For Whom the Firm Toils:

A Thesis Investigating the Ownership, Board and Performance Linkages

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A Thesis

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ABSTRACT

This thesis is articulates and empirically testing the effect of ownership on board composition and ultimately on firm performance. As per extant literature, ownership is subsumed into corporate governance and studies build on agency theory's premise of dispersed shareholders as the owners of the firm. Governance literature also accept Board of Directors as representatives of the dispersed shareholders, mandated to discharge the investor-owners' fiduciary responsibility. The composition of the board is usually seen as a reflection of its effectiveness however the determination of board composition is not fully understood. Overall, governance is generally viewed in terms of mitigating the agency costs, which *should* lead to a *homogeneous* performance objective of firm value maximization. However recent meta-analyses do not find support for any direct relationship between any of the agency theory driven governance mechanisms. In addition, some recent studies also point towards concentrated ownership being the norm worldwide. Furthermore, there seems to be other *types* of owners apart from the dispersed investors as shareholders in a firm.

Building on these findings, this thesis proposes an alternative ownership framework, wherein ownership is analyzed in terms of the different *types* of shareholders *within* a firm - unlike previous focus on 'inside' managers and 'outside' dispersed investors. The basic premise of the thesis is to examine the possibility that neither the firm's ownership, nor its board composition, nor its performance objectives are homogeneous. Utilizing a multi-theoretic framework, this thesis examines and empirically tests ownership-board composition and ownership-performance relationships respectively. The conceptualization of ownership is as an aggregation, defined as

combining the different types of owners and their respective ownership concentrations. The research setting is all US public firms for which ownership and board data is available, and the data is collated and analyzed by utilizing EQS software. I find empirical support for the multi-theoretic framework as well as general support for most of the proposed hypotheses.

In conclusion, this thesis contributes to the growing awareness that corporate governance is not a 'one size fits all' mechanism and offers an alternative multi-theoretical framework that might help resolve the mixed findings in governance and ownership literature.

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THESIS SUMMARY

This thesis is concerned with understanding and empirically testing the effect of ownership on board composition and ultimately on firm performance. As per extant literature, ownership is subsumed into corporate governance and primarily analyzed utilizing governance's predominant agency theoretic logic. As a consequence, most studies are built on agency theory's premise of dispersed shareholders as the owners of the firm and thus issues on ownership, as in the owners of a firm apart from the dispersed shareholders, are relatively under-researched.

Most governance literature also alludes to the Board of Directors as representatives of the dispersed shareholders, and the function of the board is mandated to be discharging these investor-owners' fiduciary responsibility. Thus, the board is accepted to be the link between the managers and the absentee shareholders, and the composition of the board is usually seen as a reflection of its effectiveness. However, the determination of board composition is still not fully understood (Anderson & Reeb, 2004). Furthermore, there seems to be no consensus regarding board effectiveness and board functionality.

Overall, governance is generally viewed in terms of mitigating the agency costs, which *should* lead to a *homogeneous* performance objective of firm value maximization (Jensen & Meckling, 1976). However, recent meta-analyses do not find support for any direct relationship between any of the agency-theory–driven governance mechanisms (Dalton, Daily, Certo, & Roengpitya, 2003), and most studies point to a non-monotonic

and complex relationship (Morck, Shleifer, & Vishny, 1988) between ownership and firm performance assessed in terms of firm value maximization.

In addition, some recent studies point towards concentrated ownership being the norm worldwide (Porta, Lopez-de-Silanes, & Shleifer, 1999), challenging the basic assumption of dispersed shareholders as the owners of a firm. Furthermore, there seems to be other *types* of owners (Thomsen & Pedersen, 2000) apart from the dispersed investors as shareholders in a firm.

Building on these findings, this thesis proposes an alternative ownership framework, wherein ownership is analyzed in terms of the different *types* of shareholders *within* a firm, unlike most previous studies that focus solely on 'inside' managers and 'outside' dispersed investors. The basic premise of the thesis is to examine the possibility that neither the firm's ownership, nor its board composition or performance objectives are homogeneous because different types of owners might have differing criteria of firm 'value' based on their specific governance and performance objectives. The underlying argument of this model is that different types of owners prefer different board composition as they have different functionality in mind from their boards, and also that the different types of owners have differing performance objectives. Utilizing a multi-theoretic framework, this thesis examines and empirically tests these ownership-board compositions and ownership-performance relationships.

The conceptualization of ownership is as an aggregation, defined as combining the different types of owners and their respective ownership concentrations. I develop my conceptual model by building on existing literature; thereafter, I utilize this framework to posit the relationships between ownership, governance and firm performance, and offer

specific testable hypotheses on these relationships; and finally I empirically test these hypotheses, analyze and discuss the results, and offer some promising directions for future research.

The research setting is all US public firms for which ownership and board data are available, and these secondary data are collated and analyzed by utilizing multivariate regression analyses using EQS software. I find empirical support for the multi-theoretic framework as well as general support for most of the proposed hypotheses. Specifically, I find strong correlations between the percentage shareholdings of the different types of owners and the hypothesized governance and performance variables.

In conclusion, this thesis contributes to the growing awareness that corporate governance is not a 'one size fits all' mechanism, and that shareholder return is not the sole performance objective for a firm. This thesis also offers an alternative multi-theoretical framework that might help resolve the mixed findings in governance and ownership literature. I assert that the heterogeneity in ownership directly impacts governance, objectives and ultimately firm performance, and argue for including the different types of *owners* – distinct from the dispersed investors and managers – in future studies on how ownership impacts corporate governance and firm performance.

CHAPTER 1: INTRODUCTION

Management theorists generally agree that the ownership structure of a firm impacts its performance; however, there is no consensus about the direction and magnitude of such a relationship (Daily, Dalton, & Rajagopalan, 2003). Most researchers conceptualize ownership as a homogenous entity distinct from the firm's management, while ownership arrangement worldwide reflects heterogeneity within its structure and does not fit neatly into the dichotomous agency dilemmas. The dominant logic for ownership as well as governance is based on Jensen and Meckling's (1976) seminal work on the theory of a firm, wherein ownership is considered as one of essential governance mechanisms by which a firm mitigates its agency costs. Most researchers conceptualize ownership as the capital structure or equity holding of a firm (Dalton et al., 2003; Jensen & Meckling, 1976), and the 'owner' is analyzed mostly in terms of the agency theory–prescribed alignment effect of insider manager/outsider shareholder (Jensen & Murphy, 1990), or the monitoring or controlling effect of the ownership concentration of a large shareholder on firm performance (Shleifer & Vishny, 1997). An 'owner' is generally understood to be a homogeneous 'outside' entity – either the dispersed minority shareholders (individual investors), or another exogenous entity (e.g. large shareholder or blockholder) with interests aligned with the minority shareholders. The prescribed governance mechanisms ensure that the 'inside' managers' interests are also aligned with the interests of such owners, mitigating the 'principal-agent' agency problem, and thus results in better firm performance. However, the ownership concentration of a large shareholder also raises the potential of the 'principal-principal'

agency problems (Morck, Wolfenzon, & Yeung, 2004), wherein a large shareholder might work against the interests of the minority shareholders (investors), thereby reducing firm performance. Thus, ownership concentration is mostly hypothesized to have a bell-shaped relationship with firm performance – increasing performance initially, and thereafter reducing it at the highest level (Thomsen & Pedersen, 2000).

Although some recent studies (Lehmann, Warning, & Weigand, 2004; Pedersen & Thomsen, 2003; Thomsen & Pedersen, 2000) have found that the type of the largest shareholder or blockholder impacts firm performance; however, the literature on ownership has mostly focused on the ownership concentration – performance relationship (Makhija & Spiro, 2000) – and the rationale and systematic effects of owner identities, i.e. the type of owner on firm performance is still relatively under-researched. Overall, governance is also generally viewed in terms of mitigating the two kinds of agency costs, which is considered to lead to a homogeneous performance objective of firm value maximization. However, recent meta-analyses (Dalton et al., 2003; Dalton, Daily, Ellstrand & Johnson, 1998) do not find statistical support for any such direct relationship, and most studies (McConnell & Servaes, 1990; Morck et al., 1988; Thomsen & Pedersen, 2000) point to non-monotonic and complex relationships between insider ownership and performance.

This thesis attempts to show that the firm performance objectives are not homogeneous, as different types of owners have differing criteria of firm 'value' based on their different objectives, and thus the ownership type is a major determinant of the board composition, and in the selection of the firm's performance objective. Furthermore, the *overall* composition of ownership, i.e. the aggregation of the different types of owners

and their respective ownership concentrations, determines the degree to which each type of owners' objectives is attained. Thus I will demonstrate that ownership is better understood as an aggregation, i.e. ownership composes of aggregating the different types of owners, who, differing in their governance requirement, are driven by separate imperatives (Miller, 1987), and thus govern *their* firm differently, depending on *their* choice of performance objectives. Furthermore, I argue that these owners utilize their respective ownership concentration as one of the substitution governance mechanisms (Agrawal & Knoeber, 1996; Dalton et al., 2003; Rediker & Seth, 1995) towards mitigating their specific risks, in an attempt to attain their desired performance objectives. Thus, as per the proposed model, the aggregated ownership of a firm is determined as a composite of the different types of owners and their respective ownership concentrations, and this relationship predicts the choice of governance mechanism, selected in an attempt at safeguarding their interests and attaining the owners' performance objectives.

This thesis broadly classifies ownership types as founder/family, corporate and institutional based on existing literature and, utilizing a multi-theoretic lens, attempts to explain why the types of owners might be influential in determining a firm's aggregated ownership structure;[1] how the different owners have differing risk assessment and are driven by different imperatives; and thus, offers a rationale for the systematic differences amongst firms in selection of governance mechanisms towards attaining the owners' performance objectives. Based on these arguments, I also offer a theoretical framework for analyzing ownership as an aggregation, composed of the different types and the percentage holdings of the different types of owners.

[1] Essentially, aggregated ownership and ownership structure are considered to be the same in my model. However, I subsequently avoid using the term 'ownership structure' to circumvent confusion with the imperative of 'structure' that is introduced in the later sections.

This study is an important first step in including the *owners* in studying the issues of *ownership*, furthering the understanding of the effects of ownership in three distinct ways. First, it offers a theoretical basis for understanding *why* different types of owners prefer different performance outcomes, are driven by different imperatives and thereby differ in their choice of governance mechanisms. Secondly, it advances a tentative rationale for explaining the contradictory findings in governance literature on ownership concentration and firm performance, which primarily focused on 'outside' dispersed owners and 'inside' managers. And, finally, it offers an exploratory model of aggregated ownership, using the identity of the type of owners in conjunction with their ownership concentration as determining factors for the selection and attainment of the firm's performance objectives.

This reminder of this thesis is organized as follows. In Chapter 2, I undertake a review of the extant literature across the management disciplines to integrate our present understanding and conceptualization of governance and specifically ownership. Then, in Chapter 3, I undertake a review of the literature on boards of directors and associated governance literature. I attempt to highlight the contradictions amongst the differing theoretical perspectives, emphasizing how they relate to the issues of board functionality and composition. In Chapter 4, I briefly summarize the issues in performance conceptualization and operationalization. Thus, in the above chapters I build the foundations for my proposed framework.

Thereafter, in Chapter 5, I propose a theoretical framework to understand the issues of ownership types and aggregated ownership, identify the different types of owners, highlight the need for utilizing the aggregated ownership conceptualization, and

develop a model for determining the ownership of board composition and ownership-performance relationships. A broad typology of ownership is also offered, and exploratory hypotheses predicting the relationships are presented.

In Chapter 6, I outline the study design and research methodology that is employed, and elaborate on the choice of variables that represent the above-mentioned constructs. I describe the statistical tests undertaken and present the descriptive statistics, correlation tables and the statistical outputs.

Then, in Chapter 7, I enumerate the findings and discuss the implications of the statistical tests. I analyze the theoretical model vis-à-vis the findings and interpret the results and highlight how they measure up to the hypothesized relationships.

I conclude with Chapter 8 where I highlight the envisaged future research initiatives, the managerial implications of my findings and the limitations of my study and reiterate the anticipated contributory findings of this thesis.

CHAPTER 2: REVIEW OF OWNERSHIP LITERATURE

2.1 The Agency Perspective

Ownership issues have been predominantly researched utilizing the Jensen and Meckling (1976) theory of the firm. This theory is based on the shareholder value maximization objective and is asserted to explain why managers choose activities such that the total value of the firm is lower than if they were the sole owner of the firm (Jensen & Meckling, 1976: p 306). Built on the Berle and Means (1932) premise of diffused ownership, agency theory assumes that outside dispersed investors, as the provider of capital, are the rightful owner (principal) of a firm, and the manager (agent) administers the firm on behalf of this atomized principal. As per this perspective, the degree of uncertainty associated with a financial investment by an investor, namely the market or systematic risk, is the only one of concern for the owner. As the investor-owner can eliminate the risks associated with investing in any particular firm by holding a diversified portfolio of stocks – as per agency theorists – there is little need for managers to engage in risk-management activities (Lubatkin, Schulze, McNulty, & Yeh, 2003). Most researchers operationalize ownership as the capital structure or equity holding of a firm (Dalton et al., 2003; Jensen & Meckling, 1976), and the 'owner' is analyzed mostly in terms of the agency-theory prescribed alignment effect of insider manager/outsider shareholder, or the monitoring or controlling effect of the ownership concentration of a large shareholder on firm performance. An 'owner' is generally understood to be a homogeneous 'outside' entity, either the dispersed minority shareholders (individual investors), or another exogenous entity (e.g. large shareholder or

blockholder) with interests aligned with the minority shareholders.

As per the agency perspective, a self-interested manager might work against the value-maximizing interests of these dispersed investors. The prescribed alignment governance mechanisms ensure that the 'inside' managers' interests are aligned with the interests of such owners, mitigating the 'principal-agent' agency problem (Jensen & Murphy, 1990), and thus resulting in better firm performance. Agency theorists also prescribe ownership concentration as a means of mitigating agency costs. As per this perspective, an outside investor with a relatively large shareholding (called a blockholder), monitors the managers to safeguard its investment in the firm (Shleifer & Vishny, 1997). As a result, monitoring and controlling the managers is a necessary cost of the principal-agent separation (Becht, Bolton, & Roell, 2003; Demsetz & Villalonga, 2001) thus mitigating the type I (Principal–Agent) agency dilemmas.

Somewhere in the articulation of this elegantly simple theory, the large shareholding owners of the firm, who generally are actively involved in the management of *their* firm – as distinct from the 'hands off' dispersed investors – were entirely dropped from the analyses, and researchers continue to focus on inside managers' and outside investors' differences. This oversight might be of little consequence if the Berleian premise of atomized ownership was the prevalent model, but recent research reports (Denis & McConnell, 2003; Faccio & Lang, 2002; La Porta, Lopez de Silanes, & Shleifer, 1999) show that concentrated ownership is the norm outside the US and UK. The findings of some researchers (Holderness & Sheehan, 1988; La Porta et al., 1999) question the validity of the dispersed model in the American context also. Even in Berle and Means' (1932) study, out of the 200 largest US corporations, there was evidence of

managerial control for only 44, and for only four of the 106 industrial corporations. La Porta et al. (1999: pg. 495, Table III, Panel B) report that 50% of the large US publicly traded firms have a controlling shareholder at the 10% holding cutoff, and 60% of the mid-sized firms have a controlling shareholder at the 10% cutoff, while Holderness and Sheehan (1988: pg. 321) report 13% of the largest 5240 US firms in the 1984 Spectrum database had a shareholder with more than 50.1%, but less than 95% holding (they do not include firms with more than 95% single shareholdings in their study). In the case of corporations outside the US, UK, Japan and Taiwan, the average holding of the three largest shareholders amongst the 10 largest domestic firms is 48.47% (median 48.21%). As stated by La Porta et al. (1998: pg. 1146) dispersed ownership in large public corporations is a myth, and the finance textbook model of the managers faced with a multitude of dispersed shareholders is an exception and not the rule!

Thus, if concentrated ownership *is* the norm worldwide, including in the largest of the publicly held firms, the principal-agent agency issues might have limited relevance for ownership and even corporate governance researchers.

Also, if most firms have large shareholders, then identity of the entity or entities that possess concentrated holdings will be an important influence on the selection of the firm's performance objectives, as well as on the governance and conduct of the firm towards attaining those objectives. And such large shareholders might not be mere active/passive blockholders monitoring or 'controlling' the managerial actions towards achieving the singular objective of share value maximization; they might have other performance objectives in mind (Cameron & Whetten, 1983). Such shareholders blur the strict distinction between outsiders and insiders as these are owners as well as managers

in *their* firms. Also, the risks that concern this large shareholder might be distinct from the systematic market risks that concern the individual financial investors; the large shareholder might not be able to effectively diversify away portfolio risks because of its concentrated holdings in a specific firm. Thus, the large shareholder justifiably might have objectives that differ from the investors' value maximization objective. These owners' risk assessment might legitimately be firm- or business-specific, while the investors' risk of concern is market-specific. Thus, I think it is crucial for researchers to distinguish between owners and the stereotypical dispersed investors. I elaborate further on the types of owners and their differing requirements in Chapter 5.

Some researchers do attempt to distinguish *within* the owner-manager dichotomy (Misangyi, 2002) while staying within the confines of agency theory. Hunt (1986) sorts firms into three categories that define the ownership structure. The first category consists of firms without a dominant shareholder (presumably leaving managerial agents free to pursue their own goals) and is called manager-controlled (MC) firms. This is the quintessential dispersed shareholder as owner model. The second category consists of firms with at least one non-management dominant stockholder (presumably constraining managers to firm goals) and is called owner-controlled (OC) firms. This is the block-holder model described above. And, finally, firms in which the dominant stockholder is the manager are called owner-managed (OM) firms. This is the insider as manager model. However, the governance and performance implications are still assessed in terms of the agency theoretic perspective with the focus on shareholder wealth maximization.

Of late, some agency theorists also warn of the entrenchment and expropriation effects of large ownership concentration (Dharwadkar, George, & Brandes, 2000;

Shleifer & Vishny, 1997; Young, Peng, Ahlstrom, & Bruton, 2002), wherein a blockholder or a large shareholder (principal) might work against the interests of other investors (principal), raising the type II or principal-principal agency (PPA) concern. A related stream of literature also looks at large blockholdings, especially by individuals, in terms of the owners receiving private benefits of control or entrenchment (Gompers, Ishii, & Metrick, 2004; Jarrell & Poulsen, 1988; Tatiana, 2003) by these blockholder owners. Such an analytical lens might be of more relevance for ownership studies, especially in view of the large-scale ownership by individual or family owners (Anderson, Mansi, & Reeb, 2003), and the possible differences in interests or approaches to wealth maximization in terms of financial institutions (Woidtke, 2002).

However, ownership as defined solely in terms of inside manager/outside owner as well as blockholder/institutional holding concentration has not been found to be positively or even negatively related to financial performance as predicted by agency theory (Dalton et al., 1998, 2003). Most researchers point toward a complex non-monotonic relationship between ownership concentration and firm performance (Morck et al., 1988). In fact, Demsetz (1983) argues that the ownership structure is an endogenously determined variable and cannot have a consistent relationship with firm performance, since the ownership structure that "emerges is an endogenous outcome of competitive selection in which various cost advantages and disadvantages are balanced to arrive at an equilibrium organization of the firm" (1983, pg. 384). Subsequent findings (Demsetz & Lehn, 1985; Demsetz & Villalonga, 2001) further this argument that ownership structure is an endogenously determined variable and this needs to be taken into account when

analyzing the ownership effect on firm performance; however, they do not clarify what might be the constituents of this endogenous variable.

In contrast, however, some recent studies (Boubakri, Cosset, & Guedhami, 2005; Jonnergård & Kärreman, 2004; Lehmann et al., 2004; Pedersen & Thomsen, 2003; Thomsen & Pedersen, 2000) have consistently found that the identity of the *largest* shareholder strongly impacts firm performance. Clearly, then, the entity or entities that possess concentrated holdings are an important influence on the performance and conduct of a firm. Also, the risks that concern these large shareholders might be distinct from the systematic market risks – the only risks of concern for financial investors. Thus, agency theory, even including the PPA perspective, is unable to reconcile the differences in risk preference between the different *types* of owners, and as the agency-driven literature on ownership has mostly focused on the ownership *concentration* – firm performance relationship (Makhija & Spiro, 2000) – the rationale and systematic effects of owner identities on firm performance is still relatively under-researched.

2.2 The Economic Perspective

The classic production and capabilities-centred economic view of the firm stressed the importance of the external labour and product factor markets as the determinants of a firm's conduct. In this perspective, the firm was treated as a 'black-box' that changed processes automatically as a seamless response to the supply and demand requirements of the factor markets (Coase, 1937: pg. 387). This viewpoint thereafter evolved into the transaction cost model (Coase, 1937). However, ownership of the firm was still not seen to be of any concern, as it was the external market that fully

determined the conduct of a firm. Thus demand-supply pressures and market structure defined the conduct of a firm, and ownership/governance was a reactive/adaptive process through which management tries to align the firm within the market structure, in an attempt to achieve competitive advantage. The classical economic view thus is entirely managerially focused based on the belief that (i) managers govern better than the owners (Alchian, 1965) and (ii) managers as professionals seek and achieve better profits than the owners could ever hope to make (Machlup, 1967: pg. 5-6).

Thus, in the context of analyzing the owner-manager relationship, the classical economic perspectives stand in direct contradiction to that of agency perspective: the former states that managers as professionals outperform owners, while the latter claims that managers require the owners to incur additional agency costs. This is a result of their differing underlying assumptions; however, both perspectives focus solely on profits as the value-maximizing objective of the firm. Moreover, firm- or business-specific risk mitigation is integral to such an economics-based strategic management perspective (Lubatkin & Chatterjee, 1991) and, in order to gain competitive advantage, a firm makes "strategic, or hard-to-reverse, investments ... that create value for its customers in ways that rivals will have difficulty imitating, thereby isolating its earnings from competitive pressure while simultaneously reducing the associated uncertainty (Lubatkin, 2003: pg. 7)". Thus, firm- or business-specific risk management for competitive advantage is the main managerial concern as per the economic perspective, again in contradiction to the market-specific risk management concern as per agency theory.

The subsequent neo-economic theorists, on the other hand, focus either on the firm's industry (Porter, 1980, 1998) or on internal resources (Barney, 1991; Penrose,

1966), capabilities (Foss & Christensen, 2001; Rumelt, Schendel, & Teece, 1991; Teece, Pisano, & Shuen, 1997), or transactions (Williamson, 1991, 1999) as the factors determining a firm's governance and conduct, with the objective of achieving competitive advantage. The underlying assumption is that these environmental and/or internal normative pressures *fully* and uniformly determine *all* the human actors' motivation, and thus again ownership is not considered relevant. The notable exceptions to such externally deterministic approach are Transaction Cost Economics (TCE), and Resource Based View (RBV) perspectives. TCE evolved as an integration of the classical economic and the behavioural theories, but it too implicitly assumes the owner of a firm is a homogeneous entity, with interests perfectly aligned with those of the financial investors, namely wealth maximization. Essentially, TCE combines the agency theory–prescribed managerial self-interest with opportunism as a factor in the analysis (Ghoshal & Moran, 1996; Williamson, 1999), while RBV is entirely silent on the question of ownership.

In any case, there is no analysis of possible heterogeneity in ownership in the neo-economic theories, and the owner is assumed to be an entity similar to the dispersed investors in the firm with a homologous value-maximizing objective, or completely ignored while the focus stays on managerial actions. This, indeed, is puzzling as innovation and entrepreneurship are considered essential in the resource and capabilities perspective, but, contrary to the findings in entrepreneurship literature, the identity of the owner in the entrepreneurial or innovative firm is considered to be of no consequence. The owners (or the managers on behalf of the owners) are assumed to govern the firm similarly towards a homogeneous objective of competitive advantage. Even in the resource-based

view, the fundamental question of *who* has the right to decide or choose which resources the firm must invest in is largely unanswered – a reasonable concern for a public firm with heterogeneous owners, a board of directors and professional management. Furthermore, the fundamental difference in risk management between investors (systematic market risk) and founders or corporations (firm- or business-specific risks) is also not reconciled in either the classic or the neo-economic perspectives.

2.3 The Behavioural Perspective

The theorists of this school of thought built on the seminal works of Barnard (1938), Simon (1945) and Cyert and March (1963) to analyze the conduct of a firm as the consequence of bounded-rational human actors. The behavioural theorists do not propose value maximization as the primary objective of a firm, and instead focus on the satisficing managerial process per se. These theorists also are primarily concerned with the managerial activities and processes. Building on the classic economics premise that professional managers govern firms better than owners (Alchian, 1965; Machlup, 1967), behavioural theorists effectively subsume the influence of the owner on the conduct of the firm within the managerial objectives. Thus, these theorists also do not differentiate between managerial objectives and the owner's objectives, nor recognize differences among the latter. Managerial action is accepted as determining the firm's governance and conduct, as in the classical economic view, although behavioural theorists focus on "realism in process" while the economic theorists focus on "realism in motivation" (Machlup, 1967). Thus, most of the behavioural process–based literature is qualitative, and suffers from the limitation of such an approach, namely its inability to propose

generalizable yet parsimonious and testable hypotheses or models of governance processes or mechanisms. As mathematical modeling and empiricism seem to be the norm of the hyper-rational ownership and governance studies, the behavioural theories were criticized by the early agency theorists (Jensen & Meckling, 1976) and thus did not find much traction in subsequent governance literature. The main argument against the behavioural theories was their non-adherence to the profit maximization objectives of a firm. In fact, Jensen and Meckling rather brusquely dismiss the behavioural theories in their work:

> A number of major attempts have been made during recent years to construct a theory of the firm by substituting other models for profit or value maximization, with each attempt motivated by a conviction that the latter is inadequate to explain managerial behavior in large corporations (footnote 3). Some of these reformulation attempts have rejected the fundamental principle of maximizing behavior as well as rejecting the more specific profit-maximizing model. We retain the notion of maximizing behavior on the part of all individuals in the analysis that follows (footnote 4). (Jensen & Meckling, 1976: pg. 6)

However, Jensen and Meckling do not offer any arguments that disprove non-profit-maximizing behaviour on part of individuals – owners or managers. Be that as it may, behavioural theorists have also largely ignored the issues of ownership and owner identity (as distinct from managers) and focused solely on the managerial processes that might determine firm conduct.

Thus, there seem to be some unresolved issues between ownership and managerialism in literature. The dominant paradigm in ownership research – agency theory – does not generally recognize the fact that the interests of an owner (i.e. a majority shareholder) might legitimately and justifiably be different from the interests of

the financial investors in a firm. Instead, they attribute any deviation from the investor value-maximizing objective to the agency costs incurred because of managerial self-interested behaviour. The recent agency theorists term such conflict of interest the principal-principal agency issue, while economic theorists call it the normative market pressures or transaction costs (Williamson, 1999), and the behavioural school calls it the consensus building and decision-making process (Cyert & March, 1963). I opine that there is indeed heterogeneity of interests, which might also be the underlying cause of the debate on the merits and demerits of strategic diversification (Amihud, Kamin, & Ronen, 1983; Amihud & Lev, 1981, 1999; Lane, Cannella, & Lubatkin, 1998, 1999), as ownership and performance implicitly connote different actors and performance indicators for different theorists. Thus, the issue might be about *ownership* per se, and arguably owner identification is a crucial factor in analyzing governance and performance of firms. This issue is also reflected in the works of some recent owner identity researchers. In Chapter 4, I review the literature on owner identity studies while developing the ownership framework. Meanwhile, in the next chapter I briefly review the Board literature to highlight the issues therein before developing my conceptual model any further.

