13	-0.07
Sales Growth	2	-.00160749	.00320663	-0.50
Capital Investment	2	-.59365855	.62648655	-0.94
Inflation	2	.13267886	.59469035	0.23
Productivity	2	-.00692137	.00648878	-1.06
Host GDP	2	-2.370e-14	1.058e-13	-0.23
Dependent Variable: Host GDP				
Sales Growth	1	1.142e+10	4.316e+09	**2.64**
Capital Investment	1	-3.491e+11	2.865e+10	**-12.18**
Inflation	1	-5.659e+11	1.013e+11	**-5.58**
Productivity	1	-2.999e+09	5.464e+08	**-5.48**
Host GDP	1	.85164073	.013418	**-63.47**
Sales Growth	2	-3.608e+09	1.473e+09	**-2.44**
Capital Investment	2	-2.807e+10	1.141e+10	**-2.46**
Inflation	2	1.455e+12	8.875e+10	**16.39**
Productivity	2	-1.024e+09	4.516e+08	**-2.26**
Host GDP	2	-.13430555	.01208699	**-11.10**

Table A-1 Estimation of VAR parameters and t-values

APPENDIX 2 NACE Classifications

In the Master Data Set, all the firms, both parent and subsidiaries are group in one of the following NACE classifications.

10	Agriculture and Mining	Codes 0001 to 1499
15	Manufacturing	Codes 1500 to 3999
30	Energy and Construction	Codes 4000 to 4999
40	Retail	Codes 5000 to 5999
60	Transportation and Communication	Codes 6000 to 6500
70	Communications Services	Codes 7000 to 7500

APPENDIX 3 Country Representation in Master Data Set

Country	ISO	Firms
AUSTRALIA	AU	6
BELGIUM	BE	1,094
BERMUDA	BM	15
BOSNIA AND HERZEGOVINA	BA	1
CANADA	CA	1
CAYMAN ISLANDS	KY	5
CHINA	CN	2
CROATIA	HR	55
CZECH REPUBLIC	CZ	50
FINLAND	FI	147
FRANCE	FR	2,068
GERMANY	DE	32
GREECE	GR	182
HONG KONG	HK	7
INDONESIA	ID	4
ITALY	IT	901
JAPAN	JP	2
KUWAIT	KW	1
LUXEMBOURG	LU	2
MALAYSIA	MY	10
NETHERLANDS	NL	165
NETHERLANDS ANTILLES	AN	1
NEW ZEALAND	NZ	3
NORWAY	NO	283
PAKISTAN	PK	7
PHILIPPINES	PH	20
POLAND	PL	36
RUSSIAN FEDERATION	RU	77
SINGAPORE	SG	55
SOUTH AFRICA	ZA	1
SPAIN	ES	117
SWEDEN	SE	496
SWITZERLAND	CH	40
THAILAND	TH	7
TONGA	TO	1
UNITED KINGDOM	GB	2,110
UNITED STATES	US	3
		8,007

Table A-2 Country Representation in Master Data Set

GLOSSARY

Arbitrage	The buying and selling of an asset in two-different markets. In theory, the arbitrageur risks no capital, but benefits from momentary differences in the price of an asset in different markets.
Equity Risk Premium	The rate of return of equities over that of government bonds. That is the risk premium paid for investing in the risk of equities over that of risk-free securities.
Growth	The increase or growth in sales output without an increase in capital stock or fixed investment implying increasing returns to scale as compared to *expansion* which is the increase output supported or requiring an increase in capital investment.
Interest Rate	In context of foreign investments, it is frequently interchanged with the term 'rates of return', that is the rate of interest or return on the parent's investment of equity in foreign operations or assets.
Leverage	The use of debt (i.e., borrowing to finance assets).
Market Rate	The market 'value' of the firm's assets. It is often used interchangeably with 'asset price'. It has a positive relationship to the firm's cost of capital since selling the firms share price at higher 'market rates' above the value of the firms lower capital costs.
NACE	European system for industrial classification on industries.
Return on Assets	(ROA) measured by dividing the net income for the year by the total assets of the firm. It is a proxy for returns to scale, profitability, and asset utilization.
Return on Equity	(ROE) measured by dividing net income by the shareholders total equity. ROE can be negative is company has significant profit losses which excess the total paid in equity.
Risk	Is expectation of loss as measured by multiplying the probability that a future event will occur by the relative impact it will have if it does occur.
S&P 500	The Standard and Poor's largest 500 US corporations, which include a number of large foreign affiliates of foreign corporations. It is a broad, global index of all industrial firms.
Winsorize	The removal of extreme outliers in a sample by averaging.