This thesis consists of five separate essays and an introductory chapter. The essays can be read independently from each other, but they are all in the field of corporate governance and investment performance. Specifically, the focus is on the role of institutional owners in the conflict between controlling shareholders and minority owners. The essays mainly contribute to the empirical literature on corporate governance and investment performance. In four of the five essays, panel data methods are used in the empirical investigation. The first essay investigates time and industry specific factors in the evaluation of firms’ investment performance, measured by marginal q. The second essay focuses on the role of institutional owners in relation to firms’ investment performance. By studying a large panel of Swedish listed firms the essay also provides evidence on the relationship between control enhancing mechanism, such as vote-differentiated shares, and investment performance. The third essay investigates how institutional owners affect dividend policy. The fourth essay examines the performance of European firms from a long run perspective. The fifth and last essay looks at individual mutual funds and specifically how to measure risk-adjusted performance.
This thesis consists of five separate essays and an introductory chapter. The essays can be read independently from each other, but they are all in the field of corporate governance and investment performance. Specifically, the focus is on the role of institutional owners in the conflict between controlling shareholders and minority owners. The essays mainly contribute to the empirical literature on corporate governance and investment performance. In four of the five essays, panel data methods are used in the empirical investigation. The first essay investigates time and industry specific factors in the evaluation of firms’ investment performance, measured by marginal q. The second essay focuses on the role of institutional owners in relation to firms’ investment performance. By studying a large panel of Swedish listed firms the essay also provides evidence on the relationship between control enhancing mechanism, such as vote-differentiated shares, and investment performance. The third essay investigates how institutional owners affect dividend policy. The fourth essay examines the performance of European firms from a long run perspective. The fifth and last essay looks at individual mutual funds and specifically how to measure risk-adjusted performance.
Institutional Ownership
– the Anonymous Capital

Corporate Governance and
Investment Performance
Institutional Ownership – the Anonymous Capital: Corporate Governance and Investment Performance
JIBS Dissertation Series No. 048

© 2008 Daniel Wiberg and Jönköping International Business School

ISSN 1403-0470
ISBN 91-89164-86-5

Printed by ARK Tryckaren AB, 2008
Acknowledgment

I would like to thank my supervisors Professor Per-Olof Bjuggren and Professor Börje Johansson for their guidance and insightful comments throughout the process of doing this research. I also wish to express special thanks to my co-author Johan Eklund for all discussions and debates on corporate governance issues.

I am very grateful to my final seminar discussant, Associate Professor Martin Holmén for his perceptive comments and suggestions. I was also fortunate to receive many insightful comments by the members of the European Corporate Governance network, Professor Tom Berglund, Professor Ulf Jacobsson, Professor Charlie Karlsson, Professor Ghazi Shukur, and Professor Steen Thomsen.

Visits to foreign universities and institutions in the early stages of my doctoral studies have also shaped my thesis work. In particular, the course Corporate Governance by Professor Dennis C. Mueller at Göteborg University in spring 2003 greatly encouraged me to focus on corporate governance issues in my dissertation. The corporate governance topic turned out to be exceedingly interesting.

This research was carried out at the Department of Economics, Jönköping International Business School. I wish to thank all my friends and colleagues at the Department of Economics. A special thank to all who participated in the Friday seminars at the department, excellently chaired by Professor Åke E. Andersson. They have been a most important source of input to me.

Financial scholarship from Sparbankernas Forskningsstiftelse for my dissertation work is gratefully acknowledged. I am also thankful for support from the Centre for Excellence for Science and Innovation Studies (CESIS), and the Ratio Institute and the Marcus and Amalia Wallenberg Memorial Fund Foundation.

Finally, my greatest appreciation is addressed to my parents and to my grandmother for their encouragement and unconditional support in this and all my projects. Thank you.

Daniel Wiberg
Jönköping, June 2008
Abstract

This thesis consists of five separate essays and an introductory chapter. The essays can be read independently from each other, but they are all in the field of corporate governance and investment performance. Specifically, the focus is on the role of institutional owners in the conflict between controlling shareholders and minority owners. The essays mainly contribute to the empirical literature on corporate governance and investment performance. In four of the five essays, panel data methods are used in the empirical investigation.

The first essay investigates time and industry specific factors in the evaluation of firms’ investment performance, measured by marginal q. Significant differences in valuation is found between firms, depending on the market sentiments and industry affiliation. The second essay focuses on the role of institutional owners in relation to firms’ investment performance. Institutional owners are found to have a positive influence on firms’ investment performance. By studying a large panel of Swedish listed firms the essay also provides evidence on the relationship between control enhancing mechanism, such as vote-differentiated shares, and investment performance. The third essay looks at the role of institutional owners from the perspective of dividend policy. It is shown that institutional owners demand higher dividends to compensate for aggravated agency conflicts due to vote-differentiated shares. The fourth essay investigates the performance of European firms from a long run perspective. Firm profits converge over time, but this convergence is incomplete. Investment in R&D is put forward as an explanation for persistent profits above the norm. The fifth and last essay looks at individual mutual funds and specifically how to measure risk-adjusted performance. The results show that Swedish bond funds underperform their benchmark, even when risk-adjusted to the same level of risk.
# Content

## CHAPTER I
INTRODUCTION AND SUMMERY OF THE THESIS ......................................... 11
1. INTRODUCTION ........................................................................................................... 11
   1.1 Summary of research focus ............................................................................. 15
2. BACKGROUND AND PREVIOUS RESEARCH ....................................................... 16
   2.1 Industry Specific Effects in Investment Performance and Valuation of Firms ................................................................................................................................. 16
   2.2 Institutional Ownership and the Returns on Investment ......................... 18
   2.3 Institutional Owners and Dividends ............................................................... 21
   2.4 Persistence of Profits and the Systematic Search for Knowledge ............... 23
   2.5 Risk-Adjusted Performance, an Application of the Modigliani-measure ................................................................................................................................. 25
3. METHODOLOGICAL AND EMPIRICAL ISSUES ...................................................... 27
   3.1 Tobin’s q versus Marginal q .............................................................................. 28
   3.2 Endogeneity, Causality and Panel Data ............................................................ 29
4. OUTLINE AND SUMMARY OF RESULTS AND CONTRIBUTIONS IN THE ESSAYS ......................................................................................................................... 32
REFERENCES ............................................................................................................. 35

## CHAPTER II
INDUSTRY SPECIFIC EFFECTS IN INVESTMENT PERFORMANCE AND VALUATION OF FIRMS ............................................................... 49
1. INTRODUCTION ........................................................................................................... 50
2. THE NET PRESENT VALUE AND MARGINAL q ................................................. 52
3. HYPOTHESES ............................................................................................................ 55
4. VARIABLES, DATA AND METHOD ......................................................................... 56
5. RESULTS ..................................................................................................................... 60
6. CONCLUSIONS ......................................................................................................... 64
REFERENCES ............................................................................................................. 65

## CHAPTER III
INSTITUTIONAL OWNERSHIP AND THE RETURNS ON INVESTMENT ................................................................. 67
1. INTRODUCTION ........................................................................................................... 68
2. CORPORATE OWNERSHIP IN SWEDEN ............................................................. 69
3. INSTITUTIONAL INVESTORS .................................................................................. 71
CHAPTER IV
INSTITUTIONAL OWNERSHIP AND DIVIDENDS .................................. 97
1. INTRODUCTION ...................................................................................... 98
2. OWNERSHIP AND CORPORATE GOVERNANCE ............................. 99
   2.1 Institutional Ownership and Dividends ...................................... 101
   2.2 Taxation arguments ........................................................................ 102
   2.3 Agency arguments ........................................................................ 102
   2.4 Signalling arguments ................................................................. 103
   2.5 Summary and hypothesis ............................................................ 104
3. METHOD, VARIABLES AND DATA ..................................................... 106
   3.1 The modified Earnings Trend Model ......................................... 106
   3.2 Data and Variables ...................................................................... 108
4. DESCRIPTIVE STATISTICS AND OWNERSHIP CONCENTRATION .... 111
5. EMPIRICAL RESULTS AND ANALYSIS ............................................ 115
6. CONCLUSIONS ..................................................................................... 123
REFERENCES .......................................................................................... 125
APPENDIX A .............................................................................................. 129

CHAPTER V
PERSISTENCE OF PROFITS AND THE SYSTEMATIC SEARCH FOR
KNOWLEDGE - R&D AND PROFITS ABOVE THE NORM ............... 131
1. INTRODUCTION ..................................................................................... 132
2. PREVIOUS STUDIES ........................................................................... 133
3. THE COMPETITIVE PROCESS AND PROFIT CONVERGENCE ....... 137
   3.1 Measuring Persistent Profitability .................................................. 138
   3.2 R&D and the Persistence of Profits ............................................... 139
   3.3 Data and Method ...................................................................... 140
4. RESULTS AND ANALYSIS ............................................................... 143
5. CONCLUSIONS ..................................................................................... 148
REFERENCES .......................................................................................... 149
APPENDIX A .............................................................................................. 152
Chapter I
INTRODUCTION AND SUMMARY OF THE THESIS

Daniel Wiberg

1. INTRODUCTION

During the recent decades the world’s financial markets have seen an ongoing increase in institutional ownership of capital. Do these institutional owners behave differently from other owners, and what are the consequences on firm performance? These issues, and specifically how the increasing institutional ownership has affected investment performance in listed firms, are dealt with in this thesis.

The role of the financial market is to transfer savings to investors, and establish relative prices that serve as signals to guide the allocation of capital. The efficiency of this allocation is an essential force in the creation of welfare and growth. At the same time, this allocation mechanism is the result of decisions taken by individuals or by people appointed to act on their behalf. Of particular interest therefore are the formal and informal rules that surround and affect this allocation process, that is, the corporate governance system. With a focus on shareholder value Denis and McConnell (2003, p. 2) define corporate governance as:

“the set of mechanisms – both institutional and market based – that induce the self-interested controllers of a company (those that make decisions regarding how the company will be operated) to make decisions that maximize the value of the company to its owners (the suppliers of capital)”.

More generally corporate governance can be described as the set of processes, customs, policies, laws and regulations that affect the way a corporation is administered and controlled.\(^1\) It can then be separated into three intertwined themes. The first theme concerns the accountability of certain actors in an organisation and the mechanisms used to reduce or eliminate the principal-agent problem. A second theme of corporate governance, much related to the principal-agent problem, deals with the

\(^1\) For a comprehensive survey of corporate governance, see Shleifer and Vishny (1997).
impact of certain corporate governance systems on economic efficiency, often with a strong emphasis on shareholders’ welfare. The third theme of corporate governance concerns the role played by different corporate governance structures in association with all parties related to the corporation, the so-called stakeholder view. With a strong emphasis on the first two fields of corporate governance this thesis provides empirical evidence on the relationships between corporate governance, institutional ownership, and firm performance.

Following Jensen and Meckling’s (1976) seminal article on the conflict arising from a separation of ownership and control, corporate governance research conducted mainly on large US firms, has focused on the conflict between managers and dispersed shareholders (Maury, 2004). A common assumption in many studies is that the principal goal of controlling shareholders is to maximize shareholder value (Short, 1994). If this assumption holds true more concentrated ownership will imply improved performance, since managers are less free to pursue their own goals when a controlling shareholder acts as monitor (Shleifer and Vishny, 1986).