CHAPTER 3: REVIEW OF BOARD OF DIRECTORS LITERATURE

The Board of Directors of a firm is considered by most researchers to be a vital corporate governance mechanism. The commonly accepted precept in management theory is that the board of directors represents and safeguards the interests of the dispersed shareholders (Becht et al., 2003), minimizing the risk of managerial self-serving behaviour, thereby enhancing firm value by mitigating agency costs (Shleifer & Vishny, 1997). Given such a vitally important task, it is no wonder that the workings of boards of directors and board effectiveness have been enduring topics in business literature as well as the popular press. However, there seems to be no consensus as to the efficacy of boards in influencing firm performance (Dalton et al., 1998), or on which aspect of boards is of importance (e.g. demographics, insider-outsider composition, leadership structure, board dynamics), or even what is the primary function of the board (monitoring or resource providing or a combination of the two). Thus, researchers do not have a conclusive answer as to why board characteristics differ, and who, if anyone, decides the composition of the board of directors, or any other board characteristics.

3.1 Theoretical Perspectives on Boards of Directors

The dominant logic of board and board dynamics research, consistent with other governance literature, has been the agency perspective (Daily, Dalton, & Cannella, 2003) that views boards as a governance and control mechanism for protecting shareholders' interests from self-serving managers (Beatty & Zajac, 1994; Eisenhardt, 1989; Fama, 1980; Fama & Jensen, 1983; Jensen & Meckling, 1976). As per agency perspective, the

sole functionality of the board of directors is to monitor management to safeguard against managerial adventurism or opportunism (Fama, 1980). However, some management researchers also utilize the resource-dependence perspective to view boards as a critical resource for providing advice, counsel, legitimacy and social capital/network resources to a firm's management (Boyd, 1994; Daily & Dalton, 1994; Daily & Johnson, 1997; Daily, Johnson, & Dalton, 1999; Salancik & Pfeffer, 1978; Westphal & Zajac, 1995; Zajac & Westphal, 1994). Within the resource dependency perspective, Zahra and Pearce (1989) further distinguish between the *Strategy Providing* and *Service Providing* functionalities of boards of directors.

Most studies assess board composition (e.g. size, insider/outsider ratio, demographics/diversity, functional specialization), board leadership (unitary or duality), and compensation incentives of board members (Hillman & Dalziel, 2003) as the factors that predict board effectiveness. Also, despite the differences in theoretical groundings, most recommendations on composition for board members are similar in both agency- and resource-dependence perspectives, e.g. higher number of 'outside' independent directors will provide better monitoring as per the agency perspective, while as per the resource-providing 'service' perspective, outside directors will enable access to greater resources. In spite of the similarities in the recommendations, the rationale for the desired demographics differ: agency perspective recommends a 'probing and questioning' monitoring role by the outsiders in the operations of the firm, whereas the board directors need to maintain arm's-length distance from managerial functions, and thus independent outsiders are desirable as board members. The resource-providing perspective recommends active involvement by the board, and since outsiders might have different

perspectives and linkages to external resources, independent outsiders are desirable as board members.

However, some recommendations, e.g. unitary leadership, wherein the CEO and chairman of the board is the same individual, stand in direct contradiction. From the resource-dependence perspective, unitary leadership removes ambiguity in processes and outcomes, leads to greater co-ordination and results in higher performance (Anderson & Anthony, 1986; Donaldson, 1990; Finkelstein & D'Aveni, 1994). From the agency perspective, unitary leadership equates to trusting the fox to guard the henhouse (Jensen, 1993).

The findings per either of these perspectives are mixed at best. For example, Westphal (1998) finds that CEOs use ingratiation, impression management and persuasion techniques with board members to offset the structural changes implemented to facilitate the agency-prescribed independence of boards. While Westphal (1999) also finds that, contrary to the tenets of both agency and resource-dependence perspectives, boards with higher numbers of 'insiders' are associated with higher performance, Molz (1988) finds no significant differences in firm performance between unitary or duality of board chairmanship. Furthermore, recent meta-analyses of studies based on either of these views have not shown any consistent relationship between board composition, leadership structure or compensation, and firm performance (Dalton et al., 1998, 2003; Dalton, Daily, Johnson, & Ellstrand, 1999).

Of late, some researchers also argue for an integrated functionality model for boards wherein board members provide both agency-prescribed monitoring functions and resource-dependent service functions (Hillman & Dalziel, 2003; Shen, 2003). However,

there are no empirical studies as yet assessing both these functionalities simultaneously. Hillman and Dalziel (2003) build on extant literature as well as the Korn/Ferry (1999) survey findings to assert that board members view both monitoring and resource-providing functions as integral to their board-related activities. Shen (2003) offers a model where the salient functionality among monitoring and resource-providing is dependent on the tenure/experience of the CEO, i.e. new CEOs benefit from resource-providing functionality, while more experienced CEOs require the monitoring functionality, thereby implying a curvilinear, inverted U-shaped relationship. However, this perspective does not clarify who ultimately decides when and which functionality is appropriate for the board. All that is common to both of these perspectives is that the boards represent dispersed shareholders and guard the investors' fiduciary rights.

3.2 The Issue of Board Functionality and Composition

The fact remains that the board of directors is considered to be an important component of governance of a firm, and boards are considered to be over-researched with very little understanding of their efficacy, functionality and appropriate composition, so much so that Daily et al. (2003) even call for a moratorium on board studies because they seem to create more confusion than clarification. There seems to be no consensus on whether governance by the board of directors has a beneficial impact on firm performance, or even on what might be the appropriate composition or functionality of the board of directors. Based on the premise of non-homogeneous performance objectives, I argue that the issue might be more about *who* chooses the board, to assess

what might be the appropriate functionality for the board, before we attempt to understand *how* a board can be more effective.

These issues of board, ownership and corporate governance effectiveness might have been only matters of intellectual curiosity, but for the fact that practitioners and regulators are leading implementations of 'ideal' board mechanisms and composition without sufficient evidence or even academic validity of the underlying concepts (Dalton, 2004). The fallacy of such a course of action can be judged by the spate of recent corporate governance scandals where these practitioner-designed mechanisms failed to forestall the very incidents they were purported to prevent. To cite some examples, Enron and Worldcom were the worst instances of fraud in corporate America, and Lehman Brothers is the largest American corporate bankruptcy to date. All these corporations had board compositions assessed to be effective by industry standards, i.e. with a high representation of independent outside directors, right up to their downfall.

Given the critical importance of the role and responsibilities of the board of directors, management researchers are still to address a fundamental question, namely which factors influence the choice of the board composition and functionality. I believe this is a necessary first step before we attempt to understand board effectiveness or related issues of corporate governance.

In Chapter 5, I develop the overarching framework of my conceptualization of ownership. I offer a theoretically grounded model based on the premise that different types of owners have differing governance requirements from their boards, and thus prefer different functionality for the boards. Based on these premises, I link each type of owner to their choice of director – insider, affiliated or independent. Thus, utilizing my

ownership aggregation model I am able to explain and predict the board composition in section 3 of Chapter 5.

In the following chapter, I highlight the multi-dimensional aspect of firm performance before developing the ownership aggregation–board functionality relationship and thereafter the ownership-performance relationship.

CHAPTER 4: ABRIDGED REVIEW OF FIRM PERFORMANCE LITERATURE

Nearly all management research is concerned with firm performance (Barney, 1991; Carlson & Hatfield, 2004; Meyer, 1991; Rumelt et al., 1991, but its conceptualization and operationalization are often criticized for being too narrow or limited in scope (Kanter & Brinkerhoff, 1981; Venkataraman & Ramanujam, 1986). Traditionally, firm performance is measured as the market value of the firm (Dalton et al., 2003). The underlying assumption has been that the financial markets are frictionless (efficient), the investors are rational, and thus the market valuation of a firm changes only if there is a change in the firm's fundamental value. Thus, returns of a firm should comove only with news about its fundamental value. However, some researchers assert that there are other factors that might complicate this process of comovement, at least in the short term (Bodurtha, Kim, & Lee, 1995; Froot & Dabora, 1999; Hardouvelis, LaPorta, & Wizman, 1994). These researchers find evidence that factors other than fundamentals affect market valuation of a firm. Some 'noise' in valuation can be attributed to uninformed demand (Cooper, Dimitrov, & Rau, 2001; French & Roll, 1986; Gompers & Metrick, 2001; Lamont & Thaler, 2003; Mitchell, Pulvino, & Stafford, 2002), but this factor alone does not fully explain the changes in stock price variation when there is no change in the fundamentals. In fact, some authors (Fama & French, 1995) find no common factor for the differences in comovement.

Some researchers identify the possible issues as 'friction' caused by market liquidity (Amihud & Mendelson, 1986; Amihud, Mendelson, & Lauterbach, 1997; Becht et al., 2003; Bhide, 1993; Black, 1990; Elyasiani, Hauser, & Lauterbach, 2000), and

investors' 'sentiment'-related mechanisms like investment style, beliefs and behaviour (Barberis & Shleifer, 2003; Barberis, Shleifer, & Vishny, 1998; Barberis & Thaler, 2003; Bloomfield & Hales, 2002; Teo & Woo, 2004). Barberis, Shleifer and Wurgler (2005) build on Vijh's (1994) findings and compare the differing views on comovement of the additions to the S&P 500 during the 1976-2000 period. They find strong support for the sentiment-based comovement, some support for the friction-based comovement and no support for the fundamentals-based view of comovement. They also investigate alternative explanations of firm size, non-trading illiquidity and industry characteristics and find no support for these alternative explanations.

Thus, clearly, utilizing stock price or market valuation is an inexact, if not inappropriate, measure for assessing firm performance. This imperfection in markets and the 'bounded rationality' of investors is also asserted to be an important cause for the mixed findings of the cross-sectional ownership studies. In fact, Jensen (2002) also refined his earlier definition of a firm's objective to be 'long term value maximization' instead of 'value maximization' to distinguish between short-term and long-term returns.

Based on the above findings, I assert that utilizing market valuation as the sole indicator of firm performance, especially in cross-sectional studies, is myopic, and to accurately assess the performance of firms, either longitudinal studies must be utilized or multiple measures of intermediate indicators (e.g. investor returns, production outputs, operational efficiency, research & development expenses) of business process effectiveness (Ray, Barney, & Muhanna, 2004) must be utilized. This assertion is supported by recent works (Boyd, Gove, & Hitt, 2005; Combs, Crook, & Shook, 2004) that recommend conceptualizing performance as a multi-dimensional construct and not

merely as a single-market measure of firm performance. Other researchers also argue for inclusion of multiple indicators or dimensions for firm performance that can account for not only financial, but also technological and behavioural aspects (Barney, 1997; Hitt, Ireland, Hoskisson, Rowe, & Sheppard, 2006; Kaplan, 1984). While some (Misangyi, Elms, Greckhamer, & Lepine, 2006; Rumelt et al., 1991) utilize accounting-based measures like return on assets (ROA) and return on equity (ROE) as indicators of financial performance, Kaplan specifically points to research and development or technological development, which develops firm capabilities to be successful over the long term (Kaplan, 1984). Others (Moran & Ghoshal, 1996, 1999; Nahapiet & Ghoshal, 1998; Sundaramurthy & Lewis, 2003) argue that firms experience behaviourally influenced reinforcing cycles consistent with their prior performance. Thus, there seem to be multiple legitimate and justifiable performance objectives for a firm. In fact, Kanter and Brinkerhoff (1981) specifically note that "performance is a complex construct and encompasses task effectiveness or *goal attainment"* [italics added for emphasis] (Kanter & Brinkerhoff, 1981: pg. 322). However, literature is not consistent on what these goals might be, and *who* decides *which* goal might be appropriate for a given firm.

I assert that ownership is the critical underlying driver that determines *which goal* needs to be attained and thus is a key component in assessing which of the business process measures are the most effective and appropriate indicators of the firm's performance. In the following section, I examine in greater detail the three distinct types of ownership suggested in the literature and link each type to its desired performance objective and its preferred governance structure vis-à-vis board functionality.

CHAPTER 5: OVERVIEW OF THE OWNERSHIP, GOVERNANCE AND PERFORMANCE MODEL

I propose that the objective of the *type of owner*, tempered by the external environment, determines the processes of governance and conduct of *their* firms. External structures and environment might indeed act as constraining factors. However, in keeping with the resource dependency and risk mitigation view, I propose that the owners will substitute within the available governance mechanisms (e.g. acquire a certain level of ownership concentration, adopt or adapt governance structures like size and composition of boards, and organizational form) in order to attain *their* objectives. In other words, I propose ownership is composed of the different types of owners, who, driven by differing imperatives and risk preferences, maintain a specific ownership concentration *within* a firm in order to attain their specific performance objective.

I utilize the Miller (1996) classification of configuration to develop a typology of ownership and explore the underlying imperatives (Miller, 1987) to differentiate between the driving forces (or imperatives) that determine the choice of governance mechanism and the differences in objectives between these types of owners. In the following sections, I elaborate on the theoretical basis as to why these objectives may or may not correspond to the singular shareholder (investor) value maximization objective.

5.1 Theoretical Framework

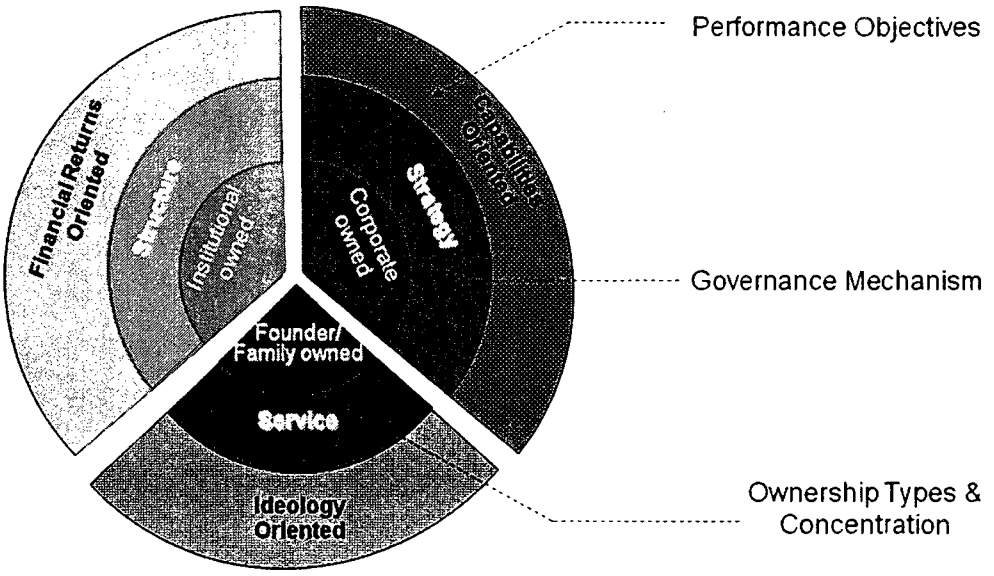
I build on the findings in the extant management literature, encompassing the agency, economic and the behavioural perspectives, to develop an integrated model of

aggregated ownership. This aggregated ownership, in turn, determines the selection of governance mechanism attempting to attain the owners' performance objectives, based on the imperatives of the different types of owners. Such a model might be able to overcome the previously mentioned theoretical shortcomings of choosing one approach over the other, and thus be a better representation of the reality of ownership effect on governance and firm performance.

I propose that the selection and attainment of a firm's performance objectives are determined by the composition of the types of owners and their ownership concentration within a given environmental context. The higher the concentration of any one type of owner, the closer will be the firm's performance objective to the objective of that type of owner. This proposition also incorporates the differences in risk assessment between the types of owners, and supports and enhances the finding of owner identity studies (Pedersen & Thomsen, 1999, 2003; Thomsen & Pedersen, 2000).

As suggested by Figure 1, I am proposing that the performance and governance objectives of a firm are in direct proportion to its aggregated ownership. The schema above implies that if one-third of a firm's shareholding is institutionally owned, one-third corporate owned and one-third owned by founder or family, then its governance mechanisms will reflect a similar split amongst structure, strategy and service and likewise its performance objective will also be equally split between financial returns, capabilities and ideology-oriented objectives.

Figure 1: Schematic of the Ownership–Governance–Performance Relationship



In the following sections I present the theoretical framework for this model, grounding each of the casual factors determining the aggregated ownership construct, and thereafter I offer the ownership typology, develop my arguments that link a type of owner to a preferred type of board director as well as a desired performance objective. Then I offer some hypotheses on the theoretically derived causal factors that link ownership type and concentration to board composition and firm performance.

5.2 Owner Identity and Performance Implications

Though under-researched, the importance of the identity of *largest* shareholder in determining firm performance has been pointed out by some researchers (Cubbin & Leech, 1983; Gedajlovic, 1993; Hansmann, 1988, 1996; Levin & Levin, 1982; McConnell & Servaes, 1990; Nickel, Nicolitsas, & Dryden, 1997; Short, 1994). Building on these studies, Pedersen and Thomsen (1997, 2003) and Thomsen and Pedersen (2000)

find that the identity of the *largest* shareholder, and its ownership concentration, has a significant impact on firm performance. These studies analyze the effect of owner identity in terms of the firm's financial performance measured as the market-value to book-value ratio (effectively share price, controlled for firm size) of 435 firms in 12 European nations, and find significant effects of country and owner identity on the firm's financial performance. Specifically, Pedersen and Thomsen (2003) find that for firms in which financial institutions owned the largest shares, ownership concentration has a positive effect on firm's market-to-book ratios, while Thomsen and Pedersen (2000) find that for firms where the largest shareholder is not a financial institution (i.e. it is either a founder, a family or another corporation), performance measures of sales growth are higher, while in the case of financial institutional 'owners', financial measures of performance are higher. Thus, they assert, owner identity matters in predicting firm performance. However, they focus solely on the largest shareholder (as in the entity with the largest shareholding), and assess performance implications solely from the perspective of the minority investors, thus not acknowledging the fact that the objectives, interests and risk assessment of the other *owners* (large shareholders, but not the *largest*) might also affect the selection and attainment of the firm's performance objectives.[2] Agency theory does not recognize the fact that the interests and risk management of shareholders might be heterogeneous, that is, the interests and risk management of an 'owner' (i.e. a large shareholder) might be justifiably different from those of the other 'owners', as well as the minority investors. Such a conflict of interests is termed as the

[2] Thomsen and Pedersen (2000) do acknowledge the possibility of conflicts of interest between two owner categories, namely shareholders and managers. However, they assert that in such cases the objectives of the dominant category *seem* more likely to prevail, though admitting that the ownership concentration and owner power relationship is 'complex' (pg. 693). They do not address the issue of the interests of other non-managerial 'owner' entities apart from the largest shareholder.

principal-principal agency problem by agency theorists, while economic theorists would term it the transaction cost (Williamson, 1999) or the nexus of contracts (Demsetz & Lehn, 1985), and the behavioural school of thought would term it the consensus-building and decision-making process (Cyert & March, 1963) between the different actors involved in governing a firm. In the context of joint ventures, Hansmann (1996) asserts that the heterogeneity of interests among the partners (two or more different large shareholders in this case) in a joint venture seriously impedes the venture's efficacy, while Tirole (1988, 2001) builds on this heterogeneity to define 'control rights' in her efficiency-based analysis of corporate governance. I assert that this heterogeneity of interests is also the cause of the debate on the merits/demerits of strategic diversification (Amihud et al., 1983; Amihud & Lev, 1981, 1999; Lane et al., 1998, 1999), as ownership and performance implicitly connote different actors and performance yardsticks, as per the agency and classic economics theorists. Thus, the underlying issue seems to be about heterogeneity in *ownership*, and I assert that non-inclusion of this factor is the root cause for the contradiction and confusion in the ownership studies. I argue that different risk assessments and differing imperatives drive different types of owners to select alternative governance mechanisms and performance objectives. Specifically, institutional owners are driven by the structure imperative and market risk management, corporate owners are driven by the strategy imperative and business-specific risk management, while founder and family firms are driven by the leadership imperative and individually (ideology) defined risk management. This argument is elaborated on in the section on typology of ownership.

In effect, I assert that the differing interests of different types of owners *within* any given firm leads to the variation in firms' governance mechanisms and performance objectives vis-à-vis other firms, and the higher the concentration of a specific type of owner, the closer the firm's performance objective to the interests and objective of that type of owner.

Moreover, instead of debating which of these interests *should* take precedence, I assert that only by analyzing ownership overall in terms of the different types of owners, in conjunction with their respective ownership concentration, will we be able to better understand the ownership–board composition and the ownership–performance relationship in a firm. I also propose that the different types of owners acquire a certain ownership concentration – depending on their imperative and environmental context – to safeguard their interests and mitigate their specific risks and thus they adopt differing board composition and functionality to attain their specific objectives. Such a governance perspective is consistent with the resource-dependency perspective, based on the premise that firms do not merely respond to external constraints and control through compliance with their environmental demands, but rather they undertake a variety of strategies to alter the situation confronting them to make compliance less necessary (Pfeffer, 1987; Pfeffer & Salancik, 1978).

This framework of ownership configuration is also consistent with the risk mitigation perspective (Lubatkin et al., 2003; Lubatkin & Chatterjee, 1991). I argue that the owners of a firm, in an effort to achieve their desired objectives, deliberately acquire a certain ownership concentration to mitigate the risks specific to their context, and to overcome or capitalize on the effects of their market and national environment. Thus, in a

largely institution-owned firm, the institutional owner might be attempting to safeguard her financial investment and will be interested in mitigating systematic market risk; in a largely corporation-owned firm, the corporate owner is attempting to safeguard her vertical value chain (Porter, 1980, 1991), or the stability of inflowing resources (Pfeffer, 1987), thereby mitigating business-specific risk; and a predominantly founder- or family-owned firm might be attempting commitment to and continuity of its ideology (Miller & Breton-Miller, 2005), and is only concerned with firm-specific risks.

Furthermore, in an attempt to attain their specific objective as defined by their specific risks, the different owners utilize differing imperatives and thus conduct and govern their firms differently. Typically, any given firm has all three types of owners, and thus the different types of owners acquire an adequate level of ownership concentration to gain and maintain sufficient control, so as to be able to attain the *desired* level of their performance objectives. Thus, the identities of *all* the types of owners (large shareholders) of a firm is a major determining factor of which governance perspective and performance measures are appropriate for analyzing the conduct of the firm, while the ownership concentrations of these types of owners determine the extent to which the firm's overall performance objective matches the respective requirements of the different owner types.

Thus, as different imperatives and different risk assessments are relevant for the different types of owners (Thomsen & Pedersen, 2000: pg. 694), there is a need to utilize a multiple lens perspective wherein the governance and performance implications of ownership in each category are best understood by the tenets of a different perspective. I utilize the agency perspective (Jensen & Meckling, 1976) as it best explains the

governance and performance objectives of an institution owner, while the capabilities perspective (Rumelt et al., 1991) is more applicable for a corporation owner. In the case of founder- and family-owned firms, the tenets of behavioural framework (Moran & Ghoshal, 1999; Nahapiet & Ghoshal, 1998) are better suited to understanding governance issues and explaining performance objectives.

Such a multi-theoretic perspective is not only congruent with the findings of the existing owner-identity studies (Jonnergård & Kärreman, 2004; Lehmann et al., 2004; Pedersen & Thomsen, 1999, 2003; Thomsen & Pedersen, 2000), but might also offer an explanation for the contradictions and mixed results in previous studies on the ownership concentration–financial performance relationship (Dalton et al., 2003; Demsetz & Lehn, 1985; Demsetz & Villalonga, 2001), as in, the relationship between the different types of owners and their ownership concentrations determines the 'various cost advantages and disadvantages' defining the 'equilibrium organization' (Demsetz, 1983: pg. 384).

Thus, governance mechanisms and performance objectives systematically differ among the distinct types of owners as their requirements from *their* firm are different, and thus different theoretical lenses need to be used to understand the variation in performance objectives among the types of owners. Utilizing this multi-theoretic perspective, I develop a broad conceptual typology of three distinct classifications of firm ownership – institution-owned, corporation-owned and founder/family–owned – based on the empirical taxonomical findings of previous studies on ownership.[3]

[3] Boubakri et al. (2005), Pedersen and Thomsen (1999, 2003) and Thomsen and Pedersen (2000) also examine the owner entity of government- or state-controlled enterprises. Though in agreement that governmental ownership operates more on the societal, geo-political and national imperative than on purely business principles as another distinct type of ownership, I exclude state ownership from the present typology.

I acknowledge the fact that most firms will have hybridized ownership, as in all three different types of shareholders will be present within their capital constituents and thus the 'voice' of these different types of owners will lead to deviation from the 'pure' performance objective, which otherwise might be the case if only one type of ownership was prevalent in the firm. Therefore, as any given firm might have two or more of the three types of owners, I argue that the different types of owners *within a firm* will acquire specific levels of ownership concentration sufficient to gain and maintain desired levels of control, in attempting to attain their desired objectives.

Thus, the identities of all the owners (large shareholders) of a firm in conjugation with their shareholding concentrations is a deterministic factor of which board composition will be considered appropriate for the conduct of *their* firm and what performance objective is desirable.

The aggregation of the identity *and* ownership concentrations of *all* the different types of owners will determine the choice of performance objective and board functionality, and hence the performance and board composition of any given firm will be a reflection of the respective performance objective and functionality requirement of the different types of owners.

It is important to reiterate here that, unlike the owner identity studies, my conceptualization of firm ownership is not merely a reflection of the identity of the *largest* shareholder, as I argue for the *aggregation of all the different types of shareholders* that hold shares in the firm. Such a conceptualization is a better reflection of reality, as all public firms have mixed ownership, i.e. the different types of shareholders are present within their capital constituents. I opine that the 'voice' of these

different types of owners will lead to deviation from the 'pure' governance form, which otherwise might be the case if that type of owner was the sole owner of the firm.

Thus, per my model, the effect of ownership is nested within the ownership concentration of these three different types of owners. Such a categorization also circumvents the requirement for a precise definition of what constitutes the 'largest shareholding' as well as the endogenity issues (Demsetz, 1983; Demsetz & Lehn, 1985; Demsetz & Villalonga, 2001) as it allows us to simultaneously assess the impact of the different types of owners within a firm. Previous research has mostly defined the largest shareholder as the entity that has the *largest* percentage shareholding (Pedersen & Thomsen, 1999, 2003; Thomsen & Pedersen, 2000) and thus cannot account for the "ownership structure that emerges being an endogenous outcome of competitive selection in which various cost advantages and disadvantages are balanced to arrive at an equilibrium organization of the firm" (Demsetz, 1983: pg. 384). I argue for assessing *all* the shareholder types and their *aggregated* shareholding percentages, based on the assumption that similar type owners might have similar governance objectives. Thus, I not only cater for the variety in 'cost advantages and disadvantages' and thus circumvent the endogenity issue, but also can better assess the impact of the largest *type* of shareholder.

As my model assesses the concentration effect of the different types of owners simultaneously, it allows us to parse the differences nested within these ownership types and their respective ownership concentration, and thus leads to a clear understanding of the overall ownership effect on firm conduct and performance.