Controlling shareholders might however be guided by other objectives than maximizing shareholder value. Often related to the person who founded the firm, this type of owner(s) may identify strongly with it (Mueller, 2003). Ensuring survival and growth of the firm, along with protecting the family name and reputation, might be important objectives. Controlling shareholders may also have the possibility to extract other benefits, benefits that are not shared by other shareholders (Williamson, 1963, 1964, and Jensen, 1986). Empirical evidence supports the hypothesis that sizable private benefits exist (Nenova, 2003, and Dyck and Zingales, 2003).

---

2 Two hundred years prior to Jensen and Meckling (1976) Adam Smith (1776) noted the problems of a separation of ownership from control. A more in-depth analysis of the diffusion of ownership was then provided in Berle and Means (1932) classical book “The Modern Corporation and Private Property”.

3 Hart (1995) provides an extensive discussion about the importance of corporate governance in the absence of complete contracts. Considerable cross-country variations in the quality of the corporate governance system have been found in a number of studies, see, i.e. La Porta et al. (1998; 1999 and 2000a), Roe (1993), Franks and Mayer (1995), Barca and Becht (2001), and Faccio and Lang (2002).

4 In this way centrally controlled business groups can substitute for under-developed economic institutions (Khanna and Yafeh, 2006). More concentrated control can also motivate entrepreneurial effort (Allaire, 2006).
Introduction and Summary of the Thesis

2004). The possibility to consume-on-the-job can also have the effect that retained earnings are preferable to dividends.5

Consequently there are both costs and benefits associated with controlling shareholders arising in a potential conflict of interest with minority owners for two principal reasons. First, regulations do not effectively protect the rights of minority shareholders. Second, the governance structure in many countries potentially makes controlling shareholders, who hold the majority of the votes and often have managerial representation, impervious to takeover threats and monitoring (Gomes, 2000).

Although the predominance of controlling shareholders in many countries has been demonstrated in the literature (La Porta et al. 1999, and Faccio and Lang, 2002)6, little research has been done on the identity of different types of controlling shareholders. More research into this area is consequently needed. A recent study by Maury (2004) investigates how firms’ performance is affected by family control on a large cross-sectional sample of European firms. In particular, the effect of family control on performance, measured by Tobin’s \( q \) and return on assets (ROA), is investigated. The conclusion is that family controlled firms perform significantly better both in terms of Tobin’s \( q \) and ROA than firms controlled by other owners.

Controlling shareholders, such as family owners, typically hold more control rights than cash-flow rights. This type of control enhancement can be arranged through a number of mechanisms, such as vote-differentiated shares, pyramidal control structures, and cross-holdings7. Examining a large panel of Swedish listed firms Bjuggren et al. (2007) present evidence that to some extent challenge the findings of Maury (2004). Private controlling owners (e.g. families, individuals and even other firms) are shown to have a

---

5 This effect may then be reinforced by tax policies, and ultimately lead to over-investment. For the case of Sweden in particular, strong tax incentives have favoured retained earnings relative to dividends as a part of the long-term social democratic economic program up to the 1990s (Högfeldt, 2004, and Henrekson and Jakobsson, 2001; 2005).

6 Investigating the evolution of ownership and control in a transition country Gregoric et al. (2000) finds that the governance structure of Slovenian firms is moving in the direction of the continental European governance system, with controlling private owners and large holdings controlled by financial institutions.

7 A recent theoretical overview concerning control enhancing mechanisms and the ‘one share - one vote’ structure is Burkart and Lee (2008), for the empirical evidence, see Adams and Ferreira (2008), Rydqvist (1992), and Allaire (2006). For pyramids, see Bebchuck et al. (2000) and for cross-holdings within business groups, see Khanna and Yafoh (2006). The optimal allocation of control and cash-flow rights in a firm is analyzed by Grossman and Hart (1988) and Harris and Raviv (1988).
positive but marginally diminishing effect on investment performance, measured as marginal $q$. If, on the other hand, the control is maintained through disproportional voting arrangements, this positive incentive effect disappears. The results by Bjuggren et al. (2007) also indicate that foreign and institutional owners have a positive effect on investment performance. The issue is thus not simply a matter of identity; the means by which the control is maintained is also an important determinant of both ownership and performance.

The thesis consists of five separate essays that focus on investment and performance in different corporate governance contexts. The first essay (co-authored with Per-Olof Bjuggren) is named *Industry Specific Effects in Investment Performance and Valuation of Firms*. It investigates how the performance of listed firms change in response to market sentiments and specific industry attributes. Marginal $q$ is used to measure investment performance. The main hypothesis is that the market valuation differs between firms operating in new and old industries as a result of information asymmetries. Performance measures based on market valuation must consequently control for these firm and industry-specific effects. The essay is based on a large panel of Swedish listed firms.

The following two essays focus on the role of institutional owners as monitors in the relation between controlling shareholders and minority owners. Essay two titled *Institutional Ownership and the Returns on Investment* (co-authored with Per-Olof Bjuggren and Johan E. Eklund) examines the effect of institutional ownership on investment performance. The hypothesis is that institutional owner’s influence investment performance positively. Furthermore, control instruments such as dual-class shares, are shown to reduce the investment performance of firms. Essay three, *Institutional Ownership and Dividends*, studies how institutional ownership affects firms’ dividend policy. By demanding higher dividend payout ratios institutional owners may reduce the cash available for managerial discretion and thus alleviate the conflict between inside and outside shareholders. The effect of control enhancing mechanisms is also examined. This is a corporate governance attribute much spread in continental Europe, yet little empirical evidence exists regarding the effects of this type of instruments. Both studies are based on a comprehensive datasets of ultimate owners in Swedish listed firms.

The fourth essay study a panel of European multinational firms, stretching over 21 years, to see whether above norm profits exist despite the assumption of competitive markets. The name of the essay is *Persistence of Profits and the Systematic Search for Knowledge – R&D and Profits Above the*
Norm. The effect of R&D investments in relation to profit persistence is also investigated. The hypothesis is that above norm profits exists but converge slowly towards the industry norm. Furthermore, above norm profits are shown to be the result of persistent investment in R&D.

Narrowing the focus to a set of Swedish bond funds, the fifth essay titled *Risk-Adjusted Performance of Swedish Bond Funds in the years 2000-2003; An Application of the Modigliani-measure*, examines an evaluation technique suitable for comparisons of mutual funds against benchmarks. The literature suggests that mutual funds on average underperform their benchmark indices. By examining a sample of Swedish bond funds, it is shown that this underperformance is due to a lower level of risk in the mutual funds than in the benchmark. By applying the Modigliani and Modigliani-measure the usefulness of this performance measure relative to other more esoteric performance measures is also demonstrated.

### 1.1 Summary of research focus

A central theme in all five essays is how performance of firms is affected by surrounding institutions and corporate governance mechanisms. In summary, these issues are investigated by addressing five broad questions that have received little attention in the literature.

- Are there systematic performance differences between firms operating in new and old industries, and are these differences dependent on market sentiments? By studying this issue the question of how to measure firm’s investment performance is also touched upon.
- What is the empirical relationship between institutional ownership and firms’ investment performance?
- Can institutional owners serve a monitoring role and what is the empirical relation between institutional ownership and firms’ dividends policy? Both the second and third question entail some investigation into the role of control enhancing mechanism, such as dual-class shares, as these instruments potentially aggravate the conflict between controlling and minority owners.
- Can the performance of firms persist and is R&D a way to maintain persistent levels of profitability above the norm?
- How to evaluate institutional investor, i.e. mutual fund, portfolios accurately and comprehensive?

The rest of the introduction continues as follows. Section 2 presents a brief background for each essay by reviewing important papers on each topic. Section 3 discusses some empirical and methodological issues relevant for
studies concerning firm level profitability and corporate governance. Section 4 is an outline of the thesis together with a short summary of the main findings and contributions in each essay.

2. BACKGROUND AND PREVIOUS RESEARCH

This section presents a brief theoretical framework for each essay by reviewing important papers on each topic. The review of papers should not be seen as comprehensive, but rather as an introduction to the problems discussed in the essays.

2.1 Industry Specific Effects in Investment Performance and Valuation of Firms

A large body of literature has investigated the relationship between corporate governance structures and performance indicators. Although the studies differ greatly both in terms of estimation techniques and samples, most of them have in common the use of Tobin’s average \( q \) as performance measure. Tobin’s \( q \) is usually approximated by the market-to-book ratio. Although Tobin’s \( q \) is commonly used its empirical construction is subject to considerable measurement error.\(^8\) For a survey of this literature, see Gugler (2003).

An alternative measure of performance is marginal \( q \). Marginal \( q \) measures the ratio of the change in a firm’s market value to the cost of the change in total assets (i.e. the investment) that caused it (Mueller and Reardon, 1993). A theoretical discussion on the advantages of using a marginal \( q \) can be found in Hayashi (1982). Even if marginal \( q \) improves the empirical measurement of a firm’s investment performance it assumes efficient capital markets, which imply unbiased estimates of future cash flows in the pricing of securities.\(^9\) Research within the field of behavioural finance has cast doubt on the presumption that the capital market always

---

\(^8\) Procedures to approximate Tobin’s \( q \) is typically a compromise between analytical precision and computational effort, most researchers approximate Tobin’s \( q \) as follows: 
\[ q = \frac{(MVE + DEBT)}{TA}, \]
where MVE is the product of the market value of the firm’s shares times the number of shares outstanding, DEBT is the value of the firm’s short and long-term liabilities, and TA is the book value of the total assets of the firm. For an extended discussion, see Chung and Pruitt (1994).

\(^9\) For a survey of the current efficient market hypothesis (EMH) paradigm, see Fama (1991) and Lo (1999).
provides unbiased estimates; see e.g. Shiller (1981, 2000 and 2002) and Shleifer (2000).

Special attention has been devoted to the unusual rise and fall in prices of technology stocks surrounding the millennium year 2000\(^1\). The event has been described as a stock price “bubble”, see amongst others Shiller (2000), Ofek and Richardson (2002, 2003), Ritter and Warr (2002), Ritter and Welch (2002), Abreu and Brunnermeier (2003), Brunnermeier and Nagel (2004), and Ljungqvist and Wilhelm (2003). One explanation for the “bubble” is that new technology industries such as Internet, telecom and biotechnology promised a new economic era with unprecedented growth in productivity and profits\(^1\). Shiller (2000) argues that the boom in technology stocks was a result of wide-spread irrational exuberance. Investor overconfidence is another explanation for the bubble; see for instance, Scheinkman and Xiong (2003) and Scheinkman et al. (2005).

Studying individual shareholdings in Finland, Kyrolainen and Perttunen (2003) find that large, active investors were trend-followers in the period, while small active investors were contrarians. Evidence has also been found for positive feedback trading by institutional investors who profited from, and possibly exacerbated the upward movement in prices (Brunnermeir and Nagle, 2004).

The differences between institutional and retail traders in terms of rationality of their beliefs have been the focus of a emergent line of research see e.g. Barber and Odean (2000, 2001) and Shiller and Pound (1989). Based on this idea Ofek and Richarsson (2003) provide empirical evidence that institutional investors, in particular, had a strong effect on the stock price development. The argument is that many institutional investors were bound by short sale restrictions which consequently excluded many pessimistic investors from the market. As short sale restrictions were eventually alleviated a shift from optimistic investors sentiments to pessimistic occurred.

Pástor and Veronesi (2003; 2006) argue that researcher have overlooked the importance of uncertainty about future growth rates of the firm’s book values. This uncertainty will naturally increase the expected return. Consequently, if booms and recessions are the results of bubbles, marginal \( q \)

\(^{10}\) The stock market bubble built up in the late 1990s and burst in the second quarter of 2000 where after stock prices continued to fall for three years, see e.g. Evans (2003) and Sheeran and Spain (2004).