However, the overriding governance and performance objective of a firm might be the one selected by the largest *type* of owner, and the degree of concentration of holding by the other types of owners will define the deviation from the 'ideal' objective of the type of owner(s) with the largest shareholding. Thus, owner identities and ownership holdings assessed *together* is the critical component in the choice of governance mechanism, i.e. the specific functionality requirement from the board of directors, as illustrated in Figures 2 and 3. Based on the above arguments, I offer the following set of hypotheses:

> *H1a: The aggregated ownership (i.e. all the types of owners and their respective shareholdings) will best predict the functionality of the board of directors,*
>
> *H1b: The aggregated ownership (i.e. all the types of owners and their respective shareholdings) will best predict the performance objective of the firm.*

Figure 2: The Aggregated Ownership–Firm Performance Relationship

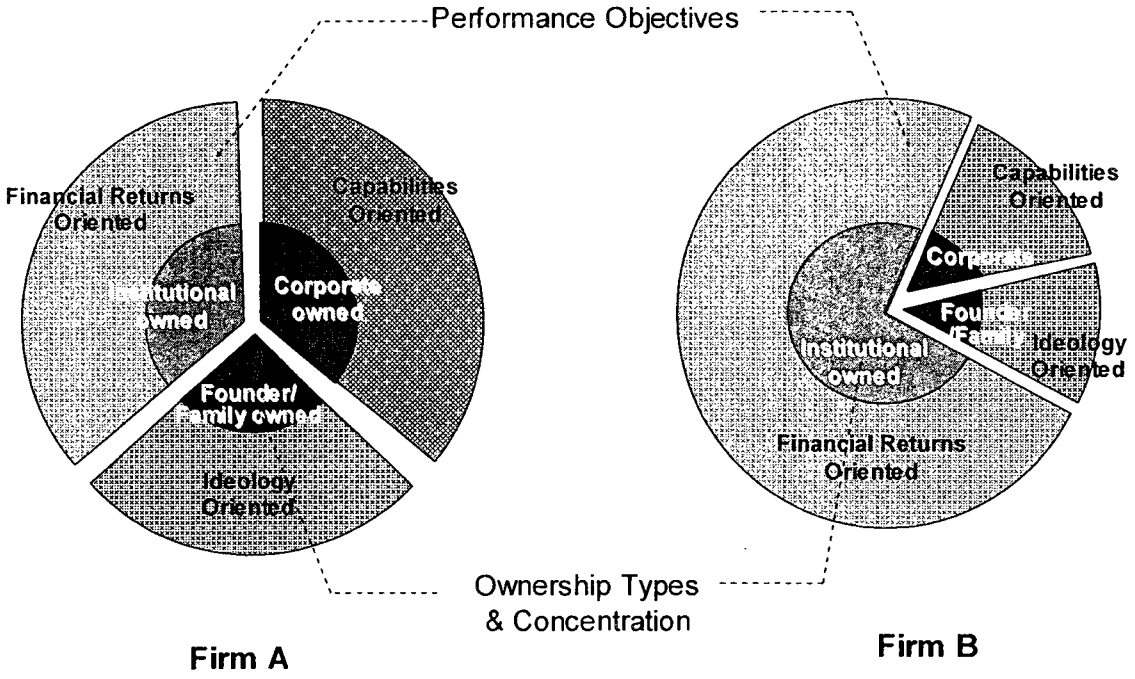
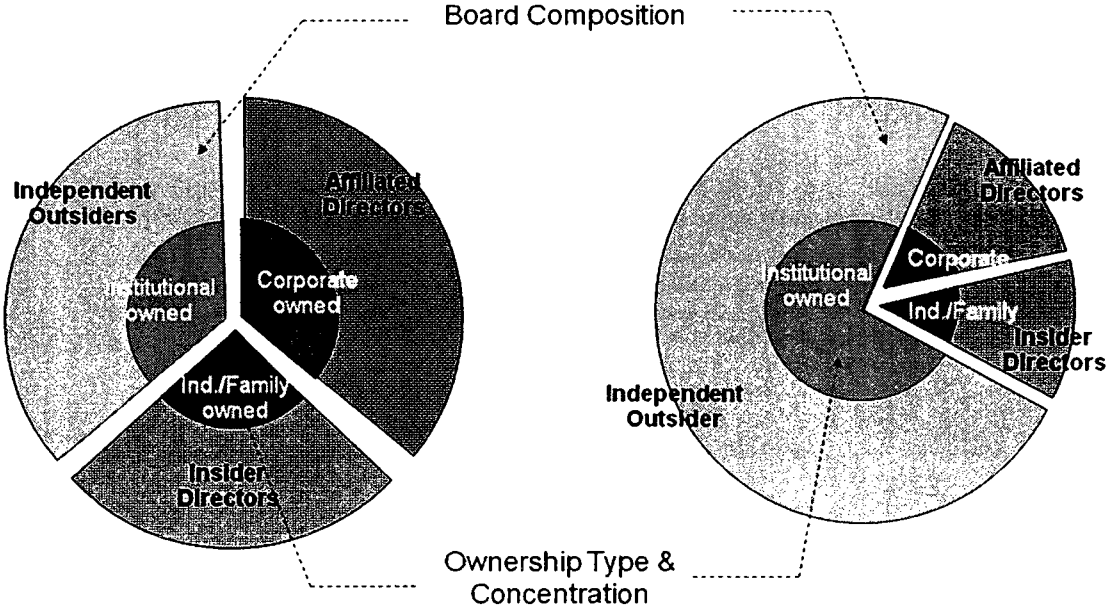


Figure 3: The Aggregated Ownership–Board Composition Relationship



Thus, the owner types and their concentrations are critical to the selection of governance mechanism and firm performance objectives, as illustrated in Table 1 and elaborated on in the following sections.

Table 1: Comparative Overview of the Broad Ownership Types

	Institution Owner	**Corporate Owner**	**Founder/Family Owner**
Risk of Concern	Market specific	Business specific	Firm specific
Imperative	Structure	Strategy	Service
Primary Governance Objective	Mitigating Agency	Resource Providing	Resource Providing
Board Function	Monitoring	Strategy	Service
Theoretical Model	Agency Perspective	Neo-Economic/RBV Perspective	Psychological Perspective
Performance Objectives	Investor Oriented	Capabilities Oriented	Ideology Oriented
Probable Performance Yardsticks	Financial Performance Cost reduction Output targets	Growth Performance R&D outlay Product development	Idiosyncratic Leader Defined
Performance Measures	Return on Total Assets Return on Equity	R&D-Sales ratio Investment in associated firms	Previous Performance

5.3 Ownership Typology and Aggregation Model

In the following section, I examine the three distinct types of owner entities suggested in literature in greater detail, and explore the rationale for the imperatives that might define why the performance objectives and governance mechanism might differ among the different type of owners. In the ensuing section I develop the aggregation model of ownership.

5.3.1 Institution-Owned Firms

The raison d'être of financial institutions (e.g. mutual funds, pension funds, banking, insurance, or other credit enterprises) is to generate financial returns for their constituents. Thus, when financial institutions are shareholders in any firm, their objective will be to ensure that they are provided the maximum return possible. Useem, Bowman, Myatt, and Irvine (1993) cite a fund manager stating, "Whatever we do in the area of proxy initiatives or voting proxies, there has to be fundamentally an economic motivation behind it. Before we devote resources to something we really have to be able to say that this is going to leave our participants better off than if we hadn't done it" (1993: pg. 181). Therefore, this category of owners will govern the firm with an objective of maximizing the financial returns. This type of owner is not a functional or firm operational specialist, and apart from the financial function, will not be able to contribute to the functioning and management of the firm. Thus, there is a distinct separation of ownership from management in such institution-owned firms.

The tenets of agency theory will best explain governance and performance in this type of ownership, and the literature is replete with support for this assertion (Bethel & Gillan, 2002; Carlsson, 2003; Clyde, 1997; Crutchley, Jensen, Jahera, & Raymond, 1999;

Demb & Richey, 1994; Firth, 1995; Hoskisson, Hitt, Johnson, & Grossman, 2002; Woidtke, 2002; Zahra, Neubaum, & Huse, 2000). In such type of ownership, the managers might possibly be in conflict with the financial institutional 'owner', as professional managers are schooled in the strategic tenets of competitive advantage and firm/business specific risk reduction (Bettis, 1983), while the financial institutional 'owner' might be concerned more with maximizing financial returns and mitigating systematic market risk. This type of institutional owner (like the dispersed investors) can minimize the financial risks that it does not wish to bear effectively by means of portfolio diversification, and thus sees no advantage in management engaging in firm/business–specific risk-management activities. Thus, what a manager might consider as gaining advantages of economy of scale and scope and mitigating firm/business–specific risk by acquiring another firm or by diversifying into new markets or new products (Lane et al., 1998), the institutional 'owner' might regard as unrelated acquisition- or value-reducing diversification, or attempts at entrenchment or managerial risk reduction (Amihud & Lev, 1981, 1999). Likewise, managers attempting to finance acquisition with free cashflow or debt might be viewed by institutional owners as attempting to maintain private benefits of control (Amihud, Lev, & Travlos, 1990), while management might view it as a conservative option of organic growth.

Such institutional owners therefore might rely on formal governance structures that are put in place to aid the institutional owner in *maintaining* control and safeguarding its interests from potential managerial misadventures or opportunism. Thus, institutional owners will be driven by the structure imperative (Miller, 1987), wherein such owners pursue the norms of efficiency and stability through routinization, standardization,

specialization and formalization (Mintzberg, 1979), that is, by enforcing formal rules, structures, procedures and hierarchies that not only reduce uncertainties, but also minimize managerial discretion and ensure adherence to specified job descriptions (Miller, 1987: pg. 691). Thus, institution-owned firms might mitigate the 'principal-agent' issues by means of the agency theory–prescribed 'alignment and monitoring' structures like managerial compensation incentives, independent directors and duality in board leadership. Agency theory–prescribed active monitoring functionality by the board of directors, such as monitoring top executives (Boyd, 1994), evaluating and rewarding the top executives (Conyon & Peck, 1998) and monitoring strategy implementation (Rindova, 1999), will be the main governance structures implemented by the institutional owners. The primary driver of these activities is the obligation to ensure that the management operates in the interests of shareholders, as these governance structures ensure scrutiny, evaluation and regulation of managerial actions (Hillman & Dalziel, 2003). Such institutional owners might also prefer the agency theory–prescribed equity incentives for insiders towards 'alignment' with shareholders' interests, and inclusion of outside directors on the board to maintain 'independence' from managerial influence (Jensen & Murphy, 1990).

Such firms utilize the slack resources (available through the institutional owners), recruit influential board members and wield their existing market power to overcome limitations caused by the rigidity and inflexibility of their structure. Such firms might have high market shares, large size, relatively stable or undemanding environment, substantial slack resources and a favourable regulatory climate (Miller, 1987: pg. 693). Thus such owners might be *exploiting* the existing competitive advantage that the firm

has already achieved. Movement towards such structure-driven governance may come with market maturity, stabilization or oligopolization of the industry. Thus, as per this imperative, structure will constrain and, to a large degree, determine strategy (Miller, 1987: pg. 692).

Hence, as per the tenets of agency theory, the financial institutional 'owner' might want to be a large (controlling) shareholder in a given firm, take advantage of the high financial returns from the firm and utilize rigid formal structures to minimize managerial agency costs. Performance will be measured in terms of cost reduction and output targets in an attempt to achieve financial efficiencies, thereby ensuring highest possible returns for the owner, and thus performance objectives will be oriented to investor returns. Governance in such largely institution-owned firms will be structure driven, as institutional owners will prefer the monitoring functionality from their board of directors and will tend to reflect separation of the CEO and Chairman positions. Thus, the board composition of firms with high institutional ownership representation will reflect the highest number of independent directors on the board. Likewise, and thus I offer:

H2a: The shareholding concentration of institutional owners in a firm will be positively related to the proportion of independent directors on the board.

H2b: The shareholding concentration of institutional owners in a given firm will be positively related to financial returns.

5.3.2 Corporation-Owned Firms

Corporations might acquire controlling rights of another firm with a view to developing unique technologies or capabilities, or to ensure uninterrupted supply of goods and resources, or even to deny these capabilities to their rivals, in an attempt to *achieve* competitiveness. Such acquiring of controlling shares is an alternative to the mergers and acquisitions (Palmer & Barber, 2001; Pfeffer, 1972) resorted to by firms to stabilize their resource inflow, or perhaps as a toehold towards a possible future merger or acquisition in accordance with the tenets of a resource-dependence perspective. Folta (1998) asserts that firms undertake equity linkages like direct minority holdings and joint ventures, especially when confronted by technological uncertainty, because they provide an *option to defer* internal development or acquisition of a target firm or venture (1998: pg. 1008). As this type of corporate owner has functional expertise and in-depth understanding of the firm's operations, the possibility of 'principal-agent' issues will be low. The controlling shareholding by the corporation might enable 'a stable structure of coordinated action' (Pfeffer & Salancik, 1978: pg. 161), wherein the corporate-owned firm is utilized for the corporate owner's strategic 'value' maximization, and not necessarily investor financial value maximization. Hence, the performance objective of such a corporate owner might be generation of capabilities and resources that further the corporation's interests instead of financial returns, as generation of profits by the 'held' firm, especially in the short term, might not be the primary concern of the corporate owner.

Likewise, the owning corporation might divert some of its resources or profits to this focal firm, if and when required, to ensure continuity of supply or uninterrupted

capability generation. Support for this assertion is found by Gedajlovic and Shapiro (2002) in their study on ownership and profitability of Japanese firms. Though uncommon in the United States, such corporate ownership is prevalent in Europe, Asia and especially Japan (Banerji & Sambharya, 1996; McGuire & Dow, 2002, 2003), where such firms form the vertical keiretsu alliances. The objective of vertical keiretsu is defined as guaranteeing a *mutually beneficial, self-sufficient* structure to the lead firm and its affiliates (Orru, Hamilton, & Suzuki, 1989). Such interactions between lead and affiliate firms will be termed a principal-principal agency problem by the agency theorists, which leads to lowered performance (Almeida & Wolfenzon, 2006). However, Gittelman and Dunning (1992) attribute the success of Japanese firms in international competition and manufacturing to such inter-firm holdings.

I argue that in certain circumstances (e.g. underdeveloped capital markets, technological uncertainties, hypercompetitive or high velocity environments, fractured specialization of resources, extremely large financial outlay), and in accordance with the tenets of system theory (Freeman, 1984), the large system (controlling corporation) might be optimal *only* when the individual sub-systems (the firms being held) are not operating optimally. An illustration of such a system might be the transfer pricing arrangements between the divisions/subsidiaries of a vertically integrated corporation. The division providing the raw materials or resources (including R&D resources) for the other divisions does so at a lower than market price, and thus the providing division is operating sub-optimally; however, the corporation overall is more competitive and/or profitable because of this arrangement. Thus, the corporate owner might restructure or reallocate resources within its 'held' firms, based on the requirements of its overall

strategic imperative and not strictly as a function of the existing performance of the 'held' firms, i.e. reallocate profits from the high-performing firms to low-performing firms as required to maintain overall efficiencies (Gedajlovic & Shapiro, 2002).

The strategy imperative will be applicable in such corporate-owned firms, wherein structure will follow strategy, as the corporate owner chooses its environment based on its strategic theme and its resource profile. Such owners might prefer to diversify, as they proactively seek new opportunities, new markets and new products, and pursue a strategy of differentiation (Miller, 1987: pg. 695). Such owners thus *maintain* their ownership concentration, so as to coordinate and synchronize the operations of their 'held' firms, in an attempt to develop distinctive competencies that might give them competitive advantage, and such owners will adopt formal planning and more explicit strategies where structure might routinely be altered to follow strategy.

In keeping with the resource-providing perspective, the functionality of the board of directors in such firms might be providing human capital (experience, expertise, reputation) and relational capital (network of ties to other firms and external contingencies) (Hillman & Dalziel, 2003) in order to achieve the desired strategic objectives. Such a "strategy" role for the board is also characterized by Zahra and Pearce (1989) as the directors' *active* involvement "in the strategic arena through advice and counsel to the CEO, by initiating their own analyses, or by suggesting alternatives" (1989: pg. 298). This is in direct contradiction to the agency theory–prescribed *passive* guidance and advisory role and *active* confrontational monitoring role of boards (Becht et al., 2003). However, based on the premise that the owners are themselves functional experts, scrutinizing and monitoring managerial action might not be of prime concern in such

firms, and thus governance in such firms might be more about the board members facilitating and implementing the overall corporate strategic vision, in conjunction with and in active involvement with the firm's management. Thus, I expect a preponderance of affiliated directors in firms with large corporate shareholdings.

Movement towards such an imperative might come during the growth stage and corporate success in such firms will be measured in terms of market-share growth and return on (project) investment (Miller, 1987: pg. 696). The finding of Thomsen and Pedersen (2000) that corporation-owned firms have higher sales growth performance also supports this assertion. Governance in such largely corporation-owned firms will be strategy driven and performance will be capability oriented. Thus I propose:

H3a: Shareholding concentration of corporation owners in a given firm will be positively related to proportion of affiliated directors on the board.

H3b: Ownership concentration of corporation shareholders in a given firm will be positively related to capability generation.

5.3.3 Individual-Owned Firms

Researchers interested in entrepreneurship and family firms have always asserted that these types of firms operate and conduct business in a distinctive manner vis-à-vis other firms (Vesper, 1985). An entrepreneur (or founder) is seen as one who undertakes risky projects that pay off in the long term, distinct from the short- or medium-term orientation of non-founder/non-family firms (Block & MacMillan, 1993; Martens, 2005). Similarly, Miller and Breton-Miller (2005) develop a typology for family-owned firms

that is distinct from comparable firms in their long-term commitment to ideology and employees. Likewise, other researchers (Anderson et al., 2003; Anderson & Reeb, 2004; Gompers et al., 2004) find founder and family firms have an idiosyncratic governance and operating mechanism that is very different from non-founder, non-family firms. These studies also show that family firms generally outperform and outlive non-family–owned firms, while some other researchers find family firms underperform vis-à-vis the market (Lauterbach & Vaninsky, 1999; Schulze, Lubatkin, Dino, & Buchholtz, 2001). An illustrative example that might explain such opposing findings is the case of Corning Inc. described by Miller and Breton-Miller (2005). The founding family and controlling shareholder of this glassware manufacturer decided to diversify into fibre optics in the 1950s, but it took about 30 years before the division generated any revenues, and 50 years before the division turned profitable. Thus, up to the 49th year, the family ownership would be seen as causing underperformance, but from year 50 onwards, it would be seen as leading to outperforming the market. (Corning claims to be rated as "first in fiber" by its costumers, and asserts itself to be the leader in fibre optics [Source: http://www.corning.com/opticalfiber/media_center/index.aspx]). Utilizing their control by the family to undertake such a process is assessed as a long-term commitment by Miller and Breton-Miller (2005), while it might also be termed as managerial entrenchment effect or appropriation of minority shareholders' rights by agency theorists, especially during the early years when the outcome of the commitment to fibre optics was uncertain. Thus, I assert that founder/family firms utilize their ownership concentration to *maintain* control in an attempt to safeguard *their* ideology and *their* aspiration-driven objectives.

The individual-owned founder/family firms also exhibit atypical high debt-to-equity ratios (Gompers et al., 2004), utilize control mechanisms like dual class capital structure or similar anti-takeover provisions (Gompers et al., 2004; Sundaramurthy, 1996), differ in their 'profit achievement' horizons, have close involvement in the activities of the firm (Miller & Breton-Miller, 2005), have stable market valuation and have lower liquidity and volatility in their stock price (Becht et al., 2003). This behaviour can be interpreted in two ways – the low variation in returns makes these types of firms unattractive to investors, or these firms are averse to diluting the ownership/control of the founder/family, and thus prefer debt to issuing equity. In any case, such firms rarely, if ever, have distinct separation of ownership from control.

Such firms are thus clearly driven by the leadership imperative, wherein the leader's ideology defines the firm's orientation towards strategy, structure, decision-making style, governance mechanisms and even selection of target markets (Miller, 1987: pg. 693). An illustrative example is this quote from Rupert Murdoch: "For better or for worse, our company [The News Corporation Ltd.] is a reflection of my thinking, my character, my values" (Pilger, 1998).

This imperative might be more pronounced in smaller firms, in which authority is tightly centralized in the hands of the leader, and the performance will depend largely on the leader's vision. In such cases, structure remains informal, underdeveloped and vague, and almost all elements of strategy and structure are derived directly from the goals, motives and desires of the leader (Miller, 1987: pg. 693). Governance mechanisms utilized by such firms are also considered primarily in terms of resource-providing functionality, or the 'service' role of the board of directors as "enhancing company

reputation, establishing contacts with the external environment, and giving advice and counsel to executives" (Zahra & Pearce, 1989: pg. 292), especially in founder-owned firms as the founders generally are actively involved in the management. Only in the case of family firms where the family is not actively managing the firm might the family members on the board be concerned with monitoring the management. However, family firms tend to recruit professionals with functional expertise or those networked with the professional communities to provide resources (Miller & Breton-Miller, 2005). In such firms, too, there seems to be little separation of ownership from control. Executives in such firms, in fact, receive lower total compensation, but they are better shielded from uncontrollable business risk (Gomez-Mejia, Larraza-Kintana, & Makri, 2003).

Furthermore, based on the tenets of behavioural framework, some studies (Moran & Ghoshal, 1996, 1999; Nahapiet & Ghoshal, 1998; Sundaramurthy & Lewis, 2003) argue that firm performance at the individual level of such firms will experience reinforcing cycles consistent with their prior performance, either continually increasing or continually decreasing. This is consistent with the commitment hypotheses and supports the assertion that governance in largely founder/family-owned firms will be leadership driven, while performance objectives will be behaviour oriented. The individual/family owners tend to maintain very close involvement in the activities of the firm (Miller & Breton-Miller, 2005) and thus have little use of additional monitoring functionality from external board members, hence will prefer to have a larger proportion of insiders on its board. Thus, I propose:

H4a: Shareholding concentration of individual/family shareholders in a given firm will be positively related to proportion of insiders on the board.

H4b: Ownership concentration of founder/family shareholders in a given firm will be positively related to previous performance.

5.4 Need for the Ownership Aggregation Model

As per my model, the effect of ownership is nested within the ownership concentration of these three different types of owners, and thus a definitive and clearer measurement will be possible only by analyzing the identities and composition of the ownership concentration of the different types of owners. Such a categorization will also circumvent the requirement for a precise definition of what constitutes the 'largest shareholding'. Previous research has mostly defined the de facto 'owner' as the entity that has the *largest* percentage shareholding (Demsetz & Lehn, 1985; Demsetz & Villalonga, 2001; Pedersen & Thomsen, 1999, 2003; Thomsen & Pedersen, 2000). Though not in disagreement with this definition, I argue that simultaneously assessing all the different types of owners by *aggregating* the percentage holding of each type might give a clearer understanding of the overall effect of ownership on board composition and firm performance.

This distinction is considered important. To clarify, consider a hypothetical firm with an individual with a 15% holding as the largest shareholder, but with four different institutions with a 10% holding each, and the remaining 45% holding dispersed. As per the classification utilized by the previous owner identity studies, this will be an individual-owned firm, as the largest shareholding is by an individual. However, when assessed in terms of our aggregated shareholding classification, such a firm will be 40% institution owned *and* 15% individual owned. Based on the aggregation model, in the case of the hypothetical firm (Firm X), the cost advantages or disadvantages of the

institutional owners might be similar and, thus, collectively their interest may outweigh the interest of the individual owner. So the question arises as to which imperative will be salient for such a firm, i.e. which of the owners' interests will be 'dominant' in such a firm, and thus which might be the appropriate typology of ownership of such a firm – individual, institutional or mixed? Utilizing the aggregation model allows us to circumvent this issue because we can assess the impact of all the different types of owners *simultaneously* based on the proportion of ownership held by each type of owner. Thus, the aggregation model might better explain and predict ownership effects. An exemplar using four hypothetical firms is shown in Table 2. A quick comparison of the four hypothetical firms illustrated there shows the advantage of utilizing the aggregation approach in analyzing ownership, as it allows for differentiating between the ownership structure of these four firms, while the erstwhile 'largest shareholder defines ownership' approach will not be able to differentiate between these four firms.

Table 2: Ownership of Hypothetical Firms Highlighting Ownership Classification Issues

Firm Name	Firm W	Firm X	Firm Y	Firm Z
Type of owner % held	Individual 15%	Individual 15%	Individual 15%	Individual 15%
Type of owner % held	Family member 10%	Pension fund A 10%	Corporation M 10%	Pension fund A 10%
Type of owner % held	Family member 10%	Pension fund B 10%	Mutual fund J 10%	Mutual fund J 5%
Type of owner % held	Family member 10%	Pension fund C 10%	Mutual fund K 2%	Corporation M 5%
Type of owner % held	Family member 10%	Pension fund D 10%	Mutual fund L 1%	Family member 5%
Classification - existing norm - aggregation model	Individual owned Ind/family 55%	Individual owned Ind/family 15%	Individual owned Corporation 10%	Individual owned Corporation 5%

Cubbin and Leech (1983) also pointed to this complexity in assessing the exact relationship between ownership concentration and owner 'power', and I propose that as utilizing the aggregation model allows us to parse the effect of the different types of owners, assessing ownership as an aggregation (including the identities and respective concentration of holdings of the different types of owners within a firm) might better explain Demsetz's (1983) endogenity effect. Furthermore, the non-inclusion of the other ownership types, when assessing ownership as a singular ownership type based on the identity of the largest shareholder, might be the underlying cause for the mixed findings of previous ownership and governance studies. That is, the non-monotonic finding of Morck et al. (1988: pg. 301), wherein the non-inclusion of the other types of owners' concentration, leads to the confound in assessing performance. The proposed aggregation model might also explain the 'plateauing' largest ownership concentration-performance finding of Thomsen and Pedersen (2000: pg. 699) and McConnell and Servaes (1990: pg. 604), where performance plateaus at the 50-60% level, contrary to the 'principal-principal' agency–prescribed bell-shaped relationship.

However, as per my model, assessing the concentration effect of the different types of owners simultaneously allows us to parse the differences nested within these ownership types and their respective ownership concentration, and thus leads to a clearer understanding of the overall ownership effect on firm conduct and performance. Thus, analyzing ownership in terms of the different types of owners and their respective ownership concentration within a firm will explain the endogenity effect and enable us to examine the effect of each type of owner in determining the overall ownership–governance and firm performance relationships. In the next chapter I describe the study

design, research methodology and choice of variables to operationalize the constructs utilized in the above framework. I chose to limit the study to firms in one particular country to obviate the confounding effects of national institutions, legal and cultural issues. I chose to utilize US corporations for three primary reasons. First, US firms are the focus of most governance and management literature and the majority of my literature review, and thus the theoretical grounding is based on US corporations. Secondly, the most extensive database readily available was for US corporations. And thirdly, US corporations are considered to be the most dispersed investor-held firms worldwide and thus finding empirical support for my conceptualization in the context of US firms might lead to greater acceptance of the framework in the academic community.

CHAPTER 6: RESEARCH METHODOLOGY

The sample was chosen to provide a representative range of all public US firms, and consists of data compiled from three different sources. The ownership data were acquired from the Bureau van Djik Electronic Publishing's OSIRIS database. All US publicly listed firms that reported name, identity and percentage holdings of all their shareholders for the financial year 2006-2007 were included in this sample. OSIRIS reports the direct as well as indirect holdings (via cross holdings, through intermediary entities and/or pyramids), thus I was able to utilize the ultimate ownership percentage of each type of owner. This additive method of compiling ultimate ownership percentages in the database led in some instances to the total holdings exceeding 100%. The boards of directors' data were compiled from the RiskMetrics Group's Corporate Governance annual report, while the CEO duality and tenure data were compiled from S&P's ExecuComp database.

As my conceptualization included multiple dependent variables and formative as well as reflective latent constructs, I chose to utilize Structural Equation Modeling for testing the first set of hypotheses. Coltman and colleagues describe the difference between formative and reflective constructs as follows:

> Management scholars often identify structural relationships among latent constructs by statistically relating covariation between the latent constructs and the observed variables or indicators used to measure these latent, unobserved constructs (Borsboom et al. 2003). This allows scholars to argue that if variation in an indicator X is associated with variation in a latent construct Y, then exogenous interventions that change Y can be detected in the indicator X. Most commonly this relationship between construct and indicator is assumed to be *reflective.* That is, the change in X

is a reflection of (determined by) the change in the latent construct Y. With reflective (or *effect*) measurement models causality flows from the latent construct to the indicators. However, not all latent constructs are entities that can be measured with a battery of positively correlated items, as is typically assumed with *reflective* indicators (Bollen & Lennox 1991; Edwards & Bagozzi, 2000; Fornell, 1982). It is equally plausible to define a construct as being determined by (or *formed)* from a number of indicators without any assumptions as to the patterns of inter-correlation between these items. This is termed a *formative* or *causal index* (Blalock 1964; Diamantopoulos & Winklhofer, 2001; Edwards & Bagozzi, 2000). Here causality flows in the opposite direction, namely from the indicator to the construct. Although the reflective view dominates in the psychological and management sciences, the formative view is common in economics and sociology (Coltman, Devinney, Midgley, & Venaik, 2008: pg. 1250).