\(^{11}\) Ofek and Richardson (2002) argue that the Internet stock prices of the late 1990s was a result of expectations of implausible high growth rates in Internet earnings. Schultz and Zaman (2001) show that technology firms typically went public early in their life-cycle in the late 1990s.
will differ between booms and recessions, because of biased estimates of future cash flows. It is not the efficient use of resources solely that determines the value of the marginal $q$, uncertainty about the firm’s future profitability also affect the value of the firms. Any empirical investigation based on market valuation must therefore control for industry-specific sentiments and time related macro-effects that affect all firms in the market.

2.2 Institutional Ownership and the Returns on Investment

The increasing ownership controlled by institutional investors is the major ongoing transformation of the capital markets around the world. Since the early 1990s assets under management of institutions have tripled and these professional managers now manage financial assets exceeding $U.S. 45 trillion (including over $U.S. trillion in equities). Despite the increasing role of institutional owners, little is known empirically on how they affect firms’ performance.

It has been suggested that institutional owners can act as monitors of managers (Demsetz, 1983 and Shleifer and Vishny, 1986). The argument is that institutional owners typically have large holdings, and it therefore pays them to develop expertise in managing investments. With substantial resources at hand, professional portfolio managers can be assumed to be more sophisticated than the average retail investor. The actual involvement of institutional investors in the firms’ operations range from the threat of selling shares (exit) to the active use of voting rights (voice) in shareholders meetings.12 By monitoring the management firms are forced to operate in a way that is more consistent with maximising shareholder wealth (Agrawal and Mandelker, 1992, Firth, 1995). The same arguments also apply to the role of institutional investors in the potential conflict between controlling owners and outside owners (Gillian and Starks, 2003). Investigating a comprehensive dataset of equity holdings from 27 countries, Ferreira and Matos (2008), show that institutional investors are involved in monitoring firms worldwide. The results further show that firms with high ownership by foreign and independent institutions have higher firm valuation, better operating performance, and lower capital expenditure. Institutional investors also seem to prefer stock of large firms and firms with strong

---

12 For a survey of shareholder activism, see Gillian and Starks (2000).
Introduction and Summary of the Thesis

governance indicators. This view of institutional investors can be labelled the ‘active investors’ hypothesis. One drawback of many studies of the relationship between ownership and performance is that they use Tobin’s average $q$ as a measure of performance. What is needed is a measure of marginal investment returns relative to the firms cost of capital. Using marginal $q$ Mueller and Reardon (1993) show that a substantial part of the large publicly traded firms in the U.S underperform, in terms of having marginal returns on investment significantly below their cost of capital. An emerging body of literature has since established the usefulness of this measure, as well as provided new empirical evidence related to corporate governance and performance (see Gugler and Yurtoglu, 2003, and Gugler et al. 2004a; 2004b).

A large fraction of the world’s publicly traded firms are controlled by their founders’ or members of the founders’ families (La Porta et al. 1999; Classens et al. 2000; Faccio and Lang, 2002; Andersson and Reeb, 2003; Morck et al. 2000). Such owners often have a substantial part of their personal wealth tied up in the firms, and are thus supposed to have strong cash-flow incentives to monitor the firm (Jensen and Meckling, 1976). Regarded as insiders the controlling owners can also be assumed to be better informed about the firms’ business activities than minority shareholders.

But there are also potential costs associated with controlling-owners. First of all, controlling owners may extract private benefits of control, benefits that are not shared with other shareholders (Thomsen et al. 2006) find a negative association between blockholder ownership, firm value, and accounting returns. It is interpreted as an indication of the conflicts of interest between controlling owners and minority shareholders). Secondly, controlling owners may retain control even when they are no longer competent to run the firm (Burkhart et al. 2003, Shleifer and Vishny, 1997). Thirdly, controlling owners frequently own more control rights than cash flow rights. This is accomplished through the use of different types of control enhancing mechanisms, such as dual-class shares, pyramidal

---

13 Empirical support in favour of a certain level of ‘activism’ by institutional investors has been presented in several studies; see, for example, Brickley et al. (1988) and Almazan et al. (2005). Anecdotal evidence suggests that institutional investors collude during certain circumstances and regarding particular issues. To what extent this happens and the importance thereof is an issue of great interest for future research. Here it is sufficed to assume that institutional investors, although often very influential per se, can form shareholder alliances and collude when necessary.

14 In a related study Cronqvist et al. (2008) provide evidence in support of the idea that entrenched CEOs pay higher wages to employees as to maintain and enjoy non-pecuniary benefits of control.
ownership structures, and cross-holdings. These mechanisms effectively entrench the controlling owners against pressure from corporate governance mechanisms, such as the market for corporate control or monitoring by non-controlling shareholders (Cronqvist and Nilsson, 2003). With relevance for continental European firms Crespi-Cladera and Gispert (2002) show that the agency predictions associated with the market for corporate control cannot be fully supported in a sample of Spanish firms.

A related issue is thus whether the widespread use of control enhancing mechanisms distorts the allocation of capital (Morck et al. 2005 and Khanna and Yafeh, 2006)\(^\text{15}\). Looking at data from Swedish mergers Holmén et al. (2007), find little evidence of shareholder expropriation. Extralegal institutions, such as tax compliance and newspaper circulation, are claimed to work as informal institutions consistent with greater shareholder protection. Applying the marginal \(q\) methodology on Swedish data, Bjuggren et al (2007) however, provide evidence that dual-class shares worsen investment performance. Furthermore, controlling shareholders may favour retained earnings to dividends which can lead to over-investment. The results show that, on average, the Swedish listed firms has marginal investment returns significantly below their costs of capital. These results are confirmed by Eklund (2008) in a study of investment performance of Scandinavian firms.

A seminal paper on the impact of institutional ownership on market value of equity is Claessens et al (2002). They investigated a large cross-country sample of 1,301 firms in East Asia in 1996. Regressing market-to-book values against a number of firm specific variables they find that ownership concentration is positively related to market-to-book, interpreted as evidence of the so-called incentive effect. They also find that a wedge between vote and cash-flow rights is negatively related to market value, which supports the entrenchment hypothesis related to the separation of votes from capital. La Porta et al. (2002) examine a sample of more than 500 large firms in 27 countries; they find that Tobin’s \(q\) is positively related to country-wide indices of investor protection. The difference between control and cash flow rights of the controlling shareholder is found to have no significant relationship with Tobin’s \(q\).

Investigating the effect of managerial ownership on Tobin’s \(q\), Kalcheva and Lins (2008) find no evidence that managerial cash flow rights affect Tobin’s \(q\). Disproportional ownership however, is found to have a significant and negative effect on Tobin’s \(q\). In a study of particular interest to this thesis

\(^{15}\) See Eklund and Desai (2008), for additional empirical investigation concerning the efficiency of capital allocation.
Introduction and Summary of the Thesis

Cronqvist and Nilsson (2003) analyze the impact of controlling shareholders’ voting rights on Tobin’s $q$, for a panel of Swedish firms during 1991-1997. The results are generally supportive of the results in Classens et al. (2002), with a negative effect of controlling shareholder’s votes on Tobin’s $q$. However, the wedge between votes and cash flow rights comes out statistically insignificant. Studying a panel of 136 Finnish firms during 1993-2000, Maury and Pajuste (2004) find a negative effect of the ratio of voting rights to cash flow rights on Tobin’s $q$.

2.3 Institutional Owners and Dividends

In a world without taxes, transaction costs, and market imperfections, dividend policy is irrelevant for shareholder wealth (Miller and Modigliani, 1961). Assuming that this description of the world is too simplified, agency models of dividends try to explain how agency problems affect dividend policy. The argument according to La Porta et al. (2000b, p.4) is that:

“In a world with significant agency problems between corporate insiders and outsiders, dividends can play a useful role. By paying dividends, insiders return corporate earnings to investors and hence are no longer capable of using these earnings to benefit themselves.”

The fundamental idea behind this approach is that the firm’s investment policy cannot be assumed to be independent of its dividend policy in the presence of market frictions. Dividend payouts may in fact even reduce the inefficiency of marginal investments.

The role of dividends in an agency context can be classified according to two main views (La Porta et al. 2000b). The first type of agency models regards dividends policy as an outcome of agency problems and the legal protection of shareholders. The second type regards dividend policy as a substitute for legal protection of shareholders. La Porta et al. (2000b) find, in support of the ‘outcome’ model of dividend, that firms operating in countries with relatively low shareholder protection pay out lower dividends than firms in the UK and the US, where shareholder protection is considered to be higher. For European firms Faccio et al. (2001) show that the presence of another large shareholder mitigates agency conflicts. That dividend payout decreases with the voting power of the largest shareholder is shown on a sample of German listed firms by Gugler and Yurtoglu (2003). Conversely, the voting power of the second largest shareholder is found to have a positive effect on dividend payouts.
Based on the assumption that institutional investors are more likely to invest in dividend paying stocks (justified by prudence restrictions etc.), Allen et al. (2000) provide theoretical arguments for why firms pay dividends rather than repurchase shares. Furthermore, they argue that institutional owners, with large ownership stakes, play a more important role in overseeing the management than dispersed retail investors.

In line with an extensive body of research concerning shareholder clienteles based on taxed-induced preferences for dividends\(^\text{16}\), Perez-Gonzales (2003) finds that changes in tax rates affect firm dividend policy in firms with dominant shareholders. Holmén et al. (2008), show a negative cross-sectional relationship between insiders’ effective tax rates and dividend payout. Looking also at the impact of large block trades on dividends, they show that large shareholders adjust dividends to suit their individual tax situations. Dahlquist et al. (2007) show that tax-neutral investors, such as institutional investors\(^\text{17}\), have significantly higher dividend yields on their portfolios than investors faced with higher effective tax rates on dividends than on capital. From a sample of Finnish firms, Kinkki (2008) supplies evidence that, in cases where the controlling shareholders do not have absolute control, minority shareholders collude to affect dividend policy. Regarding institutional ownership in particular, Del Guerico (1996) and Grinstein and Michaely (2005) find that institutions prefer dividend-paying stocks. In line with these results Michaely et al. (1995) and Dhaliwal et al. (1999) document changes in institutional ownership around dividend initiations and omissions.

By paying out dividends the firm will also be more dependent on the capital market. The capital market will thus supply monitoring at a low cost for outside shareholders (Easterbrook, 1984). In this way, the ‘substitute’ models of dividends rely on the need for firms to raise new capital through the capital market. To do so on attractive terms, the controlling shareholder or manager must establish a reputation for not expropriating outside shareholders (Maury, 2004). In a related paper, Myers (2000) proposes that managers can stay in control, only if outside shareholders believe that future

---

\(^{16}\) The seminal works in this body of research are the studies by Miller (1977), Miller and Scholes (1978) and Brennan and Thakor (1990) who examine the effect of taxes on an insider shareholder’s preferences for capital gains or dividends. The empirical evidence has shown that, *ceteris paribus*, the higher the tax rate paid on dividends, the lower the preferred dividend payout.

\(^{17}\) Based on the classification of investors according to tax preferences Dahlquist et al. (2007) also investigate ‘Swedish investment funds’, which is identical to closed-end investments funds. This group of investors, often pivotal as control instruments in the typical Swedish ownership spheres, is found to have preferences for retained earnings.
dividend payments will be made. Zwiebel (1996) argues that managers pay dividends in order to avert challenges for control. The threat of takeover is consequently disciplining managers and mitigating inefficient use of retained earnings. This proposition would also explain why managers seem reluctant to lower dividend payout ratios in response to declining profits. Looking at the payout ratio of the U.S. equity market portfolio, Arnott and Asness (2003) find that earnings growth is largest when current payout ratios are high and smallest when payout ratios are low. This evidence is in line with the view that managers use dividends to signal future earnings expectations, or engaging, at times, in inefficient empire building.