Furthermore, as the conceptualization of ownership is as an aggregation and each ownership type is simultaneously being analyzed to a type of board director as well as different dimensions of performance indicators, I chose to test the remaining sets of hypotheses as path analytical modeling.

Structural equation modeling (SEM) is considered the most appropriate statistical methodology for a hypothesis-testing approach to the multivariate analysis of a structural theory bearing on a given phenomenon (Byrne, 1994). SEM enables researchers to test the hypothesized models overall as well as the coefficients individually and it has the ability to test models with multiple dependent variables and to test coefficients across multiple between-subjects groups simultaneously. As SEM assesses the fit of the theoretically derived mathematical model to the data, it allows modeling of the error terms and enables assessment of how well the data compare to the hypothesized model.

SEM is advocated because it can expand the explanatory ability and statistical efficiency for model testing with a single comprehensive method (Hair, Anderson, Tatham, & Black, 1998). However, like any other regression model, SEM cannot confirm causality because it infers causality from the theoretical model.

I conducted the ownership-board composition analysis separately from the ownership-performance analysis because the number of firms with data for board composition and CEO characteristics was lower (N = 1487), while there were significantly more firms with both ownership and performance data readily available (N = 3825). Furthermore, when selecting firms with complete ownership, BOD and performance data available, the sample size was reduced to approximately 500, and even in those firms the distribution amongst the three types of owners and the six types of performance dimensions was drastically curtailed. Attempting to assess the direct relationship between 13 different variables (3 Ownership, 3 BOD, 2 CEO, 2 Firm Size, and 6 Performance) simultaneously with a severely depleted sample size would adversely impact the results. And if the hypothesized models would include mediation or moderation effects, such a small sample size with censored distribution might not result in interpretable or generalizable results.

In the following section, I elaborate on the choice of measures that operationalize each of the hypothesized constructs.

6.1 Ownership Measures

Ownership being the variable of interest, I utilized the aggregation model to assess the overall ownership of every firm in the sample. I calculated three focal ownership variables to test the hypotheses: individual-owned, corporate-owned and institutional-owned. The frequency distribution of the ownership types is as follows:

Table 3: Frequency Distribution of the Ownership Types

Shareholding	Individual Ownership		Corporate Ownership		Institutional Ownership	
	Number of firms	% of firms	Number of firms	% of firms	Number of firms	% of firms
0	1405	36.73	706	18.46	324	8.47
0.1% to 5%	608	15.90	1139	29.78	286	7.48
5.01% to 10%	395	10.33	734	19.19	233	6.09
10.01% to 20%	446	11.66	684	17.88	377	9.86
20.01% to 50%	646	16.89	342	8.94	1075	28.10
50.01% to 80%	272	7.11	178	4.65	1221	31.92
80.01% to 100%	48	1.25	23	0.60	241	6.30
> 100%	5	0.13	19	0.50	68	1.78
Total	3825		3825		3825	

6.1.1 Individual-Owned Shareholdings

Individual-owned (IND_OW) reflects the percentage of shareholdings by named individuals and/or families. As described in the OSIRIS database's definition of individual/family owners, besides single private individuals or families, shareholders designated by more than one named individual or family are also placed in this category. The idea behind this is that they would probably exert their voting power together (cited from the OSIRIS Ownership Guide). This latter case corresponds to entries like: "Mr

Gregory Edward Bailey & Mrs Margaret Ethel Bailey"; "Mme Bringaud and sons"; "Mme Sotto and M Cohen"; "Families Courault and Andrivon".

6.1.2 Corporate-Owned Shareholdings

Likewise, corporate-owned (CORP_OW) is the aggregated percentage of shareholdings by non-financial oriented companies. This category includes all companies that are not banks or other financial companies or insurance companies. They can be involved in manufacturing activities, but also in trading activities (wholesalers, retailers, brokers, etc.). They include companies active in B2B or B2C non-financial services (cited from the OSIRIS Ownership Guide).

6.1.3 Institution-Owned Shareholdings

Similarly, institution-owned (INSTI_OW) is the aggregated sum of shareholding by financial companies like pension funds, mutual funds, banks, insurance companies and other financial companies. I excluded private equity fund holdings from this category as these owners do not strictly conform to the theoretically grounded rationale of financial institutions, i.e. they do not have a strict mandate of generating financial returns and can easily follow the capability or ideology orientations. Also, as previously mentioned, I excluded all state ownership including sovereign fund ownership. In the following sections, I elaborate on the dependent variables for each set of analyses respectively, as well as the control and alternative variables that were utilized.

6.2 Additional Measures for Ownership-Governance Relationship

The initial pool included all firms reported in these databases and, after dropping firms with missing data, the final sample consisted of 1487 publicly listed firms with data

reported from their 2005-2006 financial year report (as reported during 2006-2007) for ownership, board composition and CEO characteristics. The abridged descriptive statistics are reported in Table 4. The complete descriptive statistics are in Appendix 1.

Table 4: Pearson Correlations Ownership–Board Composition Variables

	N	MEAN	STD. DEV.	INSIDERS	AFFILIAT	INDE-PEND	CORP_OW	IND_OW
INSIDERS	1487	1.53	0.86					
AFFILIAT	1487	0.61	0.86	0.028				
INDEPEND	1487	7.24	2.29	-0.174**	-0.083**			
DUALITY	1487	0.53	0.50	-0.050	-0.07**	0.195**		
CEOTENSQ	1403	98.19	221.2	0.175**	0.025	-0.154**		
CEOTEN	1403	6.92	7.10	0.162**	0.018	-0.164**		
CORP_OW	1487	8.72	12.09	0.127**	0.091**	-0.146**		
IND_OW	1487	6.78	15.00	0.291**	0.053*	-0.226**	0.072**	
INSTI_OW	1487	53.58	22.65	-0.119**	-0.082**	0.027	0.005	-0.131**

**. Correlation is significant at the 0.01 level (2-tailed).
*. Correlation is significant at the 0.05 level (2-tailed).

The dependent construct in this analysis is the board functionality. As mentioned before, I utilized the board's composition as a reflection of its functionality. I used the three different types of directors on the board of directors for each firm in my sample: Insider, Affiliated and Independent (Outside) Directors. Also, the alternative model as suggested in the literature is that CEO-specific characteristics influence board composition. I used CEO tenure, the squared value of tenure and duality to operationalize CEO-specific construct. These classifications are in general accordance with the commonly accepted standards in the Management literature and thus were utilized as is.

6.2.1 Insider Directors

Insider Directors (INSIDERS) is the number of insider directors on the Board. I utilized the RiskMetrics Group's classification to define Inside Directors as those who are either:

- Employees of the company or one of its affiliates;
- Non-employee officers of the company if among the five most highly paid individuals (excluding interim CEO);
- Listed as Section 16 officers;
- Current interim CEOs;
- Beneficial owners of more than 50 percent of the company's voting power (may be aggregated if voting power is distributed among more than one member of a defined group).

6.2.2 Affiliated Directors

Likewise, Affiliated Directors (AFFILIAT) is assessed as the number of affiliated directors on the Board. Affiliated Directors are also defined as per the RiskMetrics Group's classification as Directors who are either:

- Board attestation that an outside director is not independent;
- Former CEO of the company;
- Former CEO of an acquired company within the past five years;
- Former interim CEO if the service was longer than 18 months (if the service was between 12 and 18 months an assessment of the employment agreement was made);
- Former executive of the company, an affiliate or an acquired firm within the past five years;
- Executive of a former parent or predecessor firm at the time the company was sold or split off from the parent/predecessor within the past five years;

- Executive, former executive, general or limited partner of a joint venture or partnership with the company;
- Relative of a current employee of company or its affiliates;
- Relative of former executive or CEO, of company or its affiliate within the last five years;
- Currently provides (or a relative provides) professional services directly to the company, to an affiliate of the company or an individual officer of the company or one of its affiliates;
- Employed by (or a relative is employed by) a significant customer or supplier;
- Has (or a relative has) any transactional relationship with the company or its affiliates, excluding investments in the company through a private placement;
- Any material financial tie or other related party transactional relationship to the company;
- Party to a voting agreement to vote in line with management on proposals being brought to shareholder vote;
- Has (or a relative has) an interlocking relationship as defined by the SEC involving members of the BOD or its Compensation and Stock Option Committee;
- Founder of the company but not currently an employee;
- Is (or a relative is) a trustee, director or employee of a charitable or non-profit organization that receives grants or endowments from the company or its affiliates.

6.2.3 Independent Directors

Finally, Independent Directors (INDEPEND) is assessed as the number of independent directors on the Board. The RiskMetrics Group's classification of independent directors is those directors who have no material connection to the company other than a board seat. For purposes of RiskMetric Group's director independence classification, "material" is defined as a standard of relationship (financial, personal or otherwise) that a reasonable person might conclude could potentially influence one's objectivity in the boardroom in a manner that would have a meaningful impact on an individual's ability to satisfy requisite fiduciary standards on behalf of shareholders.

6.2.4 CEO-Specific Variables

As the majority of board literature hypothesizes about the CEO's influence on the board of directors, or alternatively the board's influence on the CEO, I used certain CEO-specific variables to develop an alternative CEO-centred model. I included several CEO-specific variables like duality of board leadership (DUALITY), CEO Tenure (CEOTEN), and the squared value of CEO tenure (CEOTENSQ) in accordance with the CEO power literature to assess the impact, if any, of the CEO on the board composition. DUALITY was coded as a dummy variable where a value of 1 implied the CEO position and Board Chair position were separate, and a value of 0 implied the CEO and Chairman of the board were the same. CEO Tenure was coded as is from the ExecuComp database and reflects the period in years that the individual held the CEO appointment. The squared value of tenure is a simple multiplication of the tenure value by itself and utilized to cater for the possible curvilinear relationship between CEO tenure and board composition.

6.3 Additional Measures for Ownership-Performance Relationship

The ownership and performance data were collected from the Bureau van Djik OSIRIS database. The initial pool included all publicly listed firms reported in the database and, after dropping firms with missing data (mostly ownership data), the final sample consisted of 3825 publicly listed firms with ownership data reported from their 2005-2006 financial year report (as reported during 2006-2007) for ownership and performance. The ownership variables described in section 5.1 were the independent variable in this analysis also. The abridged descriptive statistics are reported in Table 5. The complete descriptive statistics are in Appendix 2.

Table 5: Pearson Correlations Ownership–Firm Performance Variables

	N	INSTI_OW	CORP_OW	IND_OW	NO_EMP	ROSF	ROTA	BK_V_SHR	R&D	ROTA_Diff	ROSF_Diff
INSTI_OW	3825										
CORP_OW	3825	-.053**									
IND_OW	3825	-.243**	-.084**								
NO_EMP	3702	.067**	0.007	-.067**							
ROSF	3533	.139**	.050**	-.033*	.061**						
ROTA	3801	.177**	0.032	-.059**	.051**	.758**					
BK_V_SHR	3821	0.012	0.009	0.005	0.004	0.023	0.029				
R&D	1536	-.102**	0.045	.092**	-.695**	-.092**	-.080**	-.114**			
ROTA_Diff	3725	-.113**	-0.001	.064**	-0.020	-0.032	-.598**	-0.013	0.031		
ROSF_Diff	3441	-.071**	-0.013	0.021	-0.018	-.398**	-.217**	-0.019	0.033	.311**	
R&D_Diff	1497	0.045	0.012	-0.019	.395**	0.052	0.045	.132**	-.719**	-0.016	-0.019

* Correlation is significant at the 0.05 level (2-tailed).

** Correlation is significant at the 0.01 level (2-tailed)

The dependent construct in this analysis is overall firm performance. As described before, I partitioned performance into three categories: Financial Returns oriented, Capabilities oriented and Ideology oriented. I utilized different firm performance characteristics as a reflection of these three types of performance objectives as described below. Also, the alternative model suggested in the literature is that firm size influences firm performance. I included firm size characteristics like book value per share and number of employees to operationalize firm size characteristics.

I elaborate on the rationale and description of each of these variables below.

6.3.1 Financial Returns–Oriented Indicators

This performance objective was rather straightforward to operationalize. I utilized the firm's return on equity and return on total assets as indicators of financial returns. The Osiris database's nomenclature for return on equity is "Return on Shareholders Funds" (ROSF) and was utilized as is. Osiris calculates ROSF as the profit (or loss) before tax divided by total shareholders' equity, multiplying the resultant fraction by 100. Thus, in effect, ROSF is the percentage return on equity for a given firm.

Likewise, I utilized Osiris's calculation Return on Total Assets (ROTA) as is. ROTA is defined as profit (or loss) before tax divided by total assets, multiplying the resultant fraction by 100. Thus, effectively, ROTA is the percentage return on total assets for a given firm.

Utilizing ROSF and ROTA is considered to better than using net profits by itself as ROSF and ROTA normalizes the profitability based on its equity and asset base respectively.

6.3.2 Capabilities-Oriented Indicator

I utilized a commonly accepted measure of capability generation, namely Research and Development expenses incurred by a firm (David, O'Brien, & Yoshikawa, 2008; Franko, 1989). Osiris database's reports research and development (R&D) expenses in terms of thousands of dollars (USD) and was utilized as is. I acknowledge that there are other indicators that can be used in addition to R&D to assess the construct of capability orientation (namely patent applications, human skills development, employee training and developmental expenses); however, these data were not available on any of the databases known to me and manual coding for these data from company reports for 3825 firms would have been extremely time consuming and prone to biases and errors. Thus, in my empirical analysis the capability orientation construct is operationalized as a sole indicator, i.e. the research and development expenses of the firm.

6.3.3 Previous Performance–Oriented Indicators

For the sake of consistency, I retained the financial return- and capability-oriented indicators for operationalizing the previous performance orientation measure. To develop the measure, I first averaged the previous five years (2002 to 2006) ROSF, ROTA and R&D data for each firm and subtracted the 2007 data from this average. This gave me the difference score between the five-year average and the present year (2007) value for each indicator. As the requirement was to assess the difference between the present and average, while the difference could possibly have positive or negative values, where the sign was not of importance per se, I squared the difference score to develop a measure of absolute difference, which was not affected by the sign (+/-) of the indicator.

Thus, essentially, I assessed the change in present performance from (averaged) previous performance so as to assess how much present performance differed from previous performance. The calculation was as follows.

$$ROSF\_diff = [(\text{av. Of 2002 to 2006 ROSF}) - (\text{ROSF 2007})]^2$$

Likewise,

$$ROTA\_diff = [(\text{av. Of 2002 to 2006 ROTA}) - (\text{ROTA 2007})]^2$$

and

$$R\&D\_diff = [(\text{av. Of 2002 to 2006 R\&D}) - (\text{R\&D 2007})]^2$$

This manipulation is considered to be necessary for the proper assessment as illustrated by the example below.

FIRM	5 yr average ROSF	ROSF 2007	Difference	Squared term
W Inc.	12.43	14.43	–2.00	4.00
X Inc.	14.43	12.43	2.00	4.00
Y Inc.	–3.50	–1.50	–2.00	4.00
Z Inc.	3.50	1.50	2.00	4.00

As illustrated in the case above, although the difference between the average values and present values are the same in all four cases, the signs would confound the results during the analysis. Furthermore, squaring the term enables us to capture Sundaramurthy and Lewis's (2003) assertion of reinforcing cycles, i.e. increasing rate of change irrespective of whether it was positive or negative. Thus, as per the hypotheses, individual ownership will be positively related to changes in previous performance, while corporate and institutional ownership will be negatively related to changes in previous performance.

6.3.4 Firm Size Characteristics Indicators

Some of the earliest empirical studies utilized firm size as being predictive of firm performance (Scherer, 1965) and most researchers continue to use size characteristics as control variables in performance-related studies while focusing on the variable of interest for their study. Commonly accepted size characteristics are number of employees, book value per share, market capitalization and net sales.

As my research design utilizes simultaneous equation modeling, which is extremely sensitive to multicollinearity issues, I could not include net sales or market capitalization as a size indicator as it was strongly correlated to other independent variables, specifically the ownership variables of institutional ownership and corporate ownership, and the number of employees variable. This relationship is well documented, and in fact some ownership studies utilize market capitalization as well as net sales as a performance indicator (Thomsen & Pedersen, 2000).

Thus, I omitted market capitalization and net sales as indicators of firm size, and operationalized the firm size construct by utilizing the number of employees (No_EMP) and the tangible book value per share (BkVal_Shr) as indicators of firm size. Osiris reports both these data, as is commonly accepted in management studies, and thus they were utilized as is.

In the following chapter I describe the choice of statistical analysis, present the findings and discuss the results in terms of whether the proffered models and hypotheses predicting the relationships were supported by the empirical data.

CHAPTER 7: FINDINGS AND DISCUSSION

The models developed to test the hypotheses are presented in Figures 4 to 7 and the results are presented in Tables 5 to 10. I utilized structural equation modeling analytical technique using the EQS Version 6.1 (Bentler & Wu, 1995) software package to empirically test and evaluate the fit of the measurement models. I chose the maximum likelihood option for normal theory estimator and robust methods for the non-normal estimators corrections.

Structural equation modeling (SEM) is particularly effective when testing models that are path analytic or involve simultaneous modeling, as well as for models that contain latent (reflective or formative) constructs that are measured with multiple indicators. SEM allows for the simultaneous estimation of the relationships between the exogenous variables and the various levels of endogenous variables (Steensma & Lyles, 2000). Thus, SEM provides for more refined measures of the constructs that consisted of multiple variables, namely ownership-as-aggregation of different types of owners, board functionality-as-composition of the types of board members, and firm performance assessed as a multidimensional construct. SEM is also appropriate for modeling the hypotheses, that is, the relationships between the types of board directors and the type of owner, as well as type of performance and type of owner as the errors-in-variables and the errors-in-equations are simultaneously estimated by means of path analytic tests, i.e. simultaneous equation modeling.

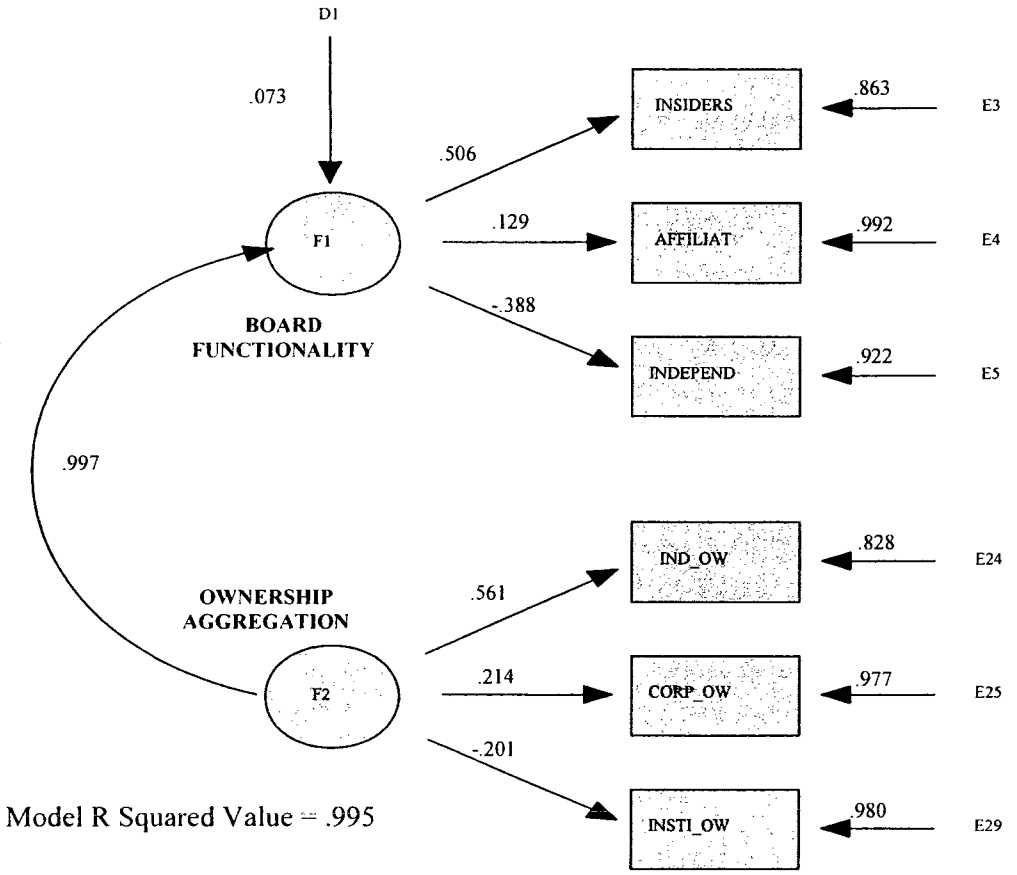
The findings of the statistical analysis utilizing the US public firm data to assess the model and relationships are described in the following sections.

7.1 Ownership-Governance Results

I utilized a model building (vs. model trimming) approach to assess the fit of the measurement models with SEM. Figure 4 shows the structural theoretical model that I tested and includes the standardized parameter values for the various linkages.

The theoretical model (Model 1) consists of assessing the fit of the structural model where the aggregated ownership construct (consisting of IND_OW, CORP_OW and INSTI_OW) predicts the board functionality construct (consisting of INSIDE, AFFILIAT and INDEPD).

Figure 4: Structural Equation Modeling of Ownership-Board Composition



The variables were allowed to correlate freely and I find that the theoretical model fit the data nearly perfectly. The χ^2 (Chi-square) statistic was non-significant (χ^2 12.401; d.f. 8; $p < 0.005$) and the fit indices were also excellent (CFI 0.952; GFI 0.991; IFI 0.954; SRMR 0.033; RMSEA 0.022). Additionally, all of the path estimates were significant and in the expected direction. Despite the good fit of the theoretical model, it was important to test the alternative models that included the CEO-specific variables. I built Model 2 by adding the CEO tenure (CEOTEN) and the squared term of CEO tenure (CEOTENSQ) to the theoretical model, and then built Model 3 by including the CEO–Board Chair duality.

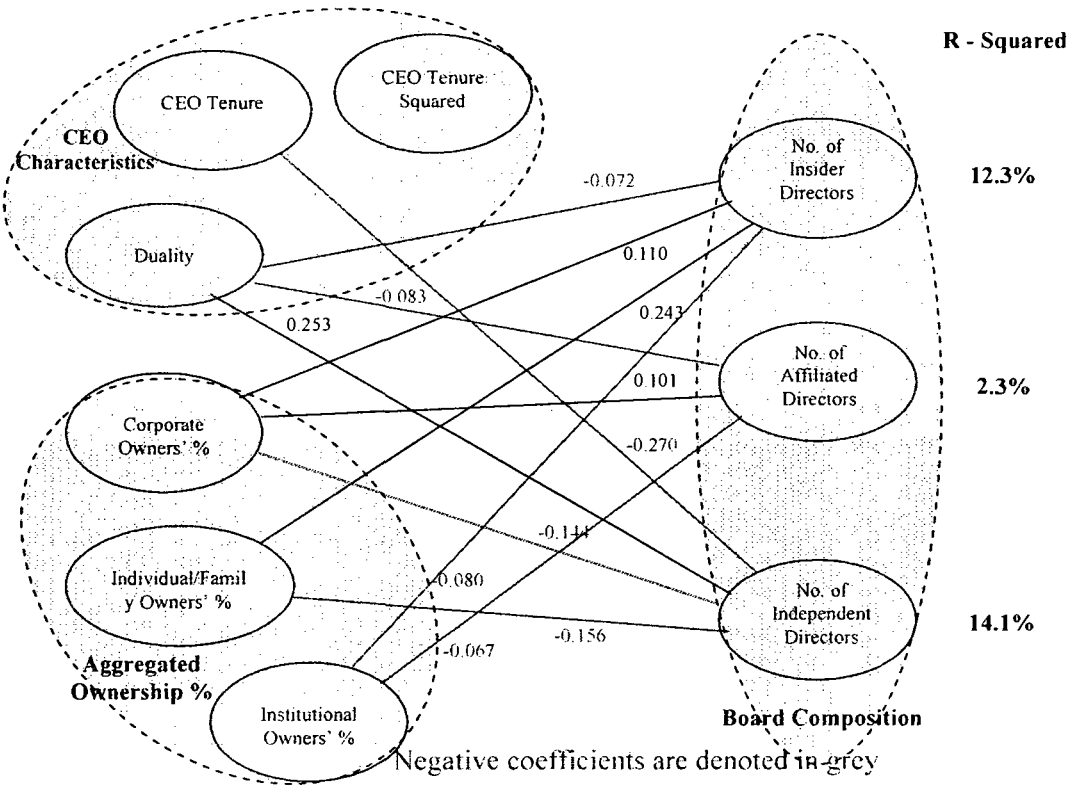
The alternative models were compared to the theoretical model on the basis of χ^2 difference tests, and by examining any changes in fit indices. As shown in Table 6, adding the CEO-specific variables did not significantly improve model fit, and actually deteriorated the alternative model fits. Table 6 shows the fit indices for the theoretical model as well as the alternative models.

Table 6: SEM Model Comparisons Using Goodness of Fit Indices

	χ^2 (*df*)	χ^2 diff (*df*)	SRMR	RMSEA	CFI	GFI	IFI
Model 1 (Baseline) Theoretical model Board Functionality–Ownership	12.401 (8)		.033	.022 90% CI .00; .40	.952	.991	.954
Model 2 Board Composition–Ownership–CEO tenure	47.807 (14)	35.406 (6)	.054	.042 90% CI .029; .055	.827	.977	.833
Model 3 Board Composition–Ownership–CEO duality	84.466 (14)	72.065 (6)	.041	.058 90% CI .046; .070	.835	.984	.838

Thus, the SEM analysis produced a statistically significant ($p < 0.005$ level) difference that allows acceptance of the 'Ownership-Board functionality' theoretical model as more parsimonious and the best fit. Thus Hypothesis 1a predicting a major impact of aggregated ownership on the functionality of the Board is strongly supported. To test Hypotheses 2a to 4a, I conducted a path-analytical analysis of the three dependent board composition variables using the independent variables of aggregated ownership of the three types of owners, and the CEO-specific variables. I used a model-building approach in this case, and assessed the change in fit indices with the addition of each variable. Model 1 assessed the relationship between board and ownership variables.

Figure 5: Path Analysis Assessing Ownership, CEO and Board Relationships



* All reported coefficients are significant at 5% level ($p < 0.05$)

The theoretical model fit the data well. The χ^2 (Chi-square) statistic was non-significant (χ^2 8.018; d.f. 3; $p < 0.005$), and the fit indices were also excellent (CFI 0.962; GFI 0.995; IFI 0.965; SRMR 0.024; RMSEA 0.034). Additionally, all of the path estimates were significant and in the expected direction. I then built Model 2 by adding the CEO tenure (CEOTEN) to the theoretical model, and Model 3 by including the CEO–Board Chair duality, while Model 4 included the squared term of CEO tenure (CEOTENSQ), and Model 5 included all the above variables. However, to overcome the lack of change in degree of freedom in this approach, I included all potentially relevant variables in each model including the baseline (Model 1), and fixed their relations to other variables at zero. As I tested Models 2-5, I simply allowed the paths to be estimated freely. Including the additional variables with paths fixed at zero permitted chi-square difference estimations. The results of the goodness of fit indices are presented in Table 7.

Table 7: Path Analytical Model Comparison Using Goodness of Fit Indices

	χ^2 (*df*)	χ^2 difference (*df*)	SRMR	RMSEA	CFI	GFI	IFI
Model 1 (Baseline) Theoretical model Board Composition–Aggregated Ownership	161.97 (12)		0.048	0.094 90% CI (0.082; 0.107)	0.952	0.974	0.952
Model 2 Board Composition–Aggregated Ownership–CEO tenure	121.72 (9)	40.20 (3)	0.040	0.095 90% CI (0.080; 0.110)	0.964	0.981	0.964
Model 3 Board Composition–Aggregated Ownership–CEO duality	97.90 (9)	64.07 (3)	0.045	0.084 90% CI (0.069; 0.099)	0.971	0.984	0.972
Model 4 Ownership–Board composition–CEO duality–CEO tenure	15.39 (6)	146.58 (6)	0.012	0.033 90% CI (0.013; 0.055)	0.997	0.998	0.997
Model 5 Ownership–Board composition–CEO duality–CEO tenure–CEO tenure square	11.44 (3)	150.53 (9)	0.012	0.045 90% CI(0.019; 0.074)	0.997	0.998	0.997

The alternative models were compared to the theoretical model on the basis of χ^2 values, and any changes in fit indices were examined. As shown in Table 7, adding the CEO-specific variables marginally improved model fit indices and the χ^2 difference test was significant, thus Model 5 is accepted as the most appropriate. The results of the simultaneous equation analysis shown in Figure 5 are tabulated in Table 8.

Table 8: Results of the Ownership-Board Relationship Path Analysis

Relationship		Unstandard -ized Coefficient	Standard Error	P value P <	Std. Co efficient	Adj. R square
Dependent	Independent					
Insider Director	Individual/Family Ownership	0.014	0.002	0.000	0.243	0.123
	Corporate Ownership	0.008	0.002	0.000	0.110	
	Institutional Ownership	-0.003	0.001	0.005	-0.080	
	CEO Chair Duality	-0.124	0.046	0.01	-0.072	
	CEO Tenure	0.005	0.007	ns	0.042	
	CEO Tenure squared	0.000	0.000	ns	0.095	
Affiliated Director	Individual/Family Ownership	0.001	0.002	ns	0.023	0.023
	Corporate Ownership	0.007	0.002	0.005	0.101	
	Institutional Ownership	-0.002	0.001	0.050	-0.067	
	CEO Chair Duality	-0.140	0.048	0.001	-0.083	
	CEO Tenure	0.002	0.008	ns	0.017	
	CEO Tenure squared	0.000	0.008	ns	0.020	
Independent Director	Individual/Family Ownership	-0.024	0.005	0.000	-0.156	0.141
	Corporate Ownership	-0.027	0.005	0.000	-0.144	
	Institutional Ownership	-0.001	0.003	ns	-0.008	
	CEO Chair Duality	1.162	0.121	0.000	0.253	
	CEO Tenure	-0.087	0.020	0.000	-0.270	
	CEO Tenure squared	0.001	0.001	ns	0.070	

The path estimates reported between the independent variables and the dependent variables were significant and in the expected direction. Number of insider directors was positively and significantly related to percentage held by individual/family as well as corporate owners, but the effect was much larger for individual/family owners. Thus, Hypothesis 4a predicting a positive relationship between individual/family ownership and insiders on the board is strongly supported. Likewise, Number of affiliated directors was positively and significantly related to percentage held by corporate owners. Thus Hypothesis 3a predicting a positive relationship between corporate ownership and affiliated directors on the board is strongly supported. Finally, Number of independent directors had no significant relationship with institutional owners, though it was negatively and significantly related to percentages held by individual and corporate owners. As suggested in my framework, founder/family firms, as well as corporate firms, prefer independent directors on their boards for the strategy- and service-providing functions, while institutional owners prefer independent directors for the monitoring functionality. This might explain the non-significant direct relationship between institutional ownership and number of independent directors on the board. Furthermore, as there were only these three types of owners in the model, negative relationships with two can be interpreted as default relationship with the third. Thus, Hypothesis 2a predicting a positive relationship between institutional owners and independent directors on the board, though consistent with the rationale, is not fully supported.

I will link the findings of the two analyses and elaborate further on these findings, especially the role of CEO-specific characteristics, in the Discussion section, after describing the ownership-performance relationship in the next section.

7.2 Ownership-Performance Results

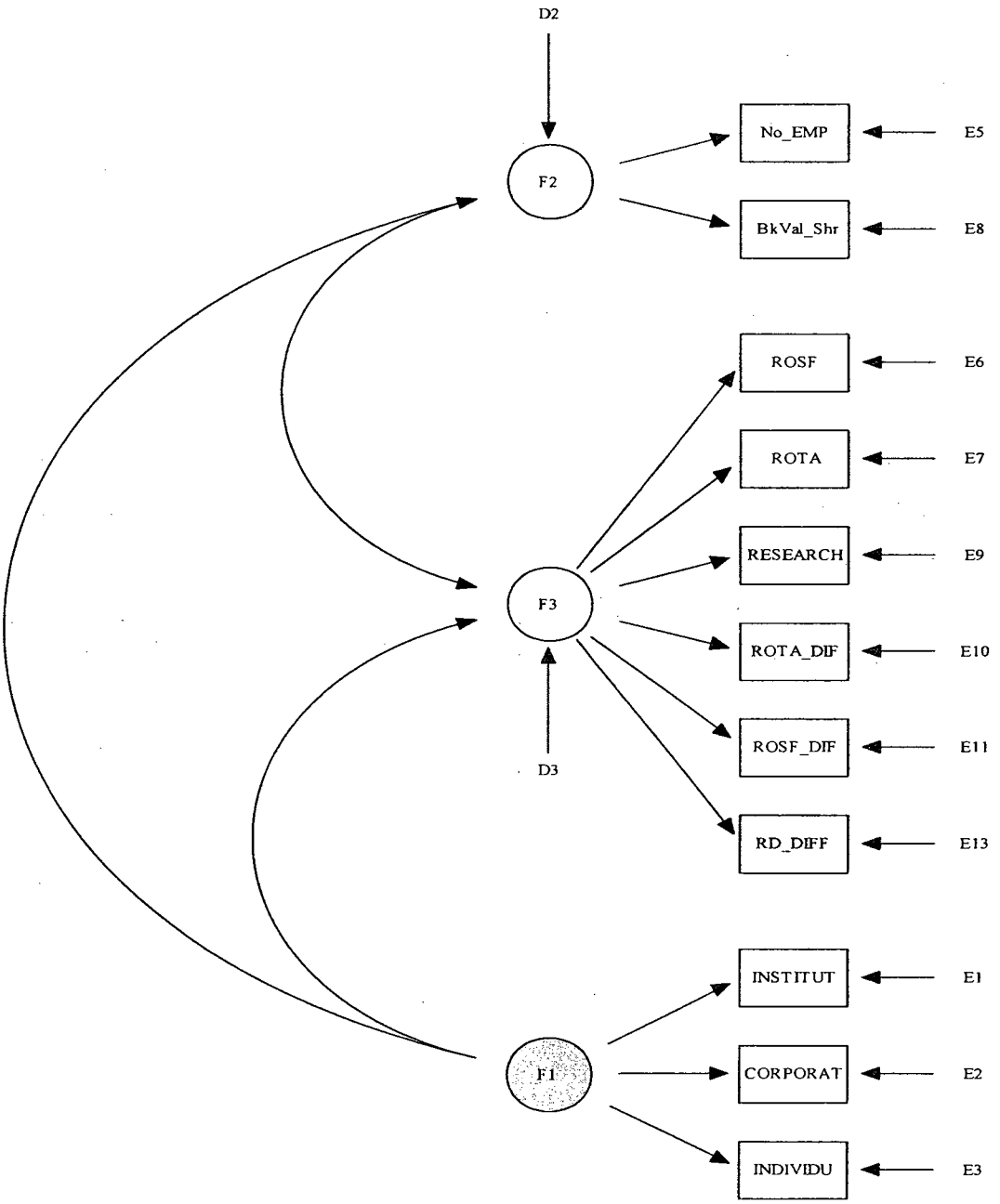
Unlike in the previous analysis, I utilized a model trimming approach to assess the fit of the measurement models utilizing SEM. Figure 6 shows the structural theoretical model that I tested and includes the standardized parameter values for the various linkages. In this analysis, unlike in the ownership-board model, the ownership-performance model does not assess ownership model vis-à-vis firm size model as predictor of performance, but states that ownership as well as firm size are important predictors for performance objectives.

Thus, the baseline theoretical model (Model 1) consists of assessing the fit of the structural model where the aggregated ownership construct (consisting of individual/ family ownership [IND_OW], corporate ownership [CORP_OW] and institutional ownership [INSTI_OW]), as well as the firm size construct (consisting of book value per share [BkVal_Shr] and number of employees [No_EMP]) together predict the firm performance objective construct consisting of financial returns orientation, capability generation orientation and leadership/behaviour orientation. These performance orientations were operationalized as return on equity (ROSF) and return on assets (ROTA) for financial returns, research and developmental expenses (R&D) for capability, and previous performance (ROSF_diff, ROTA_diff and R&D_diff) for behaviour/leadership orientation.

Although I did not specifically hypothesize ownership impact on firm size, as suggested in literature reviewed earlier, I included a two-stage model (Model 2) wherein ownership predicted firm size, and then both ownership and firm size predicted

performance. Model 3 assessed ownership-performance, while Model 4 assessed size-performance. The result of Model 2 is presented in Figure 6.

Figure 6: Structural Equation Model of Ownership, Size and Performance Relationship



Ownership-Size-Performance Model Chi Sq.=2477.67 P=0.00 CFI=0.635 RMSEA=0.047

The variables were allowed to correlate freely and, as can be seen, the theoretical model fit the data for Model 2. The χ^2 (Chi-square) statistic was non-significant (χ^2 2477.675; d.f. 41; $p < 0.000$), though the fit indices were mixed (CFI 0.635; IFI 0.649; MFI 0.955; RMSEA 0.047). Additionally, all of the path estimates were significant. The EQS printout of the results is found in Appendix 3.

Thereafter, I excluded the ownership and firm size relationship and allowed these to correlate freely while assessing the direct effects of ownership and firm size on performance (Model 1). The model fit the data for Model 1 also. The χ^2 (Chi-square) statistic was non-significant (χ^2 2444.993; d.f. 41; $p < 0.000$), though the fit indices were mixed (CFI 0.619; IFI 0.635; MFI 0.953; RMSEA 0.048) in this case too. However, as can be seen from the fit indices, this model fit was marginally poorer compared to the previous model.

Despite the adequate fit of these two theoretical models, and to clarify the impact of ownership on performance, it was important to examine the models that assessed ownership-performance and size-performance independently to test for equivalent model effect ((Henley, Shook, & Peterson, 2006). To do so, I trimmed Model 1 by first removing the firm size variables from the theoretical model, thus assessing only the ownership-performance relationship (Model 3). And, finally, I built Model 4 by including only the firm size and performance indicators.

These models were compared to the theoretical model on the basis of χ^2 difference tests, and by examining any changes in fit indices. Table 9 shows the fit indices for the models, and as can be seen from the table, the model assessing ownership predicting performance (Model 3) had the best fit based on the χ^2 difference tests and

comparing fit indices. Model 4 predicting firm size as the sole predictor of performance did not significantly improve model fit, and actually deteriorated the model fits.

Table 9: SEM Model Comparisons Using Goodness of Fit Indices

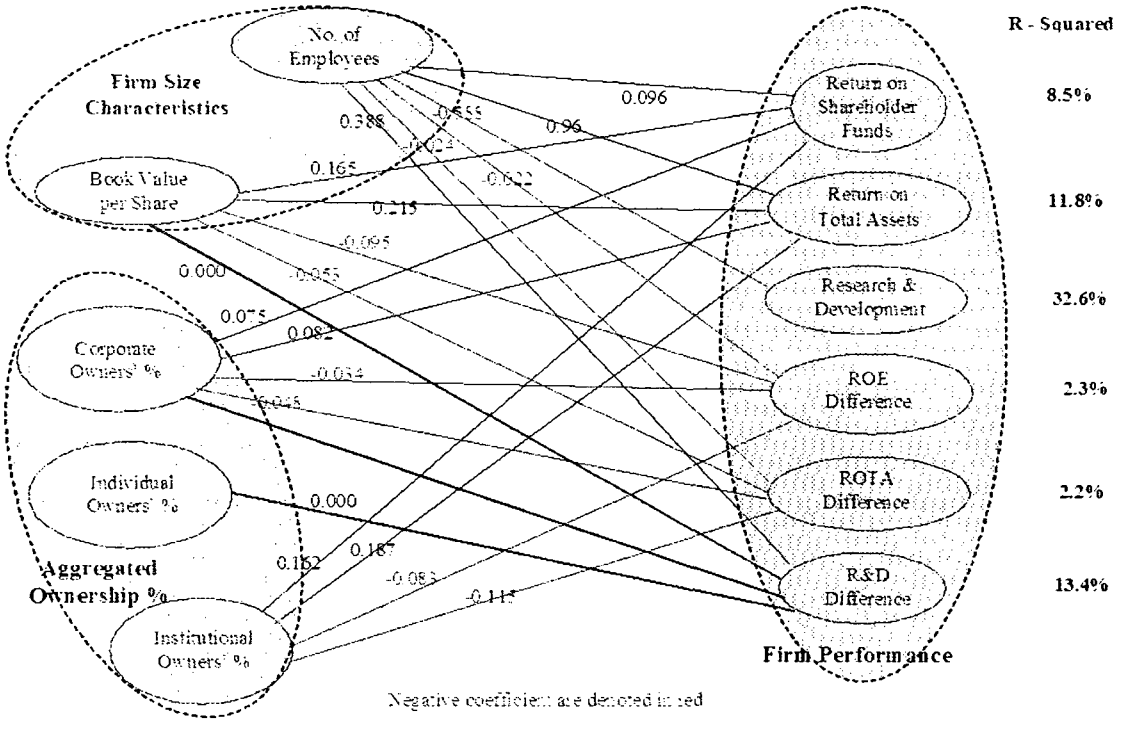
	χ^2 (*df*) *p* < *0.0000*	χ^2 diff (*df*)	Robust χ^2 (*df*)	RMSEA	CFI	MFI	IFI
Model 1 (Baseline) Theoretical model Performance–Ownership & Size	2444.99 (41)		388.32 (55)	.048 90% CI .041; .056	.619	.953	.635
Model 2 1. Performance–Ownership & Size 2. Size–Ownership	2477.67 (41)		388.32 (55)	.047 90% CI .040; .055	.635	.955	.649
Model 3 Performance–Ownership only	1637.922 (26)	807.07 (15)***	241.04 (36)	.039 90% CI .029; .049	.740	.980	.752
Model 4 Performance–Size only	2429.414 (19)	15.576 (22)^{ns}	181.27 (28)	.049 90%CI.038;.060	.610	.978	.632

*** $p < 0.0001$ ns p value is non-significant

Based on the above model fit comparisons, all four models have marginally adequate fit, but it seems that the aggregated ownership model is the most parsimonious and has the best fit. Thus, Hypothesis 1a stating that aggregated ownership has a major impact on firm performance is strongly supported. However, bearing in mind that the size measures are not complete, this result must be interpreted with caution.

To test Hypotheses 2a to 4a, I conducted a path-analytical analysis of the six dependent firm performance variables, using the independent variables of aggregated ownership of the three types of owners, and the two firm size variables. As there was no alternate model to test in this case, and the main focus was on simultaneously testing all the hypothesized relationships, I assessed the model fit indices and the direction and significance of the regression coefficients.

Figure 7: Path Analysis Assessing Ownership, Size and Performance Relationships



Model 1 assessed the relationship between performance and ownership variables. The theoretical model fit the data well. The χ^2 (Chi-square) statistic was non-significant (χ^2 2802.125; d.f. 15; $p < 0.000$) and the fit indices were adequate (MFI 0.964; IFI 0.235; RMSEA 0.070). Additionally, nearly all of the path estimates reported between the independent variables and the dependent variables were significant and in the expected direction.

Results of the SEM that assessed the individual relationships presented in Figure 7 are tabulated in Table 10. The EQS printout with the full results is in Appendix 4.

Table 10: Results of the Ownership-Performance Relationship Path Analysis

Relationship		Unstandardized Co-efficient	Standard Error	P value p <	Std. Co-efficient	Adj. R square
Dependent	Independent					
ROSF	Individual/Family Ownership	-0.054	0.162	ns	-0.009	0.085
	Corporate Ownership	0.549	0.193	0.005	0.075	
	Institutional Ownership	0.568	0.097	0.000	0.162	
	Number of Employees	0.001	0.000	0.001	0.096	
	Book Value Per Share	2.780	0.452	0.000	0.165	
ROTA	Individual/Family Ownership	0.019	0.064	ns	0.008	0.118
	Corporate Ownership	0.241	0.076	0.005	0.082	
	Institutional Ownership	0.265	0.038	0.000	0.187	
	Number of Employees	0.000	0.000	0.000	0.096	
	Book Value Per Share	1.454	0.179	0.000	0.215	
R&D	Individual/Family Ownership	471.697	1006.957	ns	0.110	0.326
	Corporate Ownership	513.131	1201.932	ns	0.010	
	Institutional Ownership	-482.188	606.543	ns	-0.019	
	Number of Employees	-21.923	0.890	0.000	-0.563	
	Book Value Per Share	-3390.198	2819.129	ns	-0.028	
ROSF_diff	Individual/Family Ownership	23.142	77.399	ns	0.008	0.023
	Corporate Ownership	-116.018	51.545*	0.001*	-0.034	
	Institutional Ownership	-135.892	46.622	0.001	-0.083	
	Number of Employees	-0.056	0.020	0.001*	-0.022	
	Book Value Per Share	-742.080	216.691	0.005	-0.095	
ROTA_diff	Individual/Family Ownership	8.403	16.527	ns	0.014	0.022
	Corporate Ownership	-34.672	19.727	0.000*	-0.048	
	Institutional Ownership	-39.912	9.955	0.000	-0.115	
	Number of Employees	-0.013	0.015	0.005*	-0.024	
	Book Value Per Share	-88.151	46.269	0.000*	-0.053	
R&D_diff	Individual/Family Ownership	1.000	0.000	0.000	0.000	0.134
	Corporate Ownership	1.000	0.000	0.000	0.000	
	Institutional Ownership	3.0E+07	2.10E+08	ns	0.004	
	Number of Employees	4.0E+06	3.0E+05	0.005*	0.366	
	Book Value Per Share	1.000	0.000	0.000	0.000	

*** Robust Statistics Negative coefficients are denoted in grey**

Return on shareholder funds (ROSF) was positively and significantly related to percentage of shares held by institutional owners as well as corporate owners, but the effect was much larger for institutional owners. The size variables were also positively and significantly related to ROSF. Individual/Family ownership had no significant relationship to ROSF. Likewise, return on total assets (ROTA) was also positively and significantly related to percentage of shares held by institutional owners as well as corporate owners, but the effect was much larger for institutional owners. The size variables were also positively and significantly related to ROTA. Individual/Family ownership had no significant relationship to ROTA. Thus, Hypothesis 2b predicting a positive relationship between institutional ownership and financial returns is strongly supported.

Hypothesis 3b predicted a positive relationship between corporate ownership and capability orientation operationalized as research and development expenses (R&D). As R&D was coded as an expense, i.e. higher R&D expenditure implied a larger negative number, a positive co-efficient would imply lower R&D spending. As can be seen from the results, R&D had no significant relationship with any of the ownership variables and, in fact, the direction was opposite to the expected direction vis-à-vis corporate ownership. Thus, Hypothesis 3b was not supported.

Finally, Hypothesis 4b predicted positive relationship between individual/family ownership and changes in previous performance, while the relationship between institutional and corporate ownerships vis-à-vis change in previous performance was predicted to be negative. As seen from the results, ROSF difference and ROTA difference are negatively related to institutional as well as corporate ownership and the

size variables while individual/family ownership had a positive but non-significant relationship with ROSF and ROTA differences. R&D difference had a positive and significant relationship with all variables except institutional ownership. Thus, overall, Hypothesis 4b is considered to be partially supported.

The findings for changes in R&D expenses need to be interpreted with caution. Although consistent with the hypothesis vis-à-vis individual/family ownership and institutional ownership, the relationship to corporate ownership is also positive. Bearing in mind that R&D expenses are hypothesized to positively relate to corporate ownership, it is plausible that corporate owners too increasing change (increase or decrease) R&D expenses based on their capability generation requirement. Furthermore, all the coefficients for R&D_diff are extremely low. Finally, closer analysis of the data reveals that the squared term of change in R&D expenses (R&D_diff) has a low base rate and an abnormal distribution (N = 1497; Range = 4.0E+12; Mean = 2.15E+10; SE= 5.05E+08; SD = 1.95E+11) so the significance might be merely statistical artifact. Please see Appendix 2 for full details.

It is important to state that, as can be seen from Tables 7 and 9, the different types of ownership, i.e. individual/family, corporate and institutional, have significantly different directionality and coefficient sizes vis-à-vis the dependent variables and, thus, overall there is strong empirical support for the assertion that different types differ in their preference for board composition and firm performance objectives.

In the next section I discuss the findings in greater details and thereafter I conclude at Chapter 8 with the limitations and research and managerial implications of this research.

7.3 Discussion of Results

As described above, most of the hypotheses generated from my framework were supported by the empirical data, in fact only Hypothesis 3b was not supported. In this section, I will attempt a post-hoc rationalization of the hypothesis as well as opine on some of the possible interpretations and implications of all the findings.

Findings on R&D indicator: I had used R&D expenses as a measure of a firm's orientation towards capability generation. As discussed in the measures section, the R&D variable might not be an effective operationalization of the capability generation construct. Some studies criticize operationalizing such measures as being tautological (Porter, 1991; Williamson, 1999). In addition to the possibility of operationalization misspecification, the findings are non-significant and in a contrary direction. As per the findings (see Table 9), corporate ownership was positively related to R&D expenses, though the co-efficient was not significant. Furthermore, individual/family ownership was positively but non-significantly related to R&D expenses. All other variables were negatively related, though only number of employees (No_EMP) was significantly related. What is interesting is that the adjusted R square value for R&D, i.e. the proportion of variance explained, was 32.6%, implying a major impact of ownership and size variables on R&D, though no conclusions can be inferred from this finding. I opine that the following might be the confounding factors in the present findings:

1. Industry Effects: As my research design was a single level (firm-level) analysis, I was unable to cater for any industry effect as that would require a multi-level structural equation modeling (ML-SEM) approach. Management literature accepts that industry has a critical impact of firm's R&D expenditure (Erwin, 2008; Juha,

Markku, Thomas, & Shaker, 2009). Therefore, not catering for industry effects might be the cause of the lack of supporting evidence.

2. Year Effects: My data were for the year 2007-2008 (as reported in September 2008) for public US corporations. As the effects of the soon to follow financial and liquidity crisis might already have been felt by the companies, R&D expenses might have been temporarily curtailed. There is a rich tradition of research linking R&D to organizational slack and debt holding (David et al., 2008). This also might be a factor confounding the finding.
3. Data Size Effects: As can be seen from the descriptive table (Table 5), R&D data were available for only 1536 firms and this is nearly half the datapoint of all other variables. This too might be a contributing factor for the lack of finding.

In addition to the hypothesis discussed above, I would like to discuss the findings overall. First, as explained in the measures section, the operationalization of firm size was limited because of multi-collinearity issues. That issue by itself is of interest because, though I did not specifically model it, firm size might be a function of ownership. I attempted an explorative test of this relationship (Model 2 of the path-analytic model) and the model fit of size partially mediating the ownership-performance relationship was marginally better than the model (Model 1) that assessed the direct effects of size and ownership on performance. Likewise, in the ownership-board relationship, it might be of interest to specifically model and test for the ownership impact on CEO characteristics. There is anecdotal as well as some academic support for the assertion that individual/ family owners tend to be the CEOs of their firms. This issue is worth investigating further, especially in the context of assessing ownership impact on board composition.

Finally, I think it is imperative to highlight the interpretation of the findings overall. Hypothesis 2b predicted positive relationship between institutional ownership and financial returns and the data support this assertion. However, this does not necessarily imply that institutional ownership *results* in superior financial returns; it only implies higher institutional ownership is consistently related to higher financial returns. Some individual/family-owned firms might outperform all other firms, while other individual/family-owned firms might underperform and thus individual/family ownership does not have any consistent relationship to financial returns. At best, the inference might be that individual/family ownership might be variance enhancing performance-wise, while institutional and corporate ownership might be mean enhancing.

Similarly, the findings of changes from previous performance (Hypothesis 4b) also do not assert causality. To be able to ascertain causality, the analysis needs to longitudinally assess the changes in ownership vis-à-vis the changes in performance.

Furthermore, the data set consisted only of US public firms for which ownership details were available and did not include privately held firms. As most of the privately held firms are individual/family owned or corporate owned, the possibility of selection biases in the findings cannot be ruled out. Finally, I specifically modeled the squared term of change in performance based on the literature, while the change might have been linear. Again, longitudinal studies might enable a clearer understanding of the relationship. In the next chapter, I go over some of the future research and managerial implications.

CHAPTER 8: IMPLICATIONS AND CONCLUSION

This thesis asserts that a firm's aggregated ownership, i.e. the type and respective concentration of the different owners, is an important determinant of the choice of governance mechanism, and important in identifying the firm's performance objectives. Utilizing the aggregated ownership model, and by simultaneously testing all the different hypotheses, this study is able to overcome the limitation of the owner identity studies and thus is a better assessment and operationalization of the ownership construct. Furthermore, as the effects on three different types of owners are simultaneously assessed, this framework might be able to explain the 'different cost advantages and disadvantages endogenous to ownership', i.e. the endogeneity issues (Demsetz & Lehn, 1985) that confounds previous ownership studies.

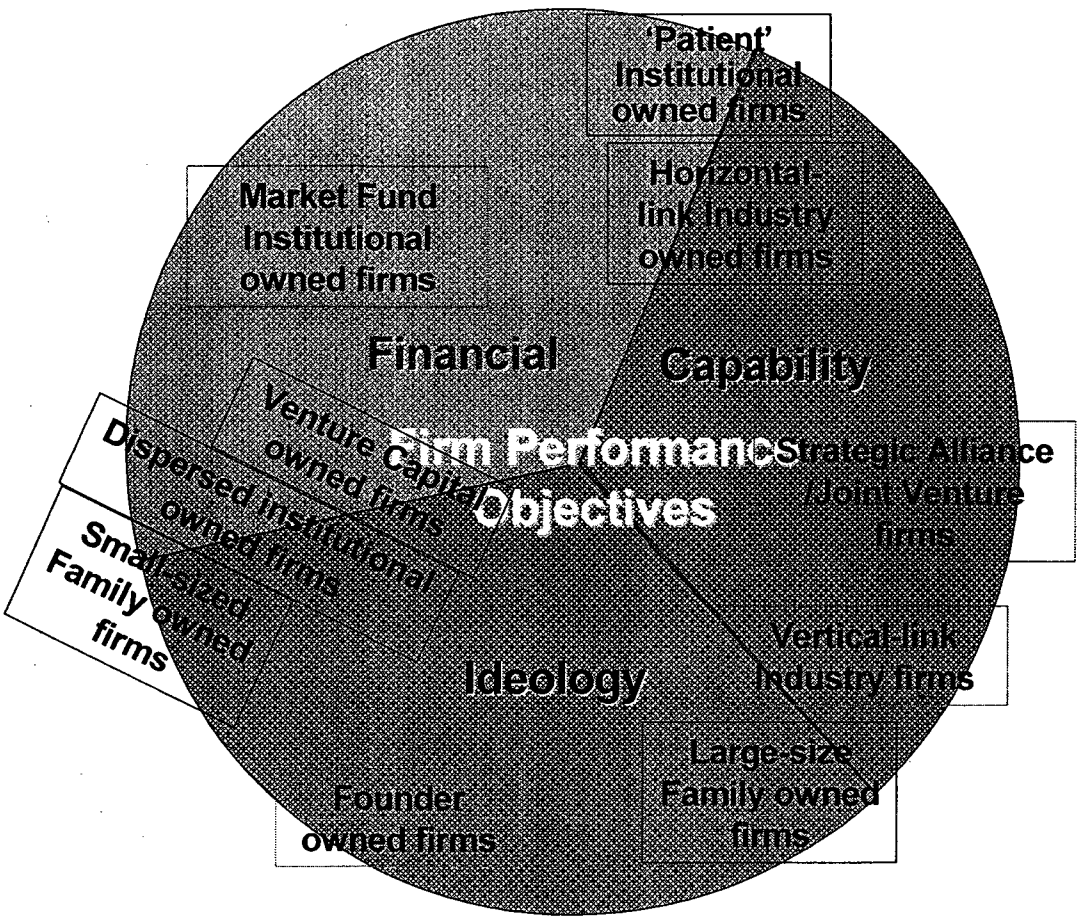
However, the proffered broad typology of ownership is by no means complete or representative of all the different ownership types that exist worldwide. Thus, this thesis is but a preliminary step in assessing the impact of ownership on firm performance and corporate governance. I enumerate some possible avenues for future research as well some managerial implications below.

8.1 Research and Managerial Implications

Literature suggests that founder-led firms might govern differently from family-owned firms (Andersen et al., 2003) and future studies can assess whether family-owned firms might operate more like institution-owned firms, as compared to founder-owned firms. I opine that less common ownership structures, like co-operatives and employee ownership, might operate like founder/family-owned firms, yet

with objectives closer to institution-owned firms. Likewise, institutional 'owners' like pension funds operate differently than professional investment fund (e.g. mutual funds, hedge funds) owners (Hoskisson et al., 2002; Woidtke, 2002), whereas pension funds have relatively longer investment horizons and are more patient with their capital vis-à-vis investment funds, and thus might govern more like family firms. An ownership-objective mapping detailing some of the relationships discussed above is shown below.

Figure 8: Some Possible Ownership-Performance Relationships



Furthermore, within institutional ownership, wide dispersion (i.e. numerous institutional owners, each with relatively low concentration of holding) might enable the CEO to assume control disproportionate to his holdings, and thus govern more like the leadership-driven founder-owned firms.

An example might be Costco Wholesale Corporation, with 78.40% aggregated institutional ownership (total of 607 institutional owners) with the largest shareholder being Davis Selected Advisor L.P. (7.86%). The CEO, James Sinegal (one of the original founders but presently with merely 0.1627% holding), in pursuance of his ideology of employee welfare as a key advantage, offers 42% higher wages and charges 8% towards healthcare contributions while the industry average is 25%. Sinegal states that although he pays attention to analysts' advice because it enforces a healthy discipline, he largely shuns pressure to be less generous to his workers as, "Wall Street [is] in the business of making money between now and next Thursday ... but we want to build a company that will still be here 50 and 60 years from now." (*The New York Times*, July 17, 2005).

Even corporate owners might be distinguished as vertically linked or horizontally linked (related or unrelated value chain) in a manner similar to the Japanese vertical and horizontal keiretsus (McGuire & Dow, 2003). Though the horizontal keiretsus are centrally related to a bank, I imply the General Electric model, wherein one central corporation controls a multitude of partially owned subsidiaries, where some subsidiary firms have no relationship or commonality of function with some of the other subsidiaries. Future studies might focus on the characteristics of these categories to assess whether the ownership configuration performance objective relationship is better understood by further differentiation within these three broad types, and thus refining

and building on the proffered ownership typology.

Additionally, because I had board composition data for only 1487 firms, while I had ownership and performance data for 3825 firms, I chose not to assess the Ownership-Performance relationship as partially mediated by board composition. Future studies can attempt to assess the ownership-governance-performance model.

Another avenue for fruitful research might be to investigate the characteristics of government/state ownership, which might be ideology oriented domestically and financial returns oriented overseas (as in sovereign funds). These future studies can look more closely into all the possible ownership types, thereby augmenting the proffered ownership typology. Future studies operationalizing, testing and further refining the aggregated ownership construct are also called for. Alternatively, future studies may be designed to assess the effect of owner type at concentrated ownership levels, as well as devise methodologies for analyzing ownership effects in dispersed ownership configurations. Future studies defining and operationalizing the performance indicators that might enable clarity in measuring and understanding the full effects of ownership type on firm performance are also called for. Of special concern is operationalization of capabilities, as described in the discussion section. Some recent studies (Dutta, Narasimhan, & Rajiv, 2005; Jacobides & Winter, 2005; Ray et al., 2004) address this issue, and offer alternative viable methodologies.

Furthermore, the proffered model assesses the ex ante determinants of the performance objectives of a firm, and does not address the environmental constraints that reshape these objectives to define the ex post performance outcomes. Future studies may utilize the Miller (1987) environment imperative to investigate the

performance objective-outcome relationship. Another interesting research stream might be the effect of macro-environmental factors that might determine the optimal ownership vis-à-vis some specific firm performance.

Finally, I hypothesized and tested the ownership effect only on board composition utilizing a multi-theoretic lens. I speculate that once freed of the mono-theoretic agency lens, future studies might find that aggregated ownership can explain and predict all of the other governance mechanisms. Thus, in effect, corporate governance might be better understood in terms of the owners' preference for administering or controlling their firms, rather than mitigation of principal-agent or principal-principal agency issues.

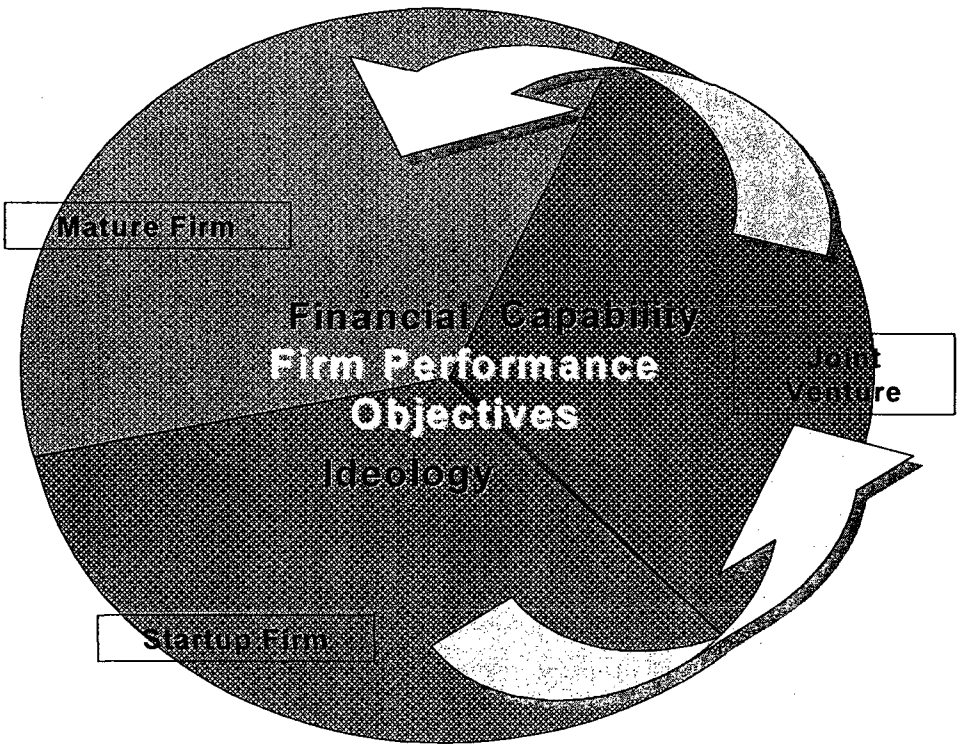
This study also has implications for managers, regulators and consultants as it highlights the importance of utilizing different yardsticks for assessing governance and performance based on the ownership and board composition. The findings caution against imposing a homogeneous governance mechanism and performance objective on firms. Awareness and sensitivity to the ownership preferences might enable clarity in managing expectations as well as developing environments conducive to greater participation by private firms in the public domain. Furthermore, free of the constraining view of agency theory, managers might not be seen only as agents who need to be monitored, disciplined or 'bribed' with equity or other such incentives, which McGuire and Matta (2003) show do not translate into greater firm performance.

8.2 Limitations

Apart from those mentioned in the discussion section, I would like to point out the following limitations of this research. Some studies (Lynall, Golden, & Hillman, 2003) assert that the life-cycle stage of a firm determines the performance as well as

the governance mechanism. I do not explore the firm's life cycle and ownership relationship. However, it is possible that life-cycle changes co-move with ownership changes, and thus ownership and life-cycle stages are closely interlinked. It is also possible that changes in ownership over time result in changes in performance that in turn are understood as the life-cycle of the firm. The relationship between the different imperatives and the firm's life cycle stage as proposed by Miller (1987) – leadership imperative in early stages, strategic imperative in growth and turnaround, and structure imperative in mature stage – also support this assertion. Future studies can focus on the extent, causality and direction of such a relationship. A possible sequence is pictorially represented by Figure 9.

Figure 9: Possible Ownership Changes in a Firm Over Time



Also, my definition of ownership is limited to equity holding and I have not considered the claims of creditors or other stakeholders. Furthermore, I do not specifically address strategic alliances as a type of ownership, apart from the constituent corporate 'owners' of the alliance, though Folta (1998: pg. 1022) asserts that these differ. Future studies might explore this issue in greater detail.

As highlighted in the discussion section, I did not specifically cater for industry effects as that would require a multi-level (ML-SEM) research design. Finally, all data are for 2007, and thus the findings might not be generalizable to periods before and after 2007. Future research, specifically multi-level longitudinal studies, can cater for these effects.

8.3 Conclusion

In conclusion, this study contributes to the growing awareness that corporate governance is not a 'one size fits all' mechanism, and offers an alternative multi-theoretical framework that might help resolve the mixed findings in governance literature.

This study commenced with reviewing the major theoretical perspectives in governance literature to bring into focus the underlying assumptions and the shortcomings with regards to explaining ownership and its relationship to corporate governance and firm performance. Thereafter, building on existing owner-identity literature, I offer a framework that can describe as well as prescribe the ownership-governance-performance literature, and is able to explain the mixed findings in literature. I also clarify the need to go beyond the 'largest shareholder as the owner' operationalization to develop the aggregated ownership model. I offer hypotheses on the

individual components of the model and empirically test these on a sample of US public corporations and find overwhelming support for the model as well as the hypotheses. Based on my findings, I call for governance research that goes beyond the myopic constraints of agency theory.

I believe this thesis contributes to governance literature as well as to the general strategic management field, and I expect my future research to fully develop and refine this multi-theoretic interpretation of the ownership theory of a firm. In conclusion, I assert that the heterogeneity in ownership directly impacts governance, and ultimately firm performance, and argue for including the different types of *owners,* distinct from the dispersed investors and managers in future studies on how ownership impacts corporations.

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APPENDICES

1

2 **Appendix 1: Descriptive Statistics and Pearson Correlation of the Ownership-Board Composition Variables**

	N	MEAN	STD. DEV.	MIN	MAX	INSIDER	AFFILIAT	INDEPENDENT	DUALITY	CEOTENSQ	CEOTENURE	CORP_OW	IND_OW	INSTI_OW
INSIDERS	1487	1.53	0.86	0	8									
AFFILIAT	1487	0.61	0.86	0	5	0.028								
INDEPEND	1487	7.24	2.29	1	16	-0.174**	-0.083**							
DUALITY	1487	0.53	0.50	0	1	-0.050	-0.07**	0.195**						
CEOTENSQ	1403	98.19	221.21	0	3025	0.175**	0.025	-0.154**	0.202**					
CEOTEN	1403	6.92	7.10	0	55	0.162**	0.018	-0.164**	0.285**	0.907**				
CORP_OW	1487	8.72	12.09	0	151.45	0.127**	0.091**	-0.146**	-0.010	-0.028	-0.021			
IND_OW	1487	6.78	15.00	0	153.51	0.291**	0.053*	-0.226**	-0.041	0.224**	0.214**	0.072**		
INSTI_OW	1487	53.58	22.65	0	195.19	-0.119**	-0.082**	0.027	0.010	-0.067*	-0.056*	0.005	-0.131**	

**. Correlation is significant at the 0.01 level (2-tailed).

*. Correlation is significant at the 0.05 level (2-tailed).

1

Appendix 2: Descriptive Statistics of the Ownership-Performance Variables

	N	Range	Minimum	Maximum	Mean		Std. Deviation
	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic
Institutional ownership	3825	139.46	0.00	139.46	39.78	0.46	28.62
Corporation	3825	233.07	0.00	233.07	11.12	0.28	17.13
Individual ownership	3825	153.51	0.00	153.51	13.99	0.33	20.69
Number of employees 2007	3702	2099999.00	1.00	2100000.00	7794.09	705.61	42932.21
Return on Shareholder Funds 2007	3533	1682.49	-940.53	741.96	-4.38	1.46	86.73
Return on Total Assets 2007	3801	1479.32	-992.13	487.19	-9.62	1.08	66.78
Tangible Book Value per Share USD 2007	3821	3868.54	-1455.18	2413.36	4.98	0.81	49.95
Research & Development thousands USD 2007	1536	8089000.00	-8089000.00	0.00	-120412.15	13919.03	545512.25
ROTA_difference	3725	870907.03	0.00	870907.03	2783.15	397.93	24287.05
ROSF_difference	3441	838557.77	0.00	838557.77	6311.71	664.41	38974.58
R&D_diff	1497	4689823359999	0.56	4689823360000	21648641524	5051940649	195465061251

Appendix 3: Pearson Correlation of the Ownership-Performance Variables

		Institu-tional Owners hip	Corpora te Owners hip	Individu al Owners hip	Number of Employee s	Return on Share-holder Funds	Return on Total Assets	Book Value per Share	Research & Develop-ment	ROTA_ Diff	ROSF _Diff	R&D_ Diff
Institutional Ownership	Pearson Correlation											
	Sig. 2-tailed											
	N											
Corporate Ownership	Pearson Correlation	-.053**										
	Sig. 2-tailed	0.001										
	N	3,825										
Individual Ownership	Pearson Correlation	-.243**	-.084**									
	Sig. 2-tailed	0.000	0.000									
	N	3,825	3,825									
Number of Employees	Pearson Correlation	.067**	0.007	-.067**								
	Sig. 2-tailed	0.000	0.657	0.000								
	N	3,702	3,702	3,702								
Return on Shareholder Funds	Pearson Correlation	.139**	.050**	-.033*	.061**							
	Sig. 2-tailed	0.000	0.003	0.047	0.000							
	N	3,533	3,533	3,533	3,437							
Return on Total Assets	Pearson Correlation	.177**	0.032	-.059**	.051**	.758**						
	Sig. 2-tailed	0.000	0.051	0.000	0.002	0.000						
	N	3,801	3,801	3,801	3,688	3,533						
Book Value per Share	Pearson Correlation	0.012	0.009	0.005	0.004	0.023	0.029					
	Sig. 2-tailed	0.462	0.567	0.750	0.826	0.173	0.079					
	N	3,821	3,821	3,821	3,698	3,530	3,797					

		Institu-tional Owners hip	Corpora te Owners hip	Individu al Owners hip	Number of Employee s	Return on Share-holder Funds	Return on Total Assets	Book Value per Share	Research & Develop-ment	ROTA_ Diff	ROSF _Diff	R&D_ Diff
Research & Development	Pearson Correlatio n	-.102**	0.045	.092**	-.695**	-.092**	-.080**	-.114**				
	Sig. 2-tailed	0.000	0.079	0.000	0.000	0.001	0.002	0.000				
	N	1,536	1,536	1,536	1,505	1,389	1,521	1,536	1,536			
ROTA_Diff	Pearson Correlatio n	-.113**	-0.001	.064**	-0.020	-0.032	-.598**	-0.013	0.031			
	Sig. 2-tailed	0.000	0.941	0.000	0.238	0.061	0.000	0.413	0.229			
	N	3,725	3,725	3,725	3,615	3,466	3,725	3,722	1,485	3,725		
ROSF_Diff	Pearson Correlatio n	-.071**	-0.013	0.021	-0.018	-.398**	-.217**	-0.019	0.033	.311**		
	Sig. 2-tailed	0.000	0.439	0.213	0.298	0.000	0.000	0.260	0.232	0.000		
	N	3,441	3,441	3,441	3,350	3,441	3,441	3,438	1,343	3,441	3,441	
RD_Diff	Pearson Correlatio n	0.045	0.012	-0.019	.395**	0.052	0.045	.132**	-.719**	-0.016	-0.019	
	Sig. 2-tailed	0.084	0.640	0.464	0.000	0.054	0.085	0.000	0.000	0.534	0.484	
	N	1,497	1,497	1,497	1,469	1,354	1,484	1,497	1,497	1,483	1,341	

**. Correlation is significant at the 0.01 level 2-tailed.

*. Correlation is significant at the 0.05 level 2-tailed.

Appendix 4: EQS Print Out for Ownership-Board Composition SEM Theoretical Model

```
1
  EQS, A STRUCTURAL EQUATION PROGRAM          MULTIVARIATE SOFTWARE, INC.
  COPYRIGHT BY P.M. BENTLER                   VERSION 6.1 (C) 1985 - 2005 (B83).


    PROGRAM CONTROL INFORMATION

     1  /TITLE
     2  Model built by EQS 6 for Windows
     3  /SPECIFICATIONS
     4  DATA='C:\Documents and Settings\Compaq_Owner\Desktop\gov_comp_onwer short.ESS';
     5  VARIABLES=30; CASES=1487;
     6  METHOD=ML; ANALYSIS=COVARIANCE; MATRIX=RAW;
     7  /LABELS
     8  V1=CONAME; V2=TICKER; V3=INSIDERS; V4=AFFILIAT; V5=INDEPEND;
     9  V6=TOTAL; V7=INSIDE_P; V8=AFFILI_P; V9=INDEPE_P; V10=L_INSDR_;
    10  V11=L_AFFILI; V12=L_INDEPD; V13=DUALITY; V14=LAGSRET; V15=LAGROA;
    11  V16=ROA_MEDI; V17=SALES_ME; V18=SRET_MED; V19=CEOTENSQ; V20=CEOTEN;
    12  V21=ASALES; V22=NO_SHRDR; V23=CORP_OW; V24=IND_OW; V25=CORPO_NO;
    13  V26=INDO_NO; V27=CORPO_PR; V28=INDO_PR; V29=INSTI_OW; V30=INSTI_P;
    14  /EQUATIONS
    15  V3 =   1F1 + E3;
    16  V4 =   *F1 + E4;
    17  V5 =   *F1 + E5;
    18  V23 =   1F2 + E23;
    19  V24 =   *F2 + E24;
    20  V29 =   *F2 + E29;
    21  F1 =   *F2 + D1;
    22  /VARIANCES
    23   F2 = *;
    24   E3 = *;
    25   E4 = *;
    26   E5 = *;
    27   E23 = *;
    28   E24 = *;
    29   E29 = *;
```

```
      30   D1 = *;
      31  /COVARIANCES
      32  /PRINT
      33  FIT=ALL;
      34  TABLE=EQUATION;
      35  /OUTPUT
      36  Derivative;
      37  Gradients;
      38  Information matrix;
      39  Parameters;
      40  Sigma;
      41  Covariance matrix;
      42  Standard Errors;
      43  SSolution;
      44  Lmtest;
      45  Wtest;
      46  RSquare;
      47  Weight matrix;
      48  Codebook;
      49  Univariate;
      50  Listing;
      51  DATA='EQSOUT.ETS';
      52  /END


         52 RECORDS OF INPUT MODEL FILE WERE READ


    DATA IS READ FROM C:\Documents and Settings\Compaq_Owner\Desktop\gov_comp_onwer short.ESS
    THERE ARE  30 VARIABLES AND  1487 CASES
    IT IS A RAW DATA ESS FILE

16-Aug-09       PAGE :  2  EQS     Licensee:
 TITLE:    Model built by EQS 6 for Windows


 SAMPLE STATISTICS BASED ON COMPLETE CASES


                            UNIVARIATE STATISTICS
                            ---------------------
```

VARIABLE	INSIDERS	AFFILIAT	INDEPEND	CORP_OW	IND_OW
MEAN	1.5252	.6093	7.2421	8.7231	6.7746
SKEWNESS (G1)	2.0779	1.6284	.4527	4.5410	3.9026
KURTOSIS (G2)	6.7037	3.1084	.3799	32.1639	20.3795
STANDARD DEV.	.8591	.8580	2.2924	12.0906	15.0004

VARIABLE	INSTI_OW
MEAN	53.5761
SKEWNESS (G1)	-.0027
KURTOSIS (G2)	1.0963
STANDARD DEV.	22.6543

MULTIVARIATE KURTOSIS

MARDIA'S COEFFICIENT (G2,P) = 81.6698
NORMALIZED ESTIMATE = 160.7131

ELLIPTICAL THEORY KURTOSIS ESTIMATES

MARDIA-BASED KAPPA = 1.7015 MEAN SCALED UNIVARIATE KURTOSIS = 3.5462

MARDIA-BASED KAPPA IS USED IN COMPUTATION. KAPPA= 1.7015

CASE NUMBERS WITH LARGEST CONTRIBUTION TO NORMALIZED MULTIVARIATE KURTOSIS:

CASE NUMBER	8	40	195	220	358
ESTIMATE	19822.9087	16854.4959	20384.8874	42368.7414	18102.0280

16-Aug-09 PAGE : 3 EQS Licensee:
TITLE: Model built by EQS 6 for Windows

COVARIANCE MATRIX TO BE ANALYZED: 6 VARIABLES (SELECTED FROM 30 VARIABLES)
BASED ON 1487 CASES.

	INSIDERS V 3	AFFILIAT V 4	INDEPEND V 5	CORP_OW V 23	IND_OW V 24
INSIDERS V 3	.738				
AFFILIAT V 4	.021	.736			
INDEPEND V 5	-.343	-.162	5.255		
CORP_OW V 23	1.316	.940	-4.046	146.183	
IND_OW V 24	3.756	.678	-7.767	13.036	225.011
INSTI_OW V 29	-2.314	-1.598	1.416	1.467	-44.408

	INSTI_OW V 29
INSTI_OW V 29	513.219

BENTLER-WEEKS STRUCTURAL REPRESENTATION:

NUMBER OF DEPENDENT VARIABLES = 7
DEPENDENT V'S : 3 4 5 23 24 29
DEPENDENT F'S : 1

NUMBER OF INDEPENDENT VARIABLES = 8
INDEPENDENT F'S : 2
INDEPENDENT E'S : 3 4 5 23 24 29
INDEPENDENT D'S : 1

NUMBER OF FREE PARAMETERS = 13
NUMBER OF FIXED NONZERO PARAMETERS = 9

*** WARNING MESSAGES ABOVE, IF ANY, REFER TO INDEPENDENCE MODEL.
CALCULATIONS FOR USER'S MODEL NOW BEGIN.

16-Aug-09 PAGE : 5 EQS Licensee:
TITLE: Model built by EQS 6 for Windows

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

PARAMETER	CONDITION CODE
D1,D1	CONSTRAINED AT LOWER BOUND

16-Aug-09 PAGE : 6 EQS Licensee:
TITLE: Model built by EQS 6 for Windows

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

RESIDUAL COVARIANCE MATRIX (S-SIGMA) :

	INSIDERS V 3	AFFILIAT V 4	INDEPEND V 5	CORP_OW V 23	IND_OW V 24
INSIDERS V 3	.000				
AFFILIAT V 4	-.027	.000			
INDEPEND V 5	.043	-.064	.000		
CORP_OW V 23	.192	.654	-1.742	.000	
IND_OW V 24	.109	-.251	-.291	-8.742	.000
INSTI_OW V 29	-.339	-1.095	-2.631	13.257	-6.160

	INSTI_OW V 29
INSTI_OW V 29	.000

AVERAGE ABSOLUTE COVARIANCE RESIDUALS = 1.6951
AVERAGE OFF-DIAGONAL ABSOLUTE COVARIANCE RESIDUALS = 2.3732

STANDARDIZED RESIDUAL MATRIX:

	INSIDERS V 3	AFFILIAT V 4	INDEPEND V 5	CORP_OW V 23	IND_OW V 24
INSIDERS V 3	.000				
AFFILIAT V 4	-.037	.000			
INDEPEND V 5	.022	-.033	.000		
CORP_OW V 23	.019	.063	-.063	.000	
IND_OW V 24	.008	-.020	-.008	-.048	.000
INSTI_OW V 29	-.017	-.056	-.051	.048	-.018

	INSTI_OW V 29
INSTI_OW V 29	.000

AVERAGE ABSOLUTE STANDARDIZED RESIDUALS = .0243

AVERAGE OFF-DIAGONAL ABSOLUTE STANDARDIZED RESIDUALS = .0341

16-Aug-09 PAGE : 8 EQS Licensee:

TITLE: Model built by EQS 6 for Windows

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

*** WARNING *** TEST RESULTS MAY NOT BE APPROPRIATE DUE TO CONDITION CODE

GOODNESS OF FIT SUMMARY FOR METHOD = ML

INDEPENDENCE MODEL CHI-SQUARE = 346.217 ON 15 DEGREES OF FREEDOM

INDEPENDENCE AIC = 316.21740 INDEPENDENCE CAIC = 221.64966

MODEL AIC = 25.64922 MODEL CAIC = -24.78690

CHI-SQUARE = 41.649 BASED ON 8 DEGREES OF FREEDOM

PROBABILITY VALUE FOR THE CHI-SQUARE STATISTIC IS .00000

THE NORMAL THEORY RLS CHI-SQUARE FOR THIS ML SOLUTION IS 41.316.

```
FIT INDICES
  -----------
  BENTLER-BONETT     NORMED FIT INDEX =       .880
  BENTLER-BONETT NON-NORMED FIT INDEX =       .810
  COMPARATIVE FIT INDEX (CFI)         =       .898
  BOLLEN    (IFI) FIT INDEX           =       .901
  MCDONALD (MFI) FIT INDEX            =       .989
  LISREL     GFI  FIT INDEX           =       .991
  LISREL    AGFI  FIT INDEX           =       .976
  ROOT MEAN-SQUARE RESIDUAL (RMR)     =     3.792
  STANDARDIZED RMR                    =       .033
  ROOT MEAN-SQUARE ERROR OF APPROXIMATION (RMSEA)    =       .053
  90% CONFIDENCE INTERVAL OF RMSEA  (        .038,         .070)

  RELIABILITY COEFFICIENTS
  ------------------------
  CRONBACH'S ALPHA                    =     -.112
  COEFFICIENT ALPHA FOR AN OPTIMAL SHORT SCALE                =       .133
  BASED ON THE FOLLOWING  2 VARIABLES
  INDEPEND  INSTI_OW
  RELIABILITY COEFFICIENT RHO         =       .045
  GREATEST LOWER BOUND RELIABILITY                            =       .065
  GLB RELIABILITY FOR AN OPTIMAL SHORT SCALE                  =       .113
  BASED ON  4 VARIABLES, ALL EXCEPT:
  CORP_OW   INSTI_OW
  BENTLER'S DIMENSION-FREE LOWER BOUND RELIABILITY            =       .062
  SHAPIRO'S LOWER BOUND RELIABILITY FOR A WEIGHTED COMPOSITE  =       .415
  WEIGHTS THAT ACHIEVE SHAPIRO'S LOWER BOUND:
  INSIDERS  AFFILIAT  INDEPEND  CORP_OW   IND_OW    INSTI_OW
      .416      .133     -.374      .335      .708     -.237


16-Aug-09      PAGE :  9  EQS     Licensee:
  TITLE:   Model built by EQS 6 for Windows

  MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)


  MEASUREMENT EQUATIONS WITH STANDARD ERRORS AND TEST STATISTICS
  STATISTICS SIGNIFICANT AT THE 5% LEVEL ARE MARKED WITH @.
```

```
INSIDERS=V3  =    1.000 F1    +  1.000 E3


AFFILIAT=V4  =     .255*F1    +  1.000 E4
                   .074
                  3.444@

INDEPEND=V5  =   -2.050*F1    +  1.000 E5
                   .257
                  -7.979@

CORP_OW =V23 =    1.000 F2    +  1.000 E23


IND_OW  =V24 =    3.244*F2    +  1.000 E24
                   .607
                  5.345@

INSTI_OW=V29 =   -1.756*F2    +  1.000 E29
                   .431
                  -4.078@

16-Aug-09      PAGE : 10  EQS     Licensee:
 TITLE:   Model built by EQS 6 for Windows

 MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)


 CONSTRUCT EQUATIONS WITH STANDARD ERRORS AND TEST STATISTICS
 STATISTICS SIGNIFICANT AT THE 5% LEVEL ARE MARKED WITH @.


   F1   =F1  =     .167*F2    +  1.000 D1
                   .031
                  5.368@
```

16-Aug-09 PAGE : 11 EQS Licensee:
TITLE: Model built by EQS 6 for Windows

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

VARIANCES OF INDEPENDENT VARIABLES

STATISTICS SIGNIFICANT AT THE 5% LEVEL ARE MARKED WITH @.