2.4 Persistence of Profits and the Systematic Search for Knowledge

Tantamount to performance a key variable in economic analysis is profitability, not only as evidence of a firm’s productivity, but also as a foundation of the economic accumulation process. Since profits, for most firms, are generated in a process of competition, studies about the dynamics of company profits often start out by analyzing the process of competition. Underlining these studies is the assumption that monopolistic attributes are present in many firms and industries, even under competition. As a result profits above the norm can be found in some firms and industries. Mueller (1986, p. 27) concludes that:

“Allthough the general pattern of results … is consistent with an overriding tendency for profits to regress back onto some normal, competitive level, the regression is not complete either in the sense that all firms exhibit such a regression, or that those that do experience a complete return to the competitive level.”

In particular, it has been shown that under competition above-norm profits persists as a result of market power or in the form of new products or

---

18 In line with this reasoning Gomes (2000) suggests that managers or controlling shareholders could reduce agency problems, by developing a reputation for treating outside shareholders well.

19 For discussion, see Short et al. (2002).

20 This branch of research was initiated by Mueller (1977, 1986) Connolly and Schwartz (1985), Levy (1987), Geroski and Jacuemin (1988). The question of the intertemporal pattern of profitability related to market structure had previously been raised by Brozen (1971a, b). For an excellent review of previous studies, see “The dynamics of company profits: an international comparison” (Mueller, 1990).
technologies (Mueller, 1990). Bourlakis (1997) test the competitive environment and persistence of profits hypothesis for a sample of Greek manufacturing firms between the years 1958 to 1984. The results show that high industry concentration and high barriers to entry lead to new firms entering the market, which indicate that disciplinary competitive forces are at work in the manufacturing industries.

As framework for the analysis of the competition process two basic models have been used in the literature. Within the first framework, concentration and profitability are directly correlated and the divergence between price and costs is greater in concentrated industries. Most empirical work based on this model is cross sectional in nature with a vector of factors determining the level of profitability. The major drawback in this type of analysis is that it takes little or no account of dynamic processes. These processes, i.e. entry and exits of firms in response to abnormal profits within industries, may naturally erode profits and render policy implications void. The other type of framework is based on a perspective of creative destruction. According to this view innovation creates monopolies; monopolies create profits, and this subsequently generates imitators until normal returns are restored within the industry. Roberts (2001) presents a theoretical framework for firm-level profit persistence that embraces product and competitor innovation, and, more importantly, the prospect that several product innovations may be materialized within a single firm.

The usual factors used to describe the determinants of long run profitability are; market structure (industry characteristics), market share, market share growth, productivity, firm concentration ratio, replacement value of capital stock, and growth of the firm. Other, less straightforward determinants are barriers to entry, minimum efficient size measures, stock of advertising, and the stock of research and development (R&D). Roberts and Dowling (2002) find that firms with relatively good reputations are better able to sustain profits above the norm. Regarding R&D, it is likely that it is the ‘persistence’ in R&D investments rather than the absolute stock that influence the long run profitability.

In a study of firm-level profitability Yurtoglu (2004) show, using a sample of the 172 largest multinational firms in Turkey, that firm-level profits converge but that the convergence process is incomplete. Due to unavailability of data no tests are made regarding the effect of R&D on profitability. Studying industry aggregates for a sample of more than 12,000 US firms Waring (1996) however, finds that industry specificities such as R&D levels have a significant impact on the speed of convergence. Bentzen

---

21 See Klepper and Graddy (1990) for a seminal study of the so-called “product life cycle”.

et al. (2005) confirm the result that industry aggregate returns persist, in a study of Danish firms and profitability. In a study based on a large panel of nearly 1600 Danish firms Smith et al. (2003) investigate how ownership affect the persistence of firm profits. The results indicate a positive relationship between the number of owners, the persistence of profits, and the permanent level of firm profits. Conversely, firms characterized by a highly concentrated ownership are found to have significantly higher rents. Although not discussed directly in the study, these results might be an indication of a non-linear relationship between ownership and performance. Investigating Japanese manufacturing firms, Odagiri and Yamawaki (1990) also conclude that profits persist. In a recent study using fifteen years of additional data Maruyama and Odagiri (2002) show that this ‘persistence of profits’ persist’. Furthermore, the firms’ profit performance is shown to be positively related to measures of market share.

2.5 Risk-Adjusted Performance, an Application of the Modigliani-measure

Consumers would like the mutual funds’ they invest in to maximize risk-adjusted expected returns. Portfolio managers, however, are often motivated by their compensation, which is tied to the mutual fund companies’ assets under management. If the actions that maximize assets under management differ from the actions that maximize risk-adjusted expected returns, inefficiencies related to this conflict will arise. One can therefore characterize the relationship between retail investors, portfolio managers, and mutual fund companies’ as a double principle agency problem. Many researchers have questioned the rationality of investors who place money with active managers, despite their apparent inability to outperform passive strategies. The relative performance of mutual fund managers also seems to be largely unpredictable from past relative performance (Berk and Green, 2004). Many researchers have regarded this as evidence for market

---

22 A seminal paper in this area is Lakonishok et al. (1991) “Window Dressing by Pension Fund Managers”; see also Chevalier and Ellison (1997).

23 Considering also that the mutual fund company has controlling owners one could describe it as a three folded agency problem; for an excellent review relevant to the Swedish mutual fund industry in particular, see Pålsson (2001). For a general discussion about mutual funds, see Haslem (2003).

24 A seminal paper within this field is Jensen (1968), see also Carhart (1997) for an extended discussion as regards to the persistence in mutual fund returns.
efficiency (see e.g. Malkiel 1995, and Ross, Westerfield and Jaffe 2002). This notwithstanding, considerable effort and resources are devoted to evaluating past performance of managers (Gruber 1996, and Daniel et al. 1997). The reason is that a strong relationship has been documented between the inflow of new investment into a mutual fund and the fund’s past performance (Patel et al.1990, Ippolito, 1992, Sirri and Tufano, 1998, Agrawal et al. 2004, and Baquero et al. 2005). Since portfolio managers usually receive a fixed percentage of assets under management as compensation, they will have an incentive to take actions that increase the total assets of the fund.

Practitioners in the financial industry often put strong emphasis on evaluations based on total return, although more sophisticated measures exist. Academics on the other hand, often stress individual utility functions and measures of portfolio performance based on so-called prospect theory, which captures not only risk and return, but also reflects differences in the aversion to upside or downside risk (Gemmill et al. 2005). Return-based style analysis, a method introduced by Sharpe (1988, 1992) has also become a popular tool when evaluating mutual fund returns (For more detailed discussion see, Van Campenhout, 2002). The techniques and methods of evaluating the relative performance of mutual fund managers are thus as many as they are diverse.

There is however a consensus that a good performance measure for portfolio evaluation should reflect not only the return, but also the risk taken to achieve that return, relative to some appropriate benchmark. An important issue relevant for most measures of portfolio performance is, that

---

25 The efficient market hypothesis states that security prices fully reflect all available information, assuming no costs associated with information or trading (Grossman and Stiglitz, 1980). In reality however, there are surely positive information and trading costs (Fama, 1961; 1991). Recognizing this Jensen (1978) reformulate the efficiency hypothesis as saying that security prices reflect all information to the point where the marginal benefits of acting on information do not exceed the marginal cost. Ambiguity regarding information and trading costs is not, however, the main impediment to inference about market efficiency. The joint-hypothesis problem, of testing the hypothesis together with some asset-pricing model, may be more serious (Fama, 1991). Although there might be disagreement about the implications for efficiency, most academics agree on the facts that emerge from test underlined by the assumption of market efficiency. The empirical work on market efficiency and asset-pricing models has fundamentally changed the views and practices of market professionals (Fama, 1991).

26 The most conventional measures or risk-adjusted performance used by both practitioners and academics are the Sharpe ratio, Jensen’s alpha, the Sortino ratio (Sortino and Van der Meer, 1991) and the Higher Moment measure (Hwang and Satchell, 1998), for reviews of performance measures see Chen and Knez (1996) and Amenc and Le Sourd (2007).

27 For a discussion about measures of mutual fund performance and benchmarks, see Lehmann and Modest (1987).
the evaluation method should be easy to understand and use. Without this feature many evaluation techniques and performance measures remain academic comments.

Modigliani and Modigliani (1997) therefore present a measure of portfolio performance which through a theoretical leveraging of the portfolio makes it risk-equivalent to the benchmark index. The measure, referred to as the M2-measure (from the two authors), is essentially an adaptation of the Sharpe-ratio (Sharpe, 1966). The two measures consequently rank portfolios identically. Compared to the Sharpe measure, which remains rather esoteric, the merit of the M2-measure is that it calculates the risk-adjusted performance in percentage points, like the original return of any portfolio or benchmark.

Common to all performance measures based on variance as a measure of risk, is the assumption normality in NAV returns. Most NAV returns however, demonstrate skewness and kurtosis (Gemmill et al. 2005). A continuing and widespread use of variance as measure of risk nevertheless speaks in favor of this assumption when evaluating portfolio performance.

In a recent study Kosowski et al. (2007) investigate whether it is possible to detect funds that outperform the market by dropping the assumption of normality associated with classic $t$ tests. Using boot strapped errors they find that some managers are able to produce positive alphas. If such skills exist, they will most likely disappear as soon as they are discovered as investors would buy into those particular manager’s funds. This would then support Berk and Green’s (2004) hypothesis about fund returns in a competitive environment. Over the last decade there have been many more attempts to analyze returns from portfolios with asymmetries in investment returns (for overview, see Keating and Shadwick, 2002). This has resulted in the current fashion for style analysis (i.e., Lhabitant, 2002; Chan et al. 2002). In particular, much of the work has been devoted to “hedge” funds (Sirri and Tufano, 1998; Agrawal et al. 2004, and Baquero et al. 2005). Mutual bond funds remain the least researched group of mutual funds.

Section five of the introduction now continues with a discussion of some methodological and empirical issues that are relevant for all the five essays. A short commentary on the differences between Tobin’s average $q$ and Marginal $q$ is included.

3. METHODOLOGICAL AND EMPIRICAL ISSUES

Common to most studies in the corporate governance literature is that they use some proxy for the performance of the firm as dependent variable. Usual
performance measures are net income/net worth, return on equity, and return on assets or Tobin’s average $q$. Furthermore, the majority of studies explore data of either US or UK large-firms (for overview, see Gugler, 2001). Based on these datasets the assumption of ‘one share-one vote’ prevails and little regard is paid to the difference between cash flow ownership and voting rights. The implicit assumption is consequently that the effect of a separation of votes from capital is immaterial. Other methodological issues relevant for investigations concerning corporate governance and performance are; omitted variables, firm and industry effects, and reverse causality. Although more research is generally warranted, some studies have tried to address these issues more in-depth. This section will try to summarize some of the findings.