V			F	
		I F2 -	F2	6.713*I
		I		2.260 I
		I		2.971@I
		I		I

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

VARIANCES OF INDEPENDENT VARIABLES

STATISTICS SIGNIFICANT AT THE 5% LEVEL ARE MARKED WITH @.

E			D	
E3 -INSIDERS	.550*I	D1 -	F1	.000*I
	.031 I			.017 I
	17.539@I			.000 I
	I			I
E4 -AFFILIAT	.724*I			I
	.027 I			I
	26.831@I			I
	I			I
E5 -INDEPEND	4.464*I			I
	.198 I			I
	22.547@I			I
	I			I

```
E23 -CORP_OW          139.470*I                                   I
                        5.358 I                                   I
                       26.031@I                                   I
                              I                                   I
E24 -IND_OW           154.363*I                                   I
                       10.490 I                                   I
                       14.715@I                                   I
                              I                                   I
E29 -INSTI_OW         492.512*I                                   I
                       18.806 I                                   I
                       26.189@I                                   I
                              I                                   I


16-Aug-09      PAGE : 13  EQS     Licensee:
 TITLE:   Model built by EQS 6 for Windows

 MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)


 STANDARDIZED SOLUTION:                                                R-SQUARED


INSIDERS=V3  =      .505 F1    +    .863 E3                              .255
AFFILIAT=V4  =      .129*F1    +    .992 E4                              .017
INDEPEND=V5  =     -.388*F1    +    .922 E5                              .151
CORP_OW =V23 =      .214 F2    +    .977 E23                             .046
IND_OW  =V24 =      .560*F2    +    .828 E24                             .314
INSTI_OW=V29 =     -.201*F2    +    .980 E29                             .040
   F1   =F1  =     1.000*F2    +    .000 D1                             1.000


-------------------------------------------------------------------------------
                        E N D    O F    M E T H O D
```

Appendix 5: EQS Print Out for Ownership-Board Composition Path Analysis

```
EQS, A STRUCTURAL EQUATION PROGRAM          MULTIVARIATE SOFTWARE, INC.
 COPYRIGHT BY P.M. BENTLER                   VERSION 6.1 (C) 1985 - 2005 (B83).
   PROGRAM CONTROL INFORMATION
    1  /TITLE
    2  path own and 3 other
    3  /SPECIFICATIONS
    4  DATA='c:\documents and settings\compaq_owner\desktop\gov_comp_onwer short.ess';
    5  VARIABLES=30; CASES=1487;
    6  METHOD=ML; ANALYSIS=COVARIANCE; MATRIX=RAW;
    7  /LABELS
    8  V1=CONAME; V2=TICKER; V3=INSIDERS; V4=AFFILIAT; V5=INDEPEND;
    9  V6=TOTAL; V7=INSIDE_P; V8=AFFILI_P; V9=INDEPE_P; V10=L_INSDR_;
   10  V11=L_AFFILI; V12=L_INDEPD; V13=DUALITY; V14=LAGSRET; V15=LAGROA;
   11  V16=ROA_MEDI; V17=SALES_ME; V18=SRET_MED; V19=CEOTENSQ; V20=CEOTEN;
   12  V21=ASALES; V22=NO_SHRDR; V23=CORP_OW; V24=IND_OW; V25=CORPO_NO;
   13  V26=INDO_NO; V27=CORPO_PR; V28=INDO_PR; V29=INSTI_OW; V30=INSTI_P;
   14  /EQUATIONS
   15  V3 =    *V13 + *V19 + *V20 + *V23 + *V24 + *V29 + E3;
   16
   17  V4 =    *V13 + *V19 + *V20 + *V23 + *V24 + *V29 + E4;
   18
   19  V5 =    *V13 + *V19 + *V20 + *V23 + *V24 + *V29 + E5;
   20
   21  /VARIANCES
   22   V13 = *;
   23   V19 = *;
   24   V20 = *;
   25   V23 = *;
   26   V24 = *;
   27   V29 = *;
   28   E3 = *;
   29   E4 = *;
   30   E5 = *;
   31  /COVARIANCES
   32  V13,V19 = *;
   33  V13,V20 = *;
   34  V19,V20 = *;
   35  V13,V23 = *;
   36  V19,V23 = *;
```

```
37  V20,V23 = *;
38  V13,V24 = *;
39  V19,V24 = *;
40  V20,V24 = *;
41  V23,V24 = *;
42  V13,V29 = *;
43  V19,V29 = *;
44  V20,V29 = *;
45  V23,V29 = *;
46  V24,V29 = *;
47  /PRINT
48  FIT=ALL;
49  TABLE=EQUATION;
50  /OUTPUT
51  Derivative;
52  Gradients;
53  Information matrix;
54  Parameters;
55  Sigma;
56  Covariance matrix;
57  Standard Errors;
58  SSolution;
59  Lmtest;
60  Wtest;
61  RSquare;
62  Weight matrix;
63  Codebook;
64  Univariate;
65  Listing;
66  DATA='EQSOUT.ETS';
67  /END


   67 RECORDS OF INPUT MODEL FILE WERE READ
```

SAMPLE STATISTICS BASED ON COMPLETE CASES

UNIVARIATE STATISTICS

VARIABLE	INSIDERS	AFFILIAT	INDEPEND	DUALITY	CEOTENSQ
MEAN	1.5146	.6030	7.2837	.5310	98.1889
SKEWNESS (G1)	2.1356	1.6265	.4338	-.1243	5.3223
KURTOSIS (G2)	7.1108	3.1827	.3346	-1.9846	41.2239
STANDARD DEV.	.8573	.8487	2.2929	.4992	221.2114

VARIABLE	CEOTEN	CORP_OW	IND_OW	INSTI_OW
MEAN	6.9159	8.7670	6.5363	53.6778
SKEWNESS (G1)	2.0348	4.5431	3.9736	-.0026
KURTOSIS (G2)	5.5506	31.7297	21.5302	1.1689
STANDARD DEV.	7.0990	12.2950	14.7518	22.6407

MULTIVARIATE KURTOSIS

MARDIA'S COEFFICIENT (G2,P) = 190.7554
NORMALIZED ESTIMATE = 253.8886

ELLIPTICAL THEORY KURTOSIS ESTIMATES

MARDIA-BASED KAPPA = 1.9268 MEAN SCALED UNIVARIATE KURTOSIS = 4.0684

MARDIA-BASED KAPPA IS USED IN COMPUTATION. KAPPA= 1.9268

CASE NUMBERS WITH LARGEST CONTRIBUTION TO NORMALIZED MULTIVARIATE KURTOSIS:

CASE NUMBER	70	195	220	278	291
ESTIMATE	14005.6878	16671.9393	28380.4650	17802.0301	148454.8661

COVARIANCE MATRIX TO BE ANALYZED: 9 VARIABLES (SELECTED FROM 30 VARIABLES)
BASED ON 1403 CASES.

	INSIDERS V 3	AFFILIAT V 4	INDEPEND V 5	DUALITY V 13	CEOTENSQ V 19
INSIDERS V 3	.735				
AFFILIAT V 4	.010	.720			
INDEPEND V 5	-.344	-.155	5.258		
DUALITY V 13	-.024	-.032	.229	.249	
CEOTENSQ V 19	33.177	4.758	-78.078	22.356	48934.483
CEOTEN V 20	.984	.109	-2.671	1.010	1424.749
CORP_OW V 23	1.328	1.068	-4.333	-.043	-75.252
IND_OW V 24	3.744	.653	-7.512	-.399	729.594
INSTI_OW V 29	-2.380	-1.404	1.381	.086	-333.282

	CEOTEN V 20	CORP_OW V 23	IND_OW V 24	INSTI_OW V 29
CEOTEN V 20	50.395			
CORP_OW V 23	-1.864	151.167		
IND_OW V 24	22.446	13.654	217.616	
INSTI_OW V 29	-9.018	-1.642	-44.873	512.603

BENTLER-WEEKS STRUCTURAL REPRESENTATION:

```
1           NUMBER OF DEPENDENT VARIABLES =  3
2               DEPENDENT V'S :      3     4     5
3
4           NUMBER OF INDEPENDENT VARIABLES =  9
5               INDEPENDENT V'S :     13    19    20    23    24    29
6               INDEPENDENT E'S :      3     4     5
7
8           NUMBER OF FREE PARAMETERS =  42
9           NUMBER OF FIXED NONZERO PARAMETERS =   3
10
11      DETERMINANT OF INPUT MATRIX IS     .30574D+13
```

TITLE: path own and 3 other

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

PARAMETER ESTIMATES APPEAR IN ORDER,
NO SPECIAL PROBLEMS WERE ENCOUNTERED DURING OPTIMIZATION.

RESIDUAL COVARIANCE MATRIX (S-SIGMA) :

	INSIDERS V 3	AFFILIAT V 4	INDEPEND V 5	DUALITY V 13	CEOTENSQ V 19
INSIDERS V 3	.000				
AFFILIAT V 4	-.018	.000			
INDEPEND V 5	-.129	-.069	.000		
DUALITY V 13	.000	.000	.000	.000	
CEOTENSQ V 19	.000	.000	.000	.000	.000
CEOTEN V 20	.000	.000	.000	.000	.000
CORP_OW V 23	.000	.000	.000	.000	.000
IND_OW V 24	.000	.000	.000	.000	.000
INSTI_OW V 29	.000	.000	.000	.000	.000

	CEOTEN V 20	CORP_OW V 23	IND_OW V 24	INSTI_OW V 29
CEOTEN V 20	.000			
CORP_OW V 23	.000	.000		
IND_OW V 24	.000	.000	.000	
INSTI_OW V 29	.000	.000	.000	.000

AVERAGE ABSOLUTE COVARIANCE RESIDUALS = .0048
AVERAGE OFF-DIAGONAL ABSOLUTE COVARIANCE RESIDUALS = .0060

STANDARDIZED RESIDUAL MATRIX:

	INSIDERS V 3	AFFILIAT V 4	INDEPEND V 5	DUALITY V 13	CEOTENSQ V 19
INSIDERS V 3	.000				
AFFILIAT V 4	-.025	.000			
INDEPEND V 5	-.066	-.035	.000		
DUALITY V 13	.000	.000	.000	.000	
CEOTENSQ V 19	.000	.000	.000	.000	.000
CEOTEN V 20	.000	.000	.000	.000	.000
CORP_OW V 23	.000	.000	.000	.000	.000
IND_OW V 24	.000	.000	.000	.000	.000
INSTI_OW V 29	.000	.000	.000	.000	.000

	CEOTEN V 20	CORP_OW V 23	IND_OW V 24	INSTI_OW V 29
CEOTEN V 20	.000			
CORP_OW V 23	.000	.000		
IND_OW V 24	.000	.000	.000	
INSTI_OW V 29	.000	.000	.000	.000

AVERAGE ABSOLUTE STANDARDIZED RESIDUALS = .0028

AVERAGE OFF-DIAGONAL ABSOLUTE STANDARDIZED RESIDUALS = .0035

```
MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)
GOODNESS OF FIT SUMMARY FOR METHOD = ML
INDEPENDENCE MODEL CHI-SQUARE        =    3146.659 ON    36 DEGREES OF FREEDOM
INDEPENDENCE AIC =  3074.65853   INDEPENDENCE CAIC =  2849.78928
       MODEL AIC =     5.44447          MODEL CAIC =   -13.29464
CHI-SQUARE =       11.444 BASED ON       3 DEGREES OF FREEDOM
PROBABILITY VALUE FOR THE CHI-SQUARE STATISTIC IS       .00955
THE NORMAL THEORY RLS CHI-SQUARE FOR THIS ML SOLUTION IS         11.176.
FIT INDICES
-----------
BENTLER-BONETT     NORMED FIT INDEX =      .996
BENTLER-BONETT NON-NORMED FIT INDEX =      .967
COMPARATIVE FIT INDEX (CFI)         =      .997
BOLLEN   (IFI) FIT INDEX            =      .997
MCDONALD (MFI) FIT INDEX            =      .997
LISREL    GFI  FIT INDEX            =      .998
LISREL   AGFI  FIT INDEX            =      .973
ROOT MEAN-SQUARE RESIDUAL (RMR)     =      .022
STANDARDIZED RMR                    =      .012
ROOT MEAN-SQUARE ERROR OF APPROXIMATION (RMSEA)     =      .045
90% CONFIDENCE INTERVAL OF RMSEA  (        .019,        .074)
RELIABILITY COEFFICIENTS
------------------------
CRONBACH'S ALPHA                    =      .072
COEFFICIENT ALPHA FOR AN OPTIMAL SHORT SCALE                =      .287
BASED ON THE FOLLOWING  2 VARIABLES
CEOTEN    IND_OW
GREATEST LOWER BOUND RELIABILITY                            =      .830
GLB RELIABILITY FOR AN OPTIMAL SHORT SCALE                  =      .841
BASED ON  7 VARIABLES, ALL EXCEPT:
CORP_OW   INSTI_OW
BENTLER'S DIMENSION-FREE LOWER BOUND RELIABILITY            =      .162
SHAPIRO'S LOWER BOUND RELIABILITY FOR A WEIGHTED COMPOSITE  =      .913
WEIGHTS THAT ACHIEVE SHAPIRO'S LOWER BOUND:
INSIDERS  AFFILIAT  INDEPEND  DUALITY   CEOTENSQ  CEOTEN
    .014      .001     -.019      .067      .963      .256
CORP_OW   IND_OW    INSTI_OW
    .003      .034     -.010
```

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)
MEASUREMENT EQUATIONS WITH STANDARD ERRORS AND TEST STATISTICS
STATISTICS SIGNIFICANT AT THE 5% LEVEL ARE MARKED WITH @.

```
INSIDERS=V3  =      -.124*V13   +      .000*V19   +      .005*V20
                      .046              .000              .007
                    -2.724@           1.576              .684

                +     .008*V23   +      .014*V24   -      .003*V29
                      .002              .002              .001
                     4.392@           9.296@           -3.171@

                +    1.000 E3


AFFILIAT=V4  =      -.140*V13   +      .000*V19   +      .002*V20
                      .048              .000              .008
                    -2.949@           .311              .263

                +     .007*V23   +      .001*V24   -      .002*V29
                      .002              .002              .001
                     3.795@           .836             -2.495@

                +    1.000 E4


INDEPEND=V5  =      1.162*V13   +      .001*V19   -      .087*V20
                      .121              .001              .020
                     9.637@           1.173            -4.431@

                -     .027*V23   -      .024*V24   -      .001*V29
                      .005              .004              .003
                    -5.794@          -6.048@           -.306

                +    1.000 E5
```

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

STANDARDIZED SOLUTION: R-SQUARED

INSIDERS=V3	=	-.072*V13	+	.095*V19	+	.042*V20			
	+	.110*V23	+	.243*V24	-	.080*V29			
	+	.936 E3							.123
AFFILIAT=V4	=	-.083*V13	+	.020*V19	+	.017*V20			
	+	.101*V23	+	.023*V24	-	.067*V29			
	+	.988 E4							.023
INDEPEND=V5	=	.253*V13	+	.070*V19	-	.270*V20			
	-	.144*V23	-	.156*V24	-	.008*V29			
	+	.927 E5							.141

Appendix 6: EQS Print Out for Ownership-Performance SEM Theoretical Model

```
EQS, A STRUCTURAL EQUATION PROGRAM          MULTIVARIATE SOFTWARE, INC.
  COPYRIGHT BY P.M. BENTLER                   VERSION 6.1 (C) 1985 - 2005 (B85).


    PROGRAM CONTROL INFORMATION

     1  /TITLE
     2  Model built by EQS 6 for Windows
     3  /SPECIFICATIONS
     4  DATA='c:\documents and settings\sba.eckelley-2007\desktop\thesis\elena\short_set
     5  .ess';
     6  VARIABLES=13; CASES=3825;
     7  METHOD=ML,ROBUST; ANALYSIS=COVARIANCE; MATRIX=RAW;
     8  /LABELS
     9  V1=INSTITUT; V2=CORPORAT; V3=INDIVIDU; V4=MARKETCA; V5=NUMBEROF;
    10  V6=RETURNON; V7=V12_A; V8=TANGIBLE; V9=RESEARCH; V10=ROTA_DIF;
    11  V11=ROSF_DIF; V12=MKTCAP_D; V13=RD_DIFF;
    12  /EQUATIONS
    13  V1 =   1F1 + E1;
    14  V2 =   *F1 + E2;
    15  V3 =   *F1 + E3;
    16  V5 =   1F2 + E5;
    17  V6 =   1F3 + E6;
    18  V7 =   *F3 + E7;
    19  V8 =   *F2 + E8;
    20  V9 =   *F3 + E9;
    21  V10 =   *F3 + E10;
    22  V11 =   *F3 + E11;
    23  V13 =   *F3 + E13;
    24  F2 =   *F1 + D2;
    25  F3 =   *F1 + *F2 + D3;
    26  /VARIANCES
    27   F1 = *;
    28   E1 = *;
    29   E2 = *;
    30   E3 = *;
    31   E5 = *;
```

```
    32    E6 = *;
    33    E7 = *;
    34    E8 = *;
    35    E9 = *;
    36    E10 = *;
    37    E11 = *;
    38    E13 = *;
    39    D2 = *;
    40    D3 = *;
    41  /COVARIANCES
    42  /PRINT
    43  FIT=ALL;
    44  TABLE=EQUATION;
    45  /OUTPUT
    46  Parameters;
    47  Standard Errors;
    48  RSquare;
    49  Codebook;
    50  Listing;
    51  DATA='EQSOUT.ETS';
    52  /END

   52 RECORDS OF INPUT MODEL FILE WERE READ
```

TITLE: Model built by EQS 6 for Windows

SAMPLE STATISTICS BASED ON COMPLETE CASES

UNIVARIATE STATISTICS

VARIABLE	INSTITUT V1	CORPORAT V2	INDIVIDU V3	NUMBEROF V5	RETURNON V6
MEAN	41.1859	9.5864	10.9383	4629.2036	-22.1727
SKEWNESS (G1)	.1587	3.1366	2.0498	10.8392	-3.3316
KURTOSIS (G2)	-.7757	13.4476	4.2806	173.8372	27.0185
STANDARD DEV.	27.8753	13.4269	16.6147	18281.1542	97.9857

VARIABLE	V12_A V7	TANGIBLE V8	RESEARCH V9	ROTA_DIF V10	ROSF_DIF V11
MEAN	-10.0924	3.7305**********		1549.9586	8204.0839
SKEWNESS (G1)	-3.4455	2.0884	-8.6366	14.3358	12.2905
KURTOSIS (G2)	19.1102	16.2629	88.6064	254.5596	186.2196
STANDARD DEV.	39.3910	5.8142584264.5395		9701.2947	45409.6284

VARIABLE	RD_DIFF V13
MEAN	**********
SKEWNESS (G1)	14.4595

KURTOSIS (G2) 257.4196

STANDARD DEV. **********

MULTIVARIATE KURTOSIS

MARDIA'S COEFFICIENT (G2,P) = 1679.1142
NORMALIZED ESTIMATE = 1807.7526

ELLIPTICAL THEORY KURTOSIS ESTIMATES

MARDIA-BASED KAPPA = 11.7421 MEAN SCALED UNIVARIATE KURTOSIS = 31.5147

MARDIA-BASED KAPPA IS USED IN COMPUTATION. KAPPA= 11.7421

CASE NUMBERS WITH LARGEST CONTRIBUTION TO NORMALIZED MULTIVARIATE KURTOSIS:

CASE NUMBER	1377	1803	1840	1935	2671
ESTIMATE	225819.8763	628591.4784	269746.4425	309901.1548	144875.7961

TITLE: Model built by EQS 6 for Windows

COVARIANCE MATRIX TO BE ANALYZED: 11 VARIABLES (SELECTED FROM 13 VARIABLES)
BASED ON 1326 CASES.

		INSTITUT V1	CORPORAT V2	INDIVIDU V3	NUMBEROF V5	RETURNON V6
INSTITUT	V1	777.031				
CORPORAT	V2	-3.557	180.281			
INDIVIDU	V3	-122.176	-9.364	276.049		
NUMBEROF	V5	45204.843	-14010.141	-32158.411**********		
RETURNON	V6	545.986	103.417	-113.866	220774.560	9601.195
V12_A	V7	251.823	46.423	-40.111	91921.137	3011.134
TANGIBLE	V8	27.532	4.770	-2.827	10401.785	117.758
RESEARCH	V9	**********	380783.102	898920.318**********		
ROTA_DIF	V10	-34922.527	-6428.499	8181.843**********		19521.560
ROSF_DIF	V11	-130958.374	-23407.845	27968.200**********		
RD_DIFF	V13	**********				

		V12_A V7	TANGIBLE V8	RESEARCH V9	ROTA_DIF V10	ROSF_DIF V11
V12_A	V7	1551.648				
TANGIBLE	V8	59.679	33.805			
RESEARCH	V9	**********-354807.175**********				
ROTA_DIF	V10	-49917.003	-4401.166**********			
ROSF_DIF	V11	-417292.135	-30025.927**********			
RD_DIFF	V13	**********				

		RD_DIFF V13
RD_DIFF	V13	**********

BENTLER-WEEKS STRUCTURAL REPRESENTATION:

```
        NUMBER OF DEPENDENT VARIABLES = 13
            DEPENDENT V'S :     1    2    3    5    6    7    8    9   10   11
            DEPENDENT V'S :    13
            DEPENDENT F'S :     2    3
        NUMBER OF INDEPENDENT VARIABLES = 14
            INDEPENDENT F'S :     1
            INDEPENDENT E'S :     1    2    3    5    6    7    8    9   10   11
            INDEPENDENT E'S :    13
            INDEPENDENT D'S :     2    3
        NUMBER OF FREE PARAMETERS =  25
        NUMBER OF FIXED NONZERO PARAMETERS =  16

 RESIDUAL COVARIANCE MATRIX  (S-SIGMA) :

                       INSTITUT    CORPORAT    INDIVIDU    NUMBEROF    RETURNON
                          V1          V2          V3          V5          V6
    INSTITUT V1           .000
    CORPORAT V2           .000        .000
    INDIVIDU V3           .000      -9.923        .000
    NUMBEROF V5      45270.905 -14010.443 -32168.799 -31881.252
    RETURNON V6        -50.306    106.146    -20.108 221095.066        -.237
    V12_A    V7         29.019     47.442     -5.079  92040.894       6.457
    TANGIBLE V8          -.038      4.896      1.508  10435.097     -15.999
    RESEARCH V9   *********** 378562.289 822633.939***********1028020.419
    ROTA_DIF V10   -30895.502  -6446.932   7548.656***********  73829.074
    ROSF_DIF V11   -21302.370 -23909.777  10726.516***********-155980.587
    RD_DIFF  V13  **********************************************************

                       V12_A       TANGIBLE    RESEARCH    ROTA_DIF    ROSF_DIF
                          V7          V8          V9          V10         V11
    V12_A    V7           -.027
    TANGIBLE V8           9.701        .000
    RESEARCH V9    -139146.673-245974.694***********
    ROTA_DIF V10    -29625.063  -3497.843***********    -91.419
    ROSF_DIF V11    135257.981  -5428.412**********************  -6792.821
    RD_DIFF  V13  **********************************************************
                       RD_DIFF
                          V13
    RD_DIFF  V13  ***********

                    AVERAGE ABSOLUTE  COVARIANCE  RESIDUALS     =      .4259D+19
```

AVERAGE OFF-DIAGONAL ABSOLUTE COVARIANCE RESIDUALS = .1591D+16

STANDARDIZED RESIDUAL MATRIX:

		INSTITUT V1	CORPORAT V2	INDIVIDU V3	NUMBEROF V5	RETURNON V6
INSTITUT	V1	.000				
CORPORAT	V2	.000	.000			
INDIVIDU	V3	.000	-.044	.000		
NUMBEROF	V5	.089	-.057	-.106	.000	
RETURNON	V6	-.018	.081	-.012	.123	.000
V12_A	V7	.026	.090	-.008	.128	.002
TANGIBLE	V8	.000	.063	.016	.098	-.028
RESEARCH	V9	-.063	.048	.085	-.693	.018
ROTA_DIF	V10	-.114	-.049	.047	-.038	.078
ROSF_DIF	V11	-.017	-.039	.014	-.038	-.035
RD_DIFF	V13	.020	.013	-.011	.394	-.019

		V12_A V7	TANGIBLE V8	RESEARCH V9	ROTA_DIF V10	ROSF_DIF V11
V12_A	V7	.000				
TANGIBLE	V8	.042	.000			
RESEARCH	V9	-.006	-.072	-.016		
ROTA_DIF	V10	-.078	-.062	.025	.000	
ROSF_DIF	V11	.076	-.021	-.012	.386	.000
RD_DIFF	V13	-.003	.113	-.708	-.013	.010

		RD_DIFF V13
RD_DIFF	V13	-.007

AVERAGE ABSOLUTE STANDARDIZED RESIDUALS = .0678

AVERAGE OFF-DIAGONAL ABSOLUTE STANDARDIZED RESIDUALS = .0809

```
18-Apr-09       PAGE :  8  EQS     Licensee:
 TITLE:   Model built by EQS 6 for Windows

 MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

 *** WARNING *** TEST RESULTS MAY NOT BE APPROPRIATE DUE TO CONDITION CODE



 GOODNESS OF FIT SUMMARY FOR METHOD = ML

*** NOTE: INDEPENDENCE MODEL WITH ADDED CONSTRAINTS DID NOT CONVERGE.
          ACTUAL INDEPENDENCE MODEL IS USED BELOW FOR FIT INDICES.

 INDEPENDENCE MODEL CHI-SQUARE        =    4170.968 ON    55 DEGREES OF FREEDOM

 INDEPENDENCE AIC =  4060.96753   INDEPENDENCE CAIC =  3720.52181
        MODEL AIC =  2395.67451          MODEL CAIC =  2141.88770

 CHI-SQUARE =     2477.675 BASED ON      41 DEGREES OF FREEDOM
 PROBABILITY VALUE FOR THE CHI-SQUARE STATISTIC IS       .00000

 THE NORMAL THEORY RLS CHI-SQUARE FOR THIS ML SOLUTION IS       1977.690.

 FIT INDICES
 -----------
 BENTLER-BONETT     NORMED FIT INDEX =      .406

 RELIABILITY COEFFICIENTS
 ------------------------
 CRONBACH'S ALPHA                    =      .000
 COEFFICIENT ALPHA FOR AN OPTIMAL SHORT SCALE                =      .701
 BASED ON THE FOLLOWING  2 VARIABLES
 RETURNON  V12_A
 RELIABILITY COEFFICIENT RHO         =      .006
 GREATEST LOWER BOUND RELIABILITY                            =      .545
 GLB RELIABILITY FOR AN OPTIMAL SHORT SCALE                   COULD NOT BE
 CALCULATED BECAUSE OF NUMERICAL PROBLEMS.
 BENTLER'S DIMENSION-FREE LOWER BOUND RELIABILITY             COULD NOT BE
 CALCULATED BECAUSE OF FAILURE TO CONVERGE IN 500 ITERATIONS.
 SHAPIRO'S LOWER BOUND RELIABILITY FOR A WEIGHTED COMPOSITE  =      .718
```

```
 1    WEIGHTS THAT ACHIEVE SHAPIRO'S LOWER BOUND:
 2    INSTITUT  CORPORAT  INDIVIDU  NUMBEROF  RETURNON  V12_A
 3       -.006      .030      .041      .993     -.097     -.005
 4    TANGIBLE  RESEARCH  ROTA_DIF  ROSF_DIF  RD_DIFF
 5       -.039      .011      .007      .005     -.002
 6
 7
 8
 9    GOODNESS OF FIT SUMMARY FOR METHOD = ROBUST
10
11    *** NOTE: INDEPENDENCE MODEL WITH ADDED CONSTRAINTS DID NOT CONVERGE.
12              ACTUAL INDEPENDENCE MODEL IS USED BELOW FOR FIT INDICES.
13
14    ROBUST INDEPENDENCE MODEL CHI-SQUARE =     388.320 ON    55 DEGREES OF FREEDOM
15
16    INDEPENDENCE AIC =   278.32031   INDEPENDENCE CAIC =   -62.12541
17           MODEL AIC =    80.75319          MODEL CAIC =  -173.03362
18
19    SATORRA-BENTLER SCALED CHI-SQUARE =    162.7532 ON      41 DEGREES OF FREEDOM
20    PROBABILITY VALUE FOR THE CHI-SQUARE STATISTIC IS       .00000
21
22    FIT INDICES
23    -----------
24    BENTLER-BONETT     NORMED FIT INDEX =      .581
25    BENTLER-BONETT NON-NORMED FIT INDEX =      .510
26    COMPARATIVE FIT INDEX (CFI)         =      .635
27    BOLLEN    (IFI) FIT INDEX           =      .649
28    MCDONALD (MFI) FIT INDEX            =      .955
29    ROOT MEAN-SQUARE ERROR OF APPROXIMATION (RMSEA)     =      .047
30    90% CONFIDENCE INTERVAL OF RMSEA  (        .040,        .055)
31
32
```

TITLE: Model built by EQS 6 for Windows

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

MEASUREMENT EQUATIONS WITH STANDARD ERRORS AND TEST STATISTICS
STATISTICS SIGNIFICANT AT THE 5% LEVEL ARE MARKED WITH @.
(ROBUST STATISTICS IN PARENTHESES)

```
INSTITUT=V1  =         1.000 F1    +       1.000 E1


CORPORAT=V2  =         -.005*F1    +       1.000 E2
                        .013
                       -.346
                (       .014)
                (      -.321)

INDIVIDU=V3  =         -.157*F1    +       1.000 E3
                        .016
                      -9.955@
                (       .017)
                (     -9.048@

NUMBEROF=V5  =         1.000 F2    +       1.000 E5


RETURNON=V6  =         1.000 F3    +       1.000 E6


V12_A   =V7  =          .374*F3    +       1.000 E7
```

```
                          .016
                        22.974@
                (         .109)
                (        3.442@

TANGIBLE=V8   =          -.417*F2    +        1.000 E8
                          .066
                        -6.283@
                (         .226)
                (       -1.844)

RESEARCH=V9   =       -813.657*F3    +        1.000 E9
                       190.908
                        -4.262@
                (      229.545)
                (       -3.545@

ROTA_DIF=V10  =         -6.753*F3    +        1.000 E10
                         3.146
                        -2.146@
                (       10.700)
                (        -.631)

ROSF_DIF=V11  =       -183.897*F3    +        1.000 E11
                        14.733
                       -12.482@
                (       41.652)
                (       -4.415@

RD_DIFF =V13  =         1.9E+08*F3   +        1.000 E13
                    67518643.842
                           2.769@
                ( 75067576.037)
                (        2.490@
```

```
18-Apr-09       PAGE : 10  EQS     Licensee:
 TITLE:   Model built by EQS 6 for Windows

 MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)


 CONSTRUCT EQUATIONS WITH STANDARD ERRORS AND TEST STATISTICS
 STATISTICS SIGNIFICANT AT THE 5% LEVEL ARE MARKED WITH @.
 (ROBUST STATISTICS IN PARENTHESES)



   F2    =F2  =          -.085*F1     +        1.000 D2
                           .000
                        -778.065@
                 (          .057)
                 (        -1.492)

   F3    =F3  =         -3.636*F2     +         .458*F1     +        1.000 D3
                           .773                  .104
                         -4.702@               4.411@
                 (         2.486)      (         .135)
                 (        -1.462)      (        3.406@
```

TITLE: Model built by EQS 6 for Windows

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

VARIANCES OF INDEPENDENT VARIABLES

STATISTICS SIGNIFICANT AT THE 5% LEVEL ARE MARKED WITH @.

V		F	
	I F1 - F1		777.031*I
	I		30.189 I
	I		25.739@I
	I	(	23.602)I
	I	(	32.922@I
	I		I

TITLE: Model built by EQS 6 for Windows

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY) VARIANCES OF INDEPENDENT VARIABLES

STATISTICS SIGNIFICANT AT THE 5% LEVEL ARE MARKED WITH @.

	E		D	
E1 -INSTITUT	.000*I	D2 - F2	74.205*I	
	.000 I		24.852 I	
	.000 I		2.986@I	
	(.000)I		(89.902)I	
	(.000)I		(.825)I	
	I		I	
E2 -CORPORAT	180.264*I	D3 - F3	6602.824*I	
	7.004 I		458.617 I	
	25.739@I		14.397@I	
	(19.383)I		(2181.073)I	
	(9.300@I		(3.027@I	
	I		I	
E3 -INDIVIDU	256.839*I		I	
	9.979 I		I	
	25.739@I		I	
	(16.945)I		I	
	(15.158@I		I	
	I		I	
E5 -NUMBEROF	3.3E+08*I		I	
	12985409.976 I		I	
	25.739@I		I	
	(1.2E+08)I		I	
	(2.747@I		I	
	I		I	
E6 -RETURNON	1559.985*I		I	
	320.032 I		I	
	4.874@I		I	
	(2144.356)I		I	
	(.727)I		I	
	I		I	
E7 -V12_A	428.981*I		I	
	46.849 I		I	
	9.157@I		I	

```
1                        (      323.757)I                                  I
2                        (        1.325)I                                  I
3                                      I                                  I
4    E8  -TANGIBLE                19.902*I                                  I
5                                   .000 I                                 I
6                          30899268.457@I                                  I
7                        (          .002)I                                 I
8                        (    10340.462@I                                  I
9                                      I                                  I
10   E9  -RESEARCH              3.4E+11*I                                  I
11                                  .000 I                                 I
12                                1.0E+38@I                                I
13                       (          .000)I                                 I
14                       (      1.0E+38@I                                  I
15                                     I                                  I
16   E10 -ROTA_DIF           93748447.972*I                                I
17                            3643682.854 I                                I
18                                 25.729@I                                I
19                       ( 42245505.648)I                                  I
20                       (        2.219@I                                  I
21                                     I                                  I
22   E11 -ROSF_DIF             1.8E+09*I                                  I
23                          71002414.807 I                                 I
24                                 25.212@I                                I
25                       (      7.6E+08)I                                  I
26                       (        2.347@I                                  I
27                                     I                                  I
28   E13 -RD_DIFF              4.3E+22*I                                  I
29                                  .000 I                                 I
30                                1.0E+38@I                                I
31                       (          .000)I                                 I
32                       (      1.0E+38@I                                  I
33                                     I                                  I
```

TITLE: Model built by EQS 6 for Windows

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

STANDARDIZED SOLUTION: R-SQUARED

INSTITUT=V1	=	1.000	F1	+	.000	E1	1.000
CORPORAT=V2	=	-.010	*F1	+	1.000	E2	.000
INDIVIDU=V3	=	-.264	*F1	+	.965	E3	.070
NUMBEROF=V5	=	.000	F2	+	1.000	E5	.000
RETURNON=V6	=	.915	F3	+	.403	E6	.838
V12_A =V7	=	.851	*F3	+	.526	E7	.724
TANGIBLE=V8	=	-.641	*F2	+	.767	E8	.411
RESEARCH=V9	=	-.124	*F3	+	.992	E9	.015
ROTA_DIF=V10	=	-.062	*F3	+	.998	E10	.004
ROSF_DIF=V11	=	-.363	*F3	+	.932	E11	.132
RD_DIFF =V13	=	.081	*F3	+	.997	E13	.006
F2 =F2	=	-.265	*F1	+	.964	D2	.070
F3 =F3	=	-.362	*F2	+	.142	*F1	
	+	.906	D3				.179

E N D O F M E T H O D

Appendix 7: EQS Print Out for Ownership-Performance Path Analysis

```
EQS, A STRUCTURAL EQUATION PROGRAM          MULTIVARIATE SOFTWARE, INC.
COPYRIGHT BY P.M. BENTLER                   VERSION 6.1 (C) 1985 - 2005 (B85).
  PROGRAM CONTROL INFORMATION

   1  /TITLE
   2  Model built by EQS 6 for Windows
   3  /SPECIFICATIONS
   4  DATA='c:\documents and settings\sba.eckelley-2007\desktop\thesis\elena\short_set
   5  .ess';
   6  VARIABLES=13; CASES=3825;
   7  METHOD=ML,ROBUST; ANALYSIS=COVARIANCE; MATRIX=RAW;
   8  /LABELS
   9  V1=INSTITUT; V2=CORPORAT; V3=INDIVIDU; V4=MARKETCA; V5=NUMBEROF;
  10  V6=RETURNON; V7=V12_A; V8=TANGIBLE; V9=RESEARCH; V10=ROTA_DIF;
  11  V11=ROSF_DIF; V12=MKTCAP_D; V13=RD_DIFF;
  12  /EQUATIONS
  13  V6 =    *V1 + *V2 + *V3 + *V5 + *V8 + E6;
  14  V7 =    *V1 + *V2 + *V3 + *V5 + *V8 + E7;
  15  V9 =    *V1 + *V2 + *V3 + *V5 + *V8 + E9;
  16  V10 =    *V1 + *V2 + *V3 + *V5 + *V8 + E10;
  17  V11 =    *V1 + *V2 + *V3 + *V5 + *V8 + E11;
  18  V13 =    *V1 + *V2 + *V3 + *V5 + *V8 + E13;
  19  /VARIANCES
  20   V1 = *;
  21   V2 = *;
  22   V3 = *;
  23   V5 = *;
  24   V8 = *;
  25   E6 = *;
  26   E7 = *;
  27   E9 = *;
  28   E10 = *;
  29   E11 = *;
  30   E13 = *;
  31  /COVARIANCES
  32  V1,V2 = *;
  33  V1,V3 = *;
  34  V2,V3 = *;
```

```
1        35  V1,V5 = *;
2        36  V2,V5 = *;
3        37  V3,V5 = *;
4        38  V1,V8 = *;
5        39  V2,V8 = *;
6        40  V3,V8 = *;
7        41  V5,V8 = *;
8        42  /PRINT
9        43  FIT=ALL;
10       44  TABLE=EQUATION;
11       45  /OUTPUT
12       46  Parameters;
13       47  Standard Errors;
14       48  RSquare;
15       49  Codebook;
16       50  Listing;
17       51  DATA='EQSOUT.ETS';
18       52  /END
```

TITLE: Model built by EQS 6 for Windows

SAMPLE STATISTICS BASED ON COMPLETE CASES

UNIVARIATE STATISTICS

VARIABLE	INSTITUT V1	CORPORAT V2	INDIVIDU V3	NUMBEROF V5	RETURNON V6
MEAN	41.1859	9.5864	10.9383	4629.2036	-22.1727
SKEWNESS (G1)	.1587	3.1366	2.0498	10.8392	-3.3316
KURTOSIS (G2)	-.7757	13.4476	4.2806	173.8372	27.0185
STANDARD DEV.	27.8753	13.4269	16.6147	18281.1542	97.9857

VARIABLE	V12_A V7	TANGIBLE V8	RESEARCH V9	ROTA_DIF V10	ROSF_DIF V11
MEAN	-10.0924	3.7305**********		1549.9586	8204.0839
SKEWNESS (G1)	-3.4455	2.0884	-8.6366	14.3358	12.2905
KURTOSIS (G2)	19.1102	16.2629	88.6064	254.5596	186.2196
STANDARD DEV.	39.3910	5.8142584264.5395		9701.2947	45409.6284

VARIABLE	RD_DIFF V13
MEAN	**********
SKEWNESS (G1)	14.4595

KURTOSIS (G2) 257.4196

STANDARD DEV. **********

MULTIVARIATE KURTOSIS

MARDIA'S COEFFICIENT (G2,P) = 1679.1142
NORMALIZED ESTIMATE = 1807.7526

ELLIPTICAL THEORY KURTOSIS ESTIMATES

MARDIA-BASED KAPPA = 11.7421 MEAN SCALED UNIVARIATE KURTOSIS = 31.5147

MARDIA-BASED KAPPA IS USED IN COMPUTATION. KAPPA= 11.7421

COVARIANCE MATRIX TO BE ANALYZED: 11 VARIABLES (SELECTED FROM 13 VARIABLES)
BASED ON 1326 CASES.

	INSTITUT V1	CORPORAT V2	INDIVIDU V3	NUMBEROF V5	RETURNON V6
INSTITUT V1	777.031				
CORPORAT V2	-3.557	180.281			
INDIVIDU V3	-122.176	-9.364	276.049		
NUMBEROF V5	45204.843	-14010.141	-32158.411**********		
RETURNON V6	545.986	103.417	-113.866	220774.560	9601.195
V12_A V7	251.823	46.423	-40.111	91921.137	3011.134
TANGIBLE V8	27.532	4.770	-2.827	10401.785	117.758
RESEARCH V9	**********	380783.102	898920.318**********		
ROTA_DIF V10	-34922.527	-6428.499	8181.843**********		19521.560
ROSF_DIF V11	-130958.374	-23407.845	27968.200**********		
RD_DIFF V13	**********				

	V12_A	TANGIBLE	RESEARCH	ROTA_DIF	ROSF_DIF

```
                          V7          V8          V9          V10         V11
      V12_A     V7       1551.648
      TANGIBLE  V8         59.679     33.805
      RESEARCH  V9    ***********-354807.175***********
      ROTA_DIF  V10    -49917.003  -4401.166**********************
      ROSF_DIF  V11   -417292.135 -30025.927**********************************
      RD_DIFF   V13   ************************************************************


                       RD_DIFF
                         V13
      RD_DIFF   V13    ***********


   BENTLER-WEEKS STRUCTURAL REPRESENTATION:

         NUMBER OF DEPENDENT VARIABLES =  6
             DEPENDENT V'S :     6    7    9   10   11   13

         NUMBER OF INDEPENDENT VARIABLES = 11
             INDEPENDENT V'S :     1    2    3    5    8
             INDEPENDENT E'S :     6    7    9   10   11   13

         NUMBER OF FREE PARAMETERS =  51
         NUMBER OF FIXED NONZERO PARAMETERS =   6


DETERMINANT OF INPUT MATRIX IS    .79746D+75
```

18-Apr-09 PAGE : 6 EQS Licensee:
TITLE: Model built by EQS 6 for Windows

RESIDUAL COVARIANCE MATRIX (S-SIGMA) :

		INSTITUT V1	CORPORAT V2	INDIVIDU V3	NUMBEROF V5	RETURNON V6
INSTITUT	V1	.000				
CORPORAT	V2	.000	.000			
INDIVIDU	V3	.000	.000	.000		
NUMBEROF	V5	.000	.000	.000	.000	
RETURNON	V6	.000	.000	.000	.000	.000
V12_A	V7	.000	.000	.000	.000	2627.149
TANGIBLE	V8	.000	.000	.000	.000	.000
RESEARCH	V9	.000	.000	.000	.000	-11709.925
ROTA_DIF	V10	.000	.000	.000	.000	59064.117
ROSF_DIF	V11	.000	.000	.000	.000**********	
RD_DIFF	V13	-16.719**********			-.250**********	

		V12_A V7	TANGIBLE V8	RESEARCH V9	ROTA_DIF V10	ROSF_DIF V11
V12_A	V7	.000				
TANGIBLE	V8	.000	.000			
RESEARCH	V9	-249856.045	.000**********			
ROTA_DIF	V10	-31481.298	.0004828441.838		.000	
ROSF_DIF	V11	-327345.132	.000**********			.000
RD_DIFF	V13	**********				

		RD_DIFF V13
RD_DIFF	V13	**********

AVERAGE ABSOLUTE COVARIANCE RESIDUALS = .1014D+21
AVERAGE OFF-DIAGONAL ABSOLUTE COVARIANCE RESIDUALS = .9817D+15
STANDARDIZED RESIDUAL MATRIX:

		INSTITUT	CORPORAT	INDIVIDU	NUMBEROF	RETURNON
		V1	V2	V3	V5	V6
INSTITUT	V1	.000				
CORPORAT	V2	.000	.000			
INDIVIDU	V3	.000	.000	.000		
NUMBEROF	V5	.000	.000	.000	.000	
RETURNON	V6	.000	.000	.000	.000	.000
V12_A	V7	.000	.000	.000	.000	.681
TANGIBLE	V8	.000	.000	.000	.000	.000
RESEARCH	V9	.000	.000	.000	.000	.000
ROTA_DIF	V10	.000	.000	.000	.000	.062
ROSF_DIF	V11	.000	.000	.000	.000	-.325
RD_DIFF	V13	.000	.035	.026	.000	.006

		V12_A	TANGIBLE	RESEARCH	ROTA_DIF	ROSF_DIF
		V7	V8	V9	V10	V11
V12_A	V7	.000				
TANGIBLE	V8	.000	.000			
RESEARCH	V9	-.011	.000	-.483		
ROTA_DIF	V10	-.082	.000	.001	.000	
ROSF_DIF	V11	-.183	.000	.001	.387	.000
RD_DIFF	V13	.014	.095	-.445	-.002	-.004

		RD_DIFF
		V13
RD_DIFF	V13	-.155

AVERAGE ABSOLUTE STANDARDIZED RESIDUALS = .0454

AVERAGE OFF-DIAGONAL ABSOLUTE STANDARDIZED RESIDUALS = .0429

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 18-Apr-09      PAGE :  8  EQS     Licensee:
 TITLE:   Model built by EQS 6 for Windows

 MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

 GOODNESS OF FIT SUMMARY FOR METHOD = ML

*** NOTE: INDEPENDENCE MODEL WITH ADDED CONSTRAINTS DID NOT CONVERGE.
          ACTUAL INDEPENDENCE MODEL IS USED BELOW FOR FIT INDICES.
 INDEPENDENCE MODEL CHI-SQUARE        =    4170.968 ON    55 DEGREES OF FREEDOM
 INDEPENDENCE AIC =  4060.96753   INDEPENDENCE CAIC =  3720.52181
        MODEL AIC =  2772.12482          MODEL CAIC =  2679.27598

 CHI-SQUARE =     2802.125 BASED ON      15 DEGREES OF FREEDOM
 PROBABILITY VALUE FOR THE CHI-SQUARE STATISTIC IS       .00000
 THE NORMAL THEORY RLS CHI-SQUARE FOR THIS ML SOLUTION IS       1637.034.

 FIT INDICES
 -----------
 BENTLER-BONETT     NORMED FIT INDEX =      .328

 RELIABILITY COEFFICIENTS
 ------------------------
 CRONBACH'S ALPHA                      =      .000
 COEFFICIENT ALPHA FOR AN OPTIMAL SHORT SCALE                =      .701
 BASED ON THE FOLLOWING  2 VARIABLES
 INSTITUT  CORPORAT
 GREATEST LOWER BOUND RELIABILITY                            =      .545
 GLB RELIABILITY FOR AN OPTIMAL SHORT SCALE                   COULD NOT BE
 CALCULATED BECAUSE OF NUMERICAL PROBLEMS.
 BENTLER'S DIMENSION-FREE LOWER BOUND RELIABILITY             COULD NOT BE
 CALCULATED BECAUSE OF FAILURE TO CONVERGE IN 500 ITERATIONS.
 SHAPIRO'S LOWER BOUND RELIABILITY FOR A WEIGHTED COMPOSITE  =      .718
 WEIGHTS THAT ACHIEVE SHAPIRO'S LOWER BOUND:
 INSTITUT  CORPORAT  INDIVIDU  NUMBEROF  RETURNON  V12_A
    -.006      .031      .042      .993     -.098     -.007
 TANGIBLE  RESEARCH  ROTA_DIF  ROSF_DIF  RD_DIFF
    -.040      .011      .008      .005     -.002
 GOODNESS OF FIT SUMMARY FOR METHOD = ROBUST

*** NOTE: INDEPENDENCE MODEL WITH ADDED CONSTRAINTS DID NOT CONVERGE.
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          ACTUAL INDEPENDENCE MODEL IS USED BELOW FOR FIT INDICES.

ROBUST INDEPENDENCE MODEL CHI-SQUARE =     142.068 ON    55 DEGREES OF FREEDOM

INDEPENDENCE AIC =    32.06841   INDEPENDENCE CAIC =  -308.37731
       MODEL AIC =    82.22497          MODEL CAIC =   -10.62386

SATORRA-BENTLER SCALED CHI-SQUARE =    112.2250 ON      15 DEGREES OF FREEDOM
PROBABILITY VALUE FOR THE CHI-SQUARE STATISTIC IS       .00000

FIT INDICES
-----------
BENTLER-BONETT     NORMED FIT INDEX =       .210
BENTLER-BONETT NON-NORMED FIT INDEX =     -3.094
COMPARATIVE FIT INDEX (CFI)         =       .000
BOLLEN   (IFI) FIT INDEX            =       .235
MCDONALD (MFI) FIT INDEX            =       .964
ROOT MEAN-SQUARE ERROR OF APPROXIMATION (RMSEA)     =       .070
90% CONFIDENCE INTERVAL OF RMSEA  (        .058,        .082)
```

18-Apr-09 PAGE : 9 MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY) MEASUREMENT EQUATIONS WITH STANDARD ERRORS AND TEST STATISTICS STATISTICS SIGNIFICANT AT THE 5% LEVEL ARE MARKED WITH @.
(ROBUST STATISTICS IN PARENTHESES)

RETURNON=V6	=	.568*V1	+	.549*V2	-	.054*V3		
		.097		.193		.162		
		5.839@		2.844@		-.334		
	(	.101)	(	.144)	(	.192)		
	(	5.641@	(	3.803@	(	-.281)		
	+	.001*V5	+	2.780*V8	+	1.000 E6		
		.000		.452				
		3.607@		6.147@				
	(	.000)	(	.417)				
	(	3.861@	(	6.673@				
V12_A =V7	=	.265*V1	+	.241*V2	+	.019*V3		
		.038		.076		.064		
		6.891@		3.169@		.296		
	(	.043)	(	.064)	(	.075)		
	(	6.173@	(	3.741@	(	.251)		
	+	.000*V5	+	1.454*V8	+	1.000 E7		
		.000		.179				
		3.654@		8.145@				
	(	.000)	(	.170)				
	(	3.421@	(	8.544@				
RESEARCH=V9	=	-482.188*V1	+	513.131*V2	+	471.697*V3		
		606.543		1201.932		1006.957		
		-.795		.427		.468		
	(	253.515)	(	978.065)	(	449.180)		
	(	-1.902)	(	.525)	(	1.050)		
	-	21.923*V5	-	3390.198*V8	+	1.000 E9		
		.890		2819.129				
		-24.632@		-1.203				
	(	3.592)	(	2661.536)				
	(	-6.103@	(	-1.274)				
ROTA_DIF=V10	=	-39.912*V1	-	34.672*V2	+	8.403*V3		
		9.955		19.727		16.527		

```
                        -4.009@              -1.758                .508
                (       10.391)      (       10.859)      (       25.308)
                (       -3.841@      (       -3.193@      (         .332)

                 -        .013*V5     -      88.151*V8     +       1.000 E10
                           .015               46.269
                          -.877               -1.905
                (          .005)      (       22.424)
                (       -2.782@      (       -3.931@

ROSF_DIF=V11 =       -135.892*V1     -     116.018*V2     +      23.142*V3
                       46.622              92.386              77.399
                       -2.915@             -1.256                .299
                (       41.484)      (       51.545)      (       83.675)
                (       -3.276@      (       -2.251@      (         .277)

                 -        .056*V5     -     742.080*V8     +       1.000 E11
                           .068              216.691
                          -.815               -3.425@
                (          .020)      (      164.498)
                (       -2.780@      (       -4.511@

RD_DIFF =V13 =  31127877.133*V1     +       1.000*V2     +       1.000*V3
                      2.1E+08               .000                .000
                         .152            1.0E+38@            1.0E+38@
                (      1.4E+08)      (         .000)      (         .000)
                (         .216)      (      1.0E+38@      (      1.0E+38@

                 + 4470193.656*V5     +       1.000*V8     +       1.000 E13
                    313106.882                .000
                        14.277@             1.0E+38@
                (  1923469.407)      (         .000)
                (        2.324@      (      1.0E+38@
```

TITLE: Model built by EQS 6 for Windows

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

STANDARDIZED SOLUTION: R-SQUARED

RETURNON=V6	=		.162*V1	+	.075*V2			
		-	.009*V3	+	.096*V5			
		+	.165*V8	+	.957 E6			.085
V12_A =V7	=		.187*V1	+	.082*V2			
		+	.008*V3	+	.096*V5			
		+	.215*V8	+	.939 E7			.118
RESEARCH=V9	=		-.019*V1	+	.010*V2			
		+	.011*V3	-	.563*V5			
		-	.028*V8	+	.821 E9			.326
ROTA_DIF=V10	=		-.115*V1	-	.048*V2			
		+	.014*V3	-	.024*V5			
		-	.053*V8	+	.988 E10			.023
ROSF_DIF=V11	=		-.083*V1	-	.034*V2			
		+	.008*V3	-	.022*V5			
		-	.095*V8	+	.989 E11			.022
RD_DIFF =V13	=		.004*V1	+	.000*V2			
		+	.000*V3	+	.366*V5			
		+	.000*V8	+	.930 E13			.134

TITLE: Model built by EQS 6 for Windows

MAXIMUM LIKELIHOOD SOLUTION (NORMAL DISTRIBUTION THEORY)

CORRELATIONS AMONG INDEPENDENT VARIABLES

		V		F	
V2	-CORPORAT	-.010			
V1	-INSTITUT				
V3	-INDIVIDU	-.264			
V1	-INSTITUT				
V5	-NUMBEROF	.089			
V1	-INSTITUT				
V8	-TANGIBLE	.170			
V1	-INSTITUT				
V3	-INDIVIDU	-.042			
V2	-CORPORAT				
V5	-NUMBEROF	-.057			
V2	-CORPORAT				
V8	-TANGIBLE	.061			
V2	-CORPORAT				
V5	-NUMBEROF	-.106			
V3	-INDIVIDU				
V8	-TANGIBLE	-.029			
V3	-INDIVIDU				
V8	-TANGIBLE	.098			
V5	-NUMBEROF				