3.1 Tobin’s $q$ versus Marginal $q$

Although correct for estimating a firm’s expected future growth opportunities the usual Tobin’s $q$, market value of equity and debt over the replacement cost of capital, actually says very little about the past performance of the firm’s investments. A performance measure used in empirical investigations concerning corporate governance and firms’ performance should mirror how well the management succeeds in maximising shareholder value. Although Tobin’s $q$ has this property theoretically, its true application in empirical studies fails to provide a proper evaluation. In fact Tobin’s $q$ is an average measure of performance and as such it suffers from some serious drawbacks. Apart from confusing inframarginal and marginal returns, the use of average measures of performance imply the need to ‘specify a fully structural model of the determinants of performance’ (Gugler and Yurtoglu, 2003). The problems of omitted variable, reverse causality, and /or endogeneity typically follow. An analysis of efficient resource allocation therefore has to be of a marginal character (Mueller, 2003). Mueller and Reardon (1993) derive a marginal $q$, which is essentially the marginal Tobin’s $q$. Assuming that the market is

28 An alternative approach is to apply the so-called Euler equation model (Bond and Meghir, 1990), which basically considers optimal capital accumulation in the presence of convex adjustment costs. Using this methodology Rondi et al. (1994) find that, consistent with the literature on the effect of financial factors on company behaviour, ownership is related to the sensitivity of cash flows. State-owned firms are found to be more sensitive to cash flow than privately owned firms. The results also suggest that firm size is relevant for the availability of external capital.

29 Perfect and Wiles (1994) compare five alternative estimators of average $q$. Their results indicate that Tobin’s $q$, amongst other things, is highly sensitive to the estimation method.
efficient, the problems associated with average returns and calculating firm-specific cost of capital can be circumvented.

The marginal $q$ measures the ratio of the change in a firm’s market value to the cost of the change in total assets (investment) that caused it. The market efficiency assumption implies that the market makes an unbiased estimation of the firm’s future cash flows. A marginal $q$ less (greater) than one, indicates that the investments at the margin had a return less (greater) than the cost of capital. Firm value is thus only maximized when marginal $q$ is equal to one. The marginal $q$ also allows for different levels of firm specific risk (firm specific cost of capital) by presupposing a correct market evaluation of the firms investments and value.

Another advantage with the marginal $q$ is that it obviates the need to specify a fully structural model of the determinants of performance. A sufficient condition of inefficient investment decisions is that marginal $q$ is below one (Gugler and Yurtoglu, 2003). Problems of reverse causality or endogeneity are also not likely when marginal returns are examined. Gugler and Yurtoglu (2003, p. 380) present an example:

“low average Tobin’s $q$ for firms with a diffuse ownership structure might not indicate that the shareholders are poor monitors of managers, but rather that original large shareholders have diffused their holdings because investment opportunities were bound to decline or simply because they wanted to diversify their wealth. An estimated $q_m$ of less than one, on the other hand, must be interpreted as a management failure. If firm investment opportunities are low, and its management are maximizing shareholder wealth, they will invest little and the returns on this investment will (at least) equal the cost of capital.”

Marginal $q$ thus has a straightforward interpretation, with a marginal return on investment below the cost of capital the shareholders would have been better off if the firm had distributed these funds directly to them instead. Conversely, marginal returns on investment greater than the cost of capital imply insufficient investment, or cash constraint on behalf of the firms.

### 3.2 Endogeneity, Causality and Panel Data

A problem when studying the influence of ownership on firm performance is that performance may also influence ownership, that is, the relationship is endogenous. It may as a result be difficult to identify the true effect of ownership. This problem is also referred to as reversed causality and it has a number of important consequences for the interpretation of the empirical
results. In the previous section it was explained why this problem is unlikely when the marginal return on investment is examined.

Another indication of the direction of causality between corporate governance factors and performance can be the functional form of the relationship. Morck et al. (1988) investigate the relationship between management ownership and the valuation of firms, measured by Tobin’s average $q$. They find that this relationship is nonmonotonic, meaning that Tobin’s average $q$ first increases, then fall, and finally rises again as management ownership rise. The results are thus in line with the so-called entrenchment hypothesis. A positive but diminishing effect of ownership has since been recorded in a number of studies, see amongst others McConnell and Servaes (1990), Gedajlovic and Shapiro (1998), Miguel et al. (2004), and Pindado and de la Torre (2006). Any study that attempts to assess the effect of ownership on performance should therefore control for this potential non-linearity in the relationship.

There are two main econometric motivations for using a panel data modelling. The first is the desire to control for unobserved time-invariant heterogeneity. The second is to study the dynamics of cross-sectional populations (Arellano, 2003). Particularly the possibility to control for firms or industry related heterogeneity has attracted attention within the corporate governance literature.

In a seminal paper by Himmelberg et al. (1999) a panel data methodology is used to control for both endogeneity and unobserved heterogeneity in the managerial ownership and performance relationship. The results are consistent with the predictions of the principal-agency models, and a large fraction of the cross-sectional variation in managerial ownership is found to be explained by unobserved heterogeneity. Reviewing the existing empirical evidence concerning control enhancing mechanism, Adams and Ferreira (2008) makes inquires for studies, additional to Cronqvist and Nilsson (2003)30, which uses the firm-fixed effects methodology to control for heterogeneity. The term fixed effects refers to the sampling in which the same units are repeatedly sampled for a given period holding constant the effects. The researcher can thus control for firm or industry heterogeneity not directly observable in the sample of firms. Due to sometimes limited time variation in both the dependent and the

---

30 Although Adams and Ferreira (2008) only mention Cronqvist and Nilsson (2003), recent studies including four essays in this thesis, are increasingly using panel data methodologies and fixed effects models for estimations.
explanatory variables, an alternative approach to panel data models is to use cross-section data for each year separately\textsuperscript{31}.

While ownership may differ significantly across firms Zhou (2001) shows that these changes in (managerial) ownership typically change slowly over time within a company. By relying on within variation consequently, fixed effects estimators may not detect an effect of ownership on performance even if one exists. Other types of owners however, such as institutional owners, most likely alter their ownership stakes more often. Industry variation may also be substantial, making fixed effects models with industry effects viable as an alternative to firm effects.

Assuming that controlling owners may prefer low dividend payments, if private benefits of control are extracted, and that minority shareholders may prefer high dividends, Thomsen (2004) tries to distinguish between the incentive and entrenchment effects. Utilizing a GMM\textsuperscript{32} methodology, which accounts for potential endogeneity, a negative effect of blockholder ownership on firm value (measured by Tobin’s \( q \)) is found in continental Europe. The same effect is not verified for firms in the US and UK. In addition, blockholder ownership is found to have a negative effect on dividend payout ratios. In a similar study Thomsen et al. (2006), use Granger tests to investigate the causal relationship between blockholder ownership and firm performance. Again the results support a negative association between blockholder ownership, over a certain level (>10%), and performance. Benfratello and Sembenelli (2006) also stress the importance of controlling for simultaneity of ownership variables in a study of the effects of foreign ownership on productivity. Applying a GMM methodology on a sample of Italian located firms, and controlling for input simultaneity, the results indicate that foreign ownership has no effect on productivity. However, when also controlling for simultaneity of ownership, they find that nationality matters and US firms tend to be more productive than firms under Italian ownership. Overall, the results from empirical investigations of endogeneity in the ownership and performance relationship give support for the findings in previous studies. That is, a positive but diminishing effect of ownership concentration, and aggravated agency conflicts between controlling shareholders and minority shareholders, due to incentive and entrenchment effects.


\textsuperscript{32} For in-depth discussion of the estimation theory of \textit{generalized method of moments} (GMM) and optimal instrumental variables, see Arellano and Bond (1988).
4. OUTLINE AND SUMMARY OF RESULTS AND CONTRIBUTIONS IN THE ESSAYS

In chapter 2 the issue of how to measure performance, specifically investment efficiency is examined empirically. The name of the essay (co-authored with Per-Olof Bjuggren) is Industry Specific Effects in Investment Performance and Valuation of Firms. Of specific interest to this study is the effect of market fluctuation and industry specificity for the investment efficiency of firms.

Basic theory of finance assumes that investment is the only fundamental factor explaining long-term changes in firm market values. As a measure of investment performance the marginal \(q\) methodology is used. The hypothesis is that investment performance will be higher during times of strong market developments (boom) and lower during times of market declines (recession). Furthermore it is hypothesised that firms operating in new industries suffer more from information asymmetry and that this create a valuation bias in favour of new industries during strong market developments (boom) and a negative bias in valuation during times of market declines (recession).

The study shows that investments represent a fundamental factor explaining how market values of firms change. During times of great market uncertainty, such as in a stock price bubble, investors seem to be more prone to making systematic errors in their forecast of firms operating in certain novel industries. As these firms are operating in industries with limited historical data, information asymmetries will be more malignant than in industries where a large body of previous experience exists.

Chapter 3, Institutional Ownership and the Returns on Investment, (co-authored with Per-Olof Bjuggren and Johan E. Eklund) is a study of how the aggregated ownership of institutional investors influences the investment performance of firms. The results show that both domestic and foreign institutional owners influence firm performance positively. By estimating firm performance with the marginal \(q\) methodology it is possible to estimate the firms’ actual performance in terms of investment efficiency. The findings are consistent with both the incentive effect of increasing ownership and the so-called entrenchment effect. That is, the relationship between institutional ownership and firm performance is found to be positive but marginally diminishing. When control instruments such as dual-class shares are used, the positive effect of institutional ownership is absent, most likely due to increased agency-problems related to the augmented separation of ownership from control. The use of this type of control instruments thus
becomes an important determinant of firm performance which eradicates the otherwise positive incentive effect associated with increased ownership.

Continuing with a strong focus on institutional ownership chapter 4, *Institutional Ownership and Dividends*, investigate the link between institutional ownership and dividend payments. In line with La Porta et al. (2000b) it is argued that the presence of influential stakeholders, other than the controlling owner(s) or management, can influence the performance of firms. In particular it is hypothesised that institutional owners might influence the firms to distribute a larger fraction of the profits to the shareholders, thus limiting the resources available for managerial discretion. By utilizing a dividend payout model, which accounts for earnings trends and partial adjustment of dividends to changes in earnings, a positive but marginally diminishing relation is found between institutional ownership and dividend changes. This result holds when ownership is retained through the use of control enhancing mechanisms such as vote-differentiated shares, instruments that induce minority owners to demand higher payout ratios as compensation for aggravated agency-conflicts. Most studies on the relationship between ownership and dividends have been made on US or UK data, which do not take into consideration the particular governance attributes of the continental European corporate governance model with highly concentrated ownership structure related to control enhancing mechanisms. By studying a panel of Swedish listed firms, the paper also utilizes a unique set of data which makes it possible to study ownership changes continuously.

Chapter 5, *Persistence of Profits and the Systematic Search for Knowledge – R&D and Profits above the Norm*, investigates how particular firms’ profits diverge from the industry norm, and how this divergence of profits persists over time. In particular the role played by R&D investments is examined.

Microeconomic theory predicts that the dynamic process of competition will restore profits to a normal level. According to this point of view, profits in excess of the opportunity cost of capital are nothing more than a transitory disequilibrium phenomenon. Depending on the firm structure and concentration in a particular industry, profits will move towards the equilibrium profit level i.e. the industry average, during a certain amount of time, if the profits converge at all. Some firms however, can maintain profits above the industry average, even in the absence of significant barriers to entry and exit. By investing in R&D for instance firms can develop technique, goods and services that allow them to maintain a competitive edge, and thus sustain profits above the industry average.
The hypotheses are that firm specific above norm profits exist and that these profits persist over time. It is also hypothesized that R&D investments have a positive effect on firm profitability. Using a large sample of European firms for a time period stretching over 21 years the results clearly indicate, in line with previous research, that firm specific profits diverge from the industry norm and that this divergence persists over time. By applying a dynamic panel data methodology which accounts for both time and firm effect’s the role played by R&D investment in relation to profit persistence is further explored. Unlike many previous studies which have applied a cross section methodology this panel data approach allows a more accurate inference of the estimated parameters.

The results also show that profits converge over time, but this process of convergence is incomplete. Firms that had profits significantly higher (lower) than the industry average 20 years ago, still present profits above (below) the average. One explanation for this persistent profit divergence, and particularly for profits above the norm, is sustained investments in R&D. Not only do firms with sustained R&D investments exhibit higher profit levels, the relative level of R&D is also positively related to the persistence of the firms’ profits.

In chapter 6, a return measure appropriate for the evaluation of institutional investors and in particular mutual funds is appraised empirically. The name of the essay is Risk-Adjusted Performance of Swedish Bond Funds in the years 2000-2003; An Application of the Modigliani-measure. More specifically the paper compares Swedish long-term bond funds’ returns against the major index of long-term bonds issued by the Swedish National Debt Office (OMRX-TBond). A measure developed by Modigliani and Modigliani (1997) is used to measure risk-adjusted performance. The main advantage with this measure is that it appraises performance in basis points like the original return of any asset. When risk-adjusted in this way, the study shows that the performance of many Swedish bond funds improves noticeably, although most funds still underperform the benchmark index. The reason for this underperformance can be attributed to a generally lower risk level in the mutual fund portfolios compared to the benchmark index.
REFERENCES


Introduction and Summary of the Thesis


Introduction and Summary of the Thesis


Introduction and Summary of the Thesis


Introduction and Summary of the Thesis


Chapter II

INDUSTRY SPECIFIC EFFECTS IN INVESTMENT PERFORMANCE AND VALUATION OF FIRMS

Per-Olof Bjuggren and Daniel Wiberg

Abstract
A necessary criterion for a performance measure in corporate governance is the degree to which it mirrors how well the management succeeds in maximizing firm value. Such a performance measure is marginal $q$ which links changes in firm value to the investments undertaken by the management. Empirical studies of investment and performance based on marginal $q$ have demonstrated the usefulness of this measure. Most research however, has mainly focused on long-term performance. This paper takes a short-term perspective and, based on the marginal $q$-theory, considers how firms’ market values change in the extreme stock price cycle of a stock market bubble. Using a data set of listed Swedish corporations we find an anomaly in form of a new industry specific effect that, in addition to investment, explains changes in firm value.

JEL classification: G14; G31; G34; L21
Keywords: Marginal $q$; Investment; Stock bubbles; Different industries

---

a Published in Empirica, Volume 35, Number 3, July 2008. We thank Dennis C. Mueller for inspiring discussions about marginal $q$ and professor Ghazi Shukur for equally inspiring statistical discussions. Helpful comments were also received from participants at the Corporate Governance and Investment Workshop 5-6 December 2003 in Vienna. Financial support from Sparbankernas Forskningsstiftelse to Daniel Wiberg's dissertation work is also gratefully acknowledged.

b Affiliations: Per-Olof Bjuggren Jönköping International Business School (JIBS) and Daniel Wiberg Jönköping International Business School (JIBS), and Centre of Excellence for Science and Innovation Studies (CESIS), Royal Institute of Technology, Stockholm
1. INTRODUCTION

A central topic in corporate governance is how to align the interests of the management with the interests of the shareholders. In a corporation with dispersed ownership most of the shareholders are primarily interested in how well the management succeeds in maximizing the value of the firm. A maximization of firm value means that the value of the equity will be maximized, thus maximizing shareholders’ personal wealth accordingly.

From this perspective a performance measure used in corporate governance should mirror how well management succeeds in maximizing firm value. One measure that has this property is Tobin’s $q$, the market value of a firm’s assets in relation to the cost of repurchasing the assets. However, Tobin’s $q$ is an average measure that shows per unit capital how much firm value is generated. An analysis of efficient resource allocation has to be of a marginal character. Assuming that the market is efficient, Mueller and Reardon (1993) circumvent the problem and present a performance measure, marginal $q$, which is essentially a marginal Tobin’s $q^1$.

The market efficiency assumption implies that the market makes an unbiased estimation of the firm’s future cash flows. The marginal $q$ measures the ratio of the change in a firm’s market value to the cost of the change in total assets (i.e. the investment) that caused it. A marginal $q$ less than one indicate that investments had a return at the margin less than the cost of capital. Firm value is thus maximized when marginal $q$ is equal to one.

Using this methodology Mueller and Reardon (1993) show that many large firms invest in projects with returns much lower than their shareholders’ opportunity costs. The upshot is that managers frequently make investments that do not promote the interests of shareholders and lenders. By using a marginal analysis it is possible to trace this type of managerial discretion and find out why corporate governance problems of this kind occur.

A growing body of literature continues to accumulate knowledge of the usefulness of marginal $q$ in analyses of investment and corporate governance issues. With the Mueller and Reardon (1993) method, Gugler, Mueller and Yurtoglu (2002b) present evidence for the relationship between institutional differences, such as legal systems, ownership structures and their

---

1 A theoretical proof of the advantages of using a marginal $q$ was first presented by Hayashi (1982).
Industry Specific Effects in Investment Performance and Valuation of Firms

relationship to investment performance. A dataset of more than 19,000 companies in 61 countries across the world was used.²

Even if marginal \( q \) improves the empirical measurement of a firm’s investment performance, it shares a weakness with all other performance measures. It assumes efficient capital markets, implying unbiased estimates of future cash flows in the pricing of securities.

However, research within the field of behavioural finance casts doubt on the presumption that the capital market always provides unbiased estimates (see e.g. Shiller (1981, 2000 and 2002) and Shleifer (2000)). Special attention has been devoted to the stock market bubble that built up in the late 1990s and burst in the second quarter of 2000 where after stock prices continued to fall for three years (see e.g. Evans, 2003, and Sheeran and Spain, 2004). One explanation of the stock market bubble is that industries based on new technologies such as Internet, telecom and biotechnology promised a new economic era with unprecedented growth in productivity and profits. Unrealistic expectations of increases in productivity, profits and growth built up, and this was primarily a new industry phenomenon which affected the stock prices of the new industry firms.

If booms and recessions are the results of bubbles, the calculated marginal \( q \) will differ between booms and recessions because of biased estimates of future cash flows. It is not the efficient use of resources solely that determines the value of the marginal \( q \).

Assuming that such a bubble effect was evident in the Swedish stock market during the period 1998 to 2002, the purpose of this paper is to study whether some industries exhibit more of a bubble-like behaviour of stock prices and market values than others. We propose that the stock prices during a bubble can be explained not only by fundamentals (investments), but also by an industry specific effect. This effect is due to asymmetric information related to new and knowledge intensive industries.³

The rest of the paper is organized as follows. The net present value rule and the theory of marginal \( q \) are discussed in the next section. The third section presents the hypotheses used in the empirical analysis. Data, variables and statistical methods are described in the fourth section. The

---

² The advantages of using a marginal \( q \) instead of Tobin’s \( q \) in studies of investment in firms and corporate governance issues have been further demonstrated in Gugler and Yurtoglu (2003) and Gugler, Mueller and Yurtoglu (2004).
³ The term “new” industry will be used in the paper, as an analogy to high-tech and knowledge intensive industries, formally defined as firms belonging to the Biotechnology, IT and Telecommunication industries.
results of our empirical analysis are presented in the fifth section. The paper concludes with a summary.

2. THE NET PRESENT VALUE AND MARGINAL q

In standard textbooks in corporate finance, such as Brealey and Myers (1991), the net present value rule is introduced as the criterion to be used when a firm is evaluating investments. The criterion requires for each project a comparison between the negative cash flow of the investment \( I \) and the present value \( PV \) of future cash flows \( CF_t \) generated

\[
PV = \sum_{t=1}^{\infty} \frac{CF_t}{(1+r)^t}
\]

The difference between \( PV \) and \( I \) is called net present value (NPV). The rule says that all projects with a positive NPV shall be undertaken (or in other words accept all projects with \( \text{NPV} = PV - I > 0 \)).

The reason for a firm to make investments in projects with \( \text{NPV} > 0 \) is that shareholders are made better off compared to alternative uses of funds. (Hence, the wealth of the shareholder is not increased more by a direct distribution of funds to the shareholders by means of repurchase of shares or dividends.) The shareholders referred to are the ones that are outsiders in the sense of not working in the firm. All their consumption takes place outside the firm. As suppliers of capital they are therefore assumed to be interested only in the return on the firm’s investments. These shareholders cannot benefit from consumption-on-the-job in the way described by Jensen and Meckling (1976). Projects with \( \text{NPV} < 0 \) due to consumption-on-the-job can only benefit insiders like the management of the firm. The wealth of the shareholders is thus negatively affected by such projects.

The market value of the firm \( M_t \) bears a direct relation to the sum of the present values of all the running projects that the firm has invested assets in over time. In an efficient market the market value of the firm is equal to the sum of the present values of these projects. The present value \( PV_t \) of investments \( I_t \) during a time period will increase the market value of the firm if \( PV_t > 0 \) is larger than the depreciation of assets from earlier investments (i.e. \( M_t - M_{t-1} = PV_t - \text{Depreciation} \), see Gugler, Mueller and Yurtoglu, 2002b).

Considering that the market can make errors in the estimation of future cash flows the expression for change in market value in a period \( t \) can be written as:

\[
M_t - M_{t-1} = PV_t - \text{Depreciation} + \mu_t
\]
where $\mu_t$ represents the error the market makes in the estimation of future cash flows. In an efficient market unbiased estimates of the error term are made and $\mu_t$ has an expected value of, and a nominal distribution around, zero.

The net present value rule prescribes that managers shall invest in projects up to the point where NPV=0. Otherwise, the management is not acting in the interest of the shareholders. A NPV=0 implies that $PV_t = I_t$ or that:

\begin{equation}
\frac{PV_t}{I_t} = 1
\end{equation}

In the same fashion NPV>0 (unused profitable investment opportunities) implies $\frac{PV_t}{I_t} > 1$ and NPV<0 (managerial discretion of consumption-on-the-job character) implies $\frac{PV_t}{I_t} < 1$.

Following Gugler, Mueller and Yurtoglu (2002b) we can rewrite (2) as:

\begin{equation}
\frac{PV_t}{I_t} = q_m
\end{equation}

with $q_m = 1$ for the project last accepted indicating efficient investment level, $q_m > 1$ implying that the firm is not investing enough, and $q_m < 1$ implying overinvestment in projects that have a return less than what is available elsewhere in the capital markets.

Inserting (3) in (1) gives:

\begin{equation}
M_t - M_{t-1} = q_m I_t - Depreciation + \mu_t
\end{equation}

As pointed out by Gugler, Mueller and Yurtoglu (2002b) it can easily be seen from (3) and (4) that $q_m$ is related to Tobin’s $q$ in a way that justifies the denomination marginal $q$ ($q_m$). While Tobin’s $q$ reflects the market value ($M_t$) divided by the replacement cost of all assets of the firm, $q_m$ shows the relationship between the cost for a change in the stock of assets and the subsequent change in market value. The marginal character is evident.
By dividing both sides of (4) with $M_{t-1}$ a normalization that is useful in empirical testing is accomplished. We get:

$$\frac{M_t - M_{t-1}}{M_{t-1}} = -\delta + q_m \frac{I_t}{M_{t-1}} + \frac{\mu}{M_{t-1}}$$

where $\delta$ is the depreciation rate.

Equation (5) assumes that the capital market is efficient in the sense that future cash flows are unbiased estimates. Unbiased estimation means that expected future cash flows are equal to the cash flows actually realized i.e.:

$$E_t (CF_{t+1}) = CF_{t+1}$$

If that is correct, there are no biased valuation errors or bubbles in the stock market prices. This assumption might be more justified for some firms than others. It might for example be more difficult to forecast future cash flow for a firm in a new or young industry than for a firm in a mature industry with a lot of history. If there are large difficulties in estimating future cash flows, the investors might make systematic errors in the forecasting. During some periods they overestimate future cash flows while they underestimate them during other periods. In case of systematic forecasting errors, (6) can to be rewritten as:

$$E_t (CF_{t+1}) = CF_{t+1} + b_t$$

where $b_t$ represents the systematic error.

Equation (5) can now be changed to:

$$\frac{M_t - M_{t-1}}{M_{t-1}} = -\delta + q_m \frac{I_t}{M_{t-1}} + \frac{b_t}{M_{t-1}} + \frac{\mu}{M_{t-1}}$$

where $b_t$ represents systematic error in forecasting future cash flows. ($\mu_t$ still represents the unbiased error the efficient capital market makes in the estimation of cash follows, and $\mu_t$ has an expected value of, and a normal distribution around, zero.)

We follow Mueller and Reardon (1993) as well as Gugler et al (2002b) and calculate firm investment as:
Industry Specific Effects in Investment Performance and Valuation of Firms

\[ I = \text{After tax profits} + \text{Depreciation} - \text{Dividends} + \Delta \text{Debt} + \Delta \text{Equity} + R&D + \text{ADV} \]

where \( \Delta D \) and \( \Delta E \) are funds raised using new debt and equity issues. R&D and ADV (advertising expenditures) are also forms of investment, which may contribute to a company’s market value.

There are two more noteworthy properties of the marginal \( q \). First, it obviates the need to determine the individual firms’ cost of capital, since that is already accounted for through the markets’ discounting of the future cash flows. Second, marginal \( q \) allows for differences in risk across firms (for riskier firm the investors will expect a higher return and vice versa).

3. **HYPOTHESES**

Using the theory of marginal \( q \) as presented above allows us to study how the financial markets evaluate investments in time periods that can be characterized as booms or recessions. Do financial markets evaluate investments in both booms and recessions equally accurately, or is there a difference? The sometimes very large fluctuations in stock prices over time make it hard to believe that we can always trust the prices set by the market. The experience from the five years surrounding year 2000 supports the impression that this was an example of a stock market bubble. In bubbles, stock prices increase more than what is justified by increased future cash flows from investments during booms, and in the same fashion subsequent drops in stock prices are not completely justified by lower future cash flows. If a bubble like this exists, it is likely to influence marginal \( q \) in equation (5) so we have to account for it by using equation (8). We can formulate our first hypothesis:

**Hypothesis 1** = During a boom the investment performance, as measured by marginal \( q \), will be higher than during a recession.

The logic behind this hypothesis is that during a boom the increase in stock prices is so strong that it cannot be explained only by fundamental investments in an efficient capital market. Psychological factors of different kinds as described in, e.g. Shiller (2000) will also have an influence. Although these factors are difficult to specify in an equation they will in a boom be reflected in a higher and more positive influence on stock prices.
than what is justified by fundamentals. The opposite forces will be at play in a recession.

It is also likely that systematic errors in the forecasting of future cash flows could be more prevalent for certain types of industries than others. The age of an industry might matter, for instance. In a young industry there is much more pure uncertainty about the future. There is no history to fall back on in analyses of the probability of future events. Guesses that are more or less well founded will have a larger importance in the predictions than for older industries that have been analysed over a longer time span. It is also easier in a boom to be overoptimistic about the future for these young industries than for old industries. The reason would be that in old industries experience works as a modifying factor in the estimation of cash flows. In a recession the sentiments are reversed. The experience of being wrong and losing money from being too optimistic make investors overly pessimistic in the next period. Such a change in behaviour of investors’ vis-à-vis young industries could partially explain a stock price bubble. The five years period around the millennium shift year 2000, characterized by a sharp rise and subsequent fall in stock prices, seems to fit nicely into this picture. Based on this reasoning our hypothesis about young industries is:

**Hypothesis 2**

Systematic errors in the predictions of future cash flows cause a positive bias for firms in new industries in the change of market values during a boom and a negative bias during a recession.

If hypothesis 2 is true, investment is no longer the only explanatory factor of changes in market values. An additional factor of a bubble character that affects the valuation of young industry firms has to be added in times of market turbulence. Equation (5) has to be replaced by equation (8) in a model that tries to explain changes during times of great market turbulence and uncertainty.

4. **VARIABLES, DATA AND METHOD**

To differentiate between the two types of industries, the established (primarily manufacturing) of the “old” economy and the young knowledge intensive of the “new” economy, a multiple equation model is required. Table 1 offers a description of the variables used in the two equation models applied here.
Table 1. Description of Variables

<table>
<thead>
<tr>
<th>Variable</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>$\frac{M_t - M_{t-1}(O)}{M_t}$</td>
<td>Change in market value for old industry firms</td>
</tr>
<tr>
<td>$\frac{M_t - M_{t-1}(N)}{M_t}$</td>
<td>Change in market value for new industry firms</td>
</tr>
<tr>
<td>$\frac{I_t}{M_{t-1}(O)}$</td>
<td>Investment ratio for old industry firms</td>
</tr>
<tr>
<td>$\frac{I_t}{M_{t-1}(N)}$</td>
<td>Investment ratio for new industry firms</td>
</tr>
</tbody>
</table>

where:

- $M_t$: Market value at the end of period $t$.
- $M_{t-1}$: Market value at the end of period $t-1$.
- $I_t$: Investment in period $t$ calculated as $I = $ After tax profit + Depreciation - Dividends + $\Delta$ Debt + $\Delta$ Equity + R&D + ADV

where $\Delta$ D and $\Delta$ E are funds raised using new debt and equity issues, R&D and ADV sales expenditures.

The data used in the regression analysis is provided by UC-Select and consist of accounting data for the firms listed on the Stockholm Stock Exchange in the period 1997-2003. To test our hypotheses that the investment performance measured as marginal $q$ is affected by a stock market bubble, and that it is for new industry firms that systematic valuation errors are made, the time period 1998-2002 is divided into two. The two-year period 1998-1999 represents a distinct boom-market, whilst the period 2001-2002 is characterized by an equally apparent stock market decline. New industry firms are represented by the firms working in the industries biotechnology, IT and telecommunication.

Several criteria were applied in the selection of firms to be included in the data set. Excluded from the sample were firms with accounting periods less and/or different than a full calendar year running from January to December. To be included in the sample the firms also needed to have stock market data reported by Affärsvärlden, which is the major Swedish database for stock market data. As a result of this second criterion, firms not belonging to the major stock exchange lists, the A- or O-lists, were excluded.
from the sample. (In other words, only firms listed on the A- and O-lists of Stockholm Stock Exchange were included.) The last selection criterion was that the companies in the sample for 1998-1999 had to be listed on any of these two lists during both years. In the same fashion the sample for 2001-2002 consists of firms present on the A- and O-lists during the whole period. The above-stated criteria ensure a reasonable level of trading in the share, i.e. liquidity in the share, and that valid comparisons can be made for the same firms for all years.

Summary statistics of the variables used are provided in Table 2.

<table>
<thead>
<tr>
<th>Table 2. Summary Statistics 1998-1999 and 2001-2002</th>
</tr>
</thead>
<tbody>
<tr>
<td>Period</td>
</tr>
<tr>
<td>--------</td>
</tr>
<tr>
<td>1998-1999</td>
</tr>
<tr>
<td>DM(O)</td>
</tr>
<tr>
<td>I/Mt-1(O)</td>
</tr>
<tr>
<td>DM(N)</td>
</tr>
<tr>
<td>I/Mt-1(N)</td>
</tr>
<tr>
<td>2001-2002</td>
</tr>
<tr>
<td>DM(O)</td>
</tr>
<tr>
<td>I/Mt-1(O)</td>
</tr>
<tr>
<td>DM(N)</td>
</tr>
<tr>
<td>I/Mt-1(N)</td>
</tr>
</tbody>
</table>

To empirically test the relationship between investments and market value two different methods are employed. First, we estimate our empirical model by ordinary least squares estimation (OLS) for firms from both old and new industry for each of the two time periods 1998-1999 and 2001-2002. Second, the existence of a stock price cycle implies that the valuation of firms across the subsets may not be independent but the regressions error can be correlated across the subset regressions. Therefore, we estimate the empirical model using seemingly unrelated regression estimation (SUR). SUR estimation provides the additional advantage of restricting the coefficients to test if there is a significant difference between the old and new industry firms during the two time periods. The two equations to be estimated for the two time periods 1998-1999 and 2001-2002 are:
Industry Specific Effects in Investment Performance and Valuation of Firms

\[
\frac{M_t - M_{t-1}}{M_{t-1}}(O) = -\delta(O) + q_m(O) \frac{I_t}{M_{t-1}}(O) + \frac{\mu}{M_{t-1}}(O)
\]

and

\[
\frac{M_t - M_{t-1}}{M_{t-1}}(N) = -\delta(N) + q_m(N) \frac{I_t}{M_{t-1}}(N) + \frac{\mu}{M_{t-1}}(N)
\]

In the regression the parameters \(\delta(O)\), \(q_m(O)\), \(\delta(N)\) and \(q_m(N)\) are estimated. The parameter \(\delta(i)\) can be interpreted as a proxy for the depreciation rate. With perfect capital markets the coefficient \(q_m\), marginal \(q\), mirrors how efficiently the resources of the firm are used. A firm that is wasting its resources will have a \(q_m\) less than one.

If our hypotheses 1 and 2 are true the \(q_m\) will differ between boom and recession and this difference will be especially noticeable for new industry firms. A prerequisite for these hypotheses is that the capital market is inefficient in the sense that bubbles occur. This inefficiency of a bubble character will exist for these new industries because the experience of evaluating future cash flows of investments is limited. The probability of being over optimistic and over pessimistic in the evaluation of future cash flows in a new industry sector is likely to be much higher than for old industries.

Finally, to confirm and test the robustness of the SUR estimations we employ panel data techniques and estimate the sample firms’ average marginal \(q\) as well as the effect of a new industry dummy-variable, as shown by equation (11)

\[
\frac{M_t - M_{t-1}}{M_{t-1}} = -\delta + q_m \frac{I_t}{M_{t-1}} + D_{NEWIND}
\]

by pooled OLS, Fixed Effects LS, and Random Effects GLS. The industry dummy variable NEWIND takes on unit value for firms in new industries and zero value otherwise.
5. RESULTS

Tables 3, 4, and 5 present the results of our study. A distinction was made between four different cases. For each of the two periods 1998-1999 and 2001-2002 regressions were run for old and new industry firms. A three-step statistical procedure was applied. An ordinary least squares model was first used in a comparative analysis of the periods and industries. In a second step a seemingly unrelated regression model (SUR model) was estimated in order to take possible correlations between error terms into consideration and test structural differences between the two types of industries. In the SUR-estimation the number of observations used is equal to the smallest data set, in this case meaning that the number of observations for new industry firms set a limit in both periods. As a third step, to test the robustness of the results, panel data estimations were made for the full sample of firms in the two periods.

Table 3 shows the OLS results. All coefficients are significant at least at the five per cent level. The results indicate that new industry firms are different from firms in old industries. The old firms exhibit a marginal \( q \) that does not differ much between the two periods. However, the results for the new industry firms show a completely different picture. The coefficient of \( I_t/M_{t-1} \), the marginal \( q \), varies substantially between the two periods. From a value of 1.634 in the boom period 1998-1999 the marginal \( q \) for new industry firms drops to only 0.441 in the recession period 2001-2002. The value of the constant term also changes in an extraordinary way, from a value indicating a sharp appreciation of 26 per cent during the boom, the assets are in the following recession period depreciated by 33 per cent. This pattern indicates overreactions in the valuation of assets of new industry firms. The old industry firms seem to be much more accurately and consistently valued over time. The marginal \( q \) is a bit lower than 1 indicating that some (but not many) of the investments could have been more profitably used elsewhere in the economy. The estimated constant term indicate that there is a relatively stable depreciation of assets over time (around 10%). These results confirm hypothesis two, that a specific effect related to firms working in new industries affect the market valuation, and consequently the fundamental investment analysis offered by marginal \( q \).
Industry Specific Effects in Investment Performance and Valuation of Firms

Table 3. OLS. Change in market value \( \frac{M_t - M_{t-1}}{M_t} \) is the dependent variable.

<table>
<thead>
<tr>
<th></th>
<th>Old industry firms</th>
<th>New industry firms</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.077* (2.37)</td>
<td>-0.148** (7.42)</td>
</tr>
<tr>
<td></td>
<td>0.264* (2.39)</td>
<td>-0.330** (7.42)</td>
</tr>
<tr>
<td>I/M_{t-1}</td>
<td>0.955* (8.55)</td>
<td>0.855** (10.85)</td>
</tr>
<tr>
<td></td>
<td>1.634* (3.577)</td>
<td>0.441** (3.85)</td>
</tr>
<tr>
<td>N</td>
<td>170 266</td>
<td>46 108</td>
</tr>
<tr>
<td>R²</td>
<td>0.30 0.31</td>
<td>0.23 0.12</td>
</tr>
<tr>
<td>Adj R²</td>
<td>0.30 0.31</td>
<td>0.21 0.11</td>
</tr>
<tr>
<td>F-values</td>
<td>73.2 117.9</td>
<td>12.8 14.8</td>
</tr>
<tr>
<td>D-W</td>
<td>1.8 2.1</td>
<td>1.9 2.3</td>
</tr>
</tbody>
</table>

Note: t-values are in parentheses. ** denotes significant at 0.01 level, * denotes significant at 0.05 level.

As a second step in the statistical analysis a SUR-estimation was made. Table 4 shows the results of the SUR-estimation. In the SUR-estimation the number of observations is determined by the smaller data set, that is, the number of new industry firms in period one 1998-1999. Consequently, the number of usable observations for old industry firms is reduced to the first 46 observations in 1998-1999 and the first 108 observations in 2001-2002. There is a correlation of 0.22 between error terms of old and new industry firms in 1998-1999 and minus 0.02 in 2001-2002.4

The estimated parameters of the two equations (9) and (10) in the period 1998-1999 differ more than in 2001-2002 compared to the OLS-estimation. The depreciation rate for old industry firms is increased in 1998-1999 and made more similar to the rate in the subsequent recession period. It is again worth noting that the \( q_m \)-value for new industry firms changes dramatically over the two periods.

Of special interest for this study is that the constant and the coefficient \( q_m \) differ significantly between old and new industry firms in 2001-2002.

---

4 Multiplied by degrees of freedom these correlations give us chi-squared distributed test statistics of 10.12 respectively 2.38 (see Griffith, Hill & Carter 1999, p. 552). Hence, a null hypothesis of no correlation between the residuals at the 5-per cent level can only be rejected for the first time period.
There is also a difference for 1998-1999 even though this difference is only significant at the 13 per cent level.

Table 4. SUR. Change in market value \( \left( \frac{M_t - M_{t-1}}{M_t} \right) \) is dependent variable.

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Old industry firms</td>
<td>New industry firms</td>
<td>Old industry firms</td>
<td>New industry firms</td>
</tr>
<tr>
<td>Constant</td>
<td>-0.124**</td>
<td>0.284**</td>
<td>-0.156**</td>
<td>-0.330**</td>
</tr>
<tr>
<td></td>
<td>(2.68)</td>
<td>(2.64)</td>
<td>(4.56)</td>
<td>(10.26)</td>
</tr>
<tr>
<td>( \text{I/M}_{t-1} )</td>
<td>0.759*</td>
<td>1.492**</td>
<td>1.090**</td>
<td>0.444**</td>
</tr>
<tr>
<td></td>
<td>(4.44)</td>
<td>(3.41)</td>
<td>(8.27)</td>
<td>(3.91)</td>
</tr>
<tr>
<td>( N )</td>
<td>46</td>
<td>46</td>
<td>108</td>
<td>108</td>
</tr>
<tr>
<td>( R^2 )</td>
<td>0.29</td>
<td>0.22</td>
<td>0.39</td>
<td>0.12</td>
</tr>
<tr>
<td>( \text{Adj R}^2 )</td>
<td>0.28</td>
<td>0.21</td>
<td>0.38</td>
<td>0.11</td>
</tr>
<tr>
<td>( \text{D-W} )</td>
<td>1.9</td>
<td>1.9</td>
<td>2.0</td>
<td>2.3</td>
</tr>
<tr>
<td>Test of equal coefficients</td>
<td>( \chi^2(1) = 2.25 )</td>
<td>( \chi^2(1) = 13.76** )</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Note: t-values are in parentheses. ** denotes significant at 0.01 level, * denotes significant at 0.05 level.

Regarding the results in Table 4, the tendency to make systematic mistakes in the forecasting of cash flows seems to be larger when evaluating young industries compared to old established industries, which would support hypothesis two. Furthermore, the mistakes change character; during a stock market boom there is a positive bias, while the bias is negative during recessions.

A further interpretation of this result could be that the greater the number of new industries is compared to mature industries, the more likely bubbles are to appear in the stock prices.

In order to verify the results of the SUR-estimation three panel data models were estimated for the two time periods. Table 5 present the results of these estimations.
Table 5. Panel Data Estimation with Dummy Variable
Dependent variable: Change in market value \( \frac{M_t - M_{t-1}}{M_t} \)

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.105** (-2.62)</td>
<td></td>
<td>-0.098 (-1.23)</td>
<td></td>
<td>-0.128** (-2.86)</td>
<td></td>
</tr>
<tr>
<td>( \frac{I}{M_{t-1}} )</td>
<td>1.091** (8.40)</td>
<td>0.694** (10.63)</td>
<td>1.055** (8.21)</td>
<td>0.676** (10.42)</td>
<td>1.060** (8.26)</td>
<td>0.678** (10.42)</td>
</tr>
<tr>
<td>NEWIND</td>
<td>0.443** (6.73)</td>
<td>-0.195** (-5.39)</td>
<td>0.441** (6.79)</td>
<td>-0.198** (-5.51)</td>
<td>0.441** (6.80)</td>
<td>-0.197** (-5.49)</td>
</tr>
<tr>
<td>N</td>
<td>216</td>
<td>374</td>
<td>216</td>
<td>374</td>
<td>216</td>
<td>216</td>
</tr>
<tr>
<td>R²</td>
<td>0.33</td>
<td>0.33</td>
<td>0.35</td>
<td>0.34</td>
<td>0.33</td>
<td>0.33</td>
</tr>
<tr>
<td>Adj R²</td>
<td>0.32</td>
<td>0.32</td>
<td>0.34</td>
<td>0.34</td>
<td>-</td>
<td>-</td>
</tr>
<tr>
<td>F-values</td>
<td>51.3</td>
<td>90.31</td>
<td>37.77</td>
<td>63.8</td>
<td>-</td>
<td>-</td>
</tr>
</tbody>
</table>

Note: t-values are in parentheses. * denotes significant at 0.01 level, * denotes significant at 0.05 level.

All three panel data models support the results in the previous OLS and SUR estimation. Both the pooled OLS and the Fixed Effects regressions have coefficient estimates significant at 0.01 level for the marginal \( q \) and the \( \text{new industry} \) dummy. For the Random Effects GLS regression all coefficients but one are significant at the 0.01 level. Arguing that there are specific individual effects across firms, the Fixed Effects model would be the most accurate. Indeed, the Fixed Effects model has the highest explanatory power and significant estimates of all coefficients. In addition to the individual firm effects there is an additional industry effect that explains the investment performance of the firms. The time effects between the years in the two sub periods are negligible. The Hausmann test also indicates that the Fixed Effects model has the best predictive power of the three models.

For all firms in the sample, that is when there is no division into subgroups, the estimated marginal \( q \) should be somewhere in the region of one, otherwise firms would make, on average, inefficient investment decisions. Or to put it in another way, a marginal \( q \) less than (larger than) one would imply that an investment of one would make the market value change less than (larger than) one i.e. overinvestment (underinvestment). In the panel data models the estimated marginal \( q \) is an average for the whole
sample. In the boom period 1998-1999 the average marginal $q$ for all firms lies between 1.05 and 1.09. For the recession period 2001-2002 the investment performance is dramatically lowered, and marginal $q$ is on average between 0.68-0.69. This is consistent with our reasoning that during a recession the market is very sceptical about investment opportunities, and during a boom the market is overoptimistic. These results support the findings of the OLS and SUR estimation models and thus confirm the presence of a specific valuation effect for firms of so-called new industries. It also supports the finding that the investment performance and subsequently valuation of firms change dramatically due to changes in market sentiments.

6. CONCLUSIONS

The yearly changes in stock prices and market values of firms can be large. As Shiller (1981) demonstrates, prices and values seem to move more than what can be justified by changes in fundamentals. The fundamental explanatory factor used in this paper is investment. According to the marginal $q$-theory as proposed by Mueller and Reardon (1993), and its empirical tests, such as Gugler, Mueller and Yurtoglu (2002a and 2002b), investment is the most appropriate fundamental factor to explain changes in firm market values in a long-term perspective.

This paper has taken a short-term perspective. Investment represents the fundamental factor explaining how market values change in a stock price cycle consisting of a rise followed by a fall in stock prices. We find that the investment performance (marginal $q$) of listed Swedish firms during the 1998/99 boom and the 2001/02 recession varies in a bubble-like fashion for new industry firms (represented by biotechnology, IT and telecommunication). The increase in market values during the boom, and the decrease in market values during the subsequent recession, is significantly greater for these new industry firms than other firms. In fact, marginal $q$ is comparably stable for the mature industry firms. Investors seem to be more prone to make systematic errors in their forecasts for new industry firms. To understand why such systematic errors arise bounded rationality and limited industry experience could add to explanations of psychological nature in the behavioural finance literature.
REFERENCES

Chapter III

INSTITUTIONAL OWNERSHIP AND THE RETURNS ON INVESTMENT

Per-Olof Bjuggren, Johan E. Eklund, and Daniel Wiberg

Abstract

By examining a large number of Swedish listed firms, we analyse how institutional and foreign owners affect investment decisions and firm performance. To measure investment performance Mueller and Reardon’s (1993) marginal $q$ is used, although derived directly from Tobin’s average $q$. Marginal $q$ measures the ratio of the returns on investment to the cost of capital. Our findings show that both domestic and foreign institutional owners positively influence firm performance. Furthermore a non-linear relation between institutional ownership concentration and performance is found. This is consistent with positive incentive effects and negative entrenchment effects. During the last decades the ownership structure of Swedish firms has undergone dramatic changes: institutional and foreign investors have been increasing their stakes, whereas Swedish households have decreased in importance. Controlling owners, often founding families, remain in control by resorting to an extensive use of dual-class shares. The practice of dual-class shares which separates cash-flow rights and control rights is also found to be an important determinant of firm performance that eradicates the positive influence of institutional ownership.

JEL codes: G 30, C 23, L25

Keywords: Corporate governance, institutions, ownership, performance, Tobin’s $q$, marginal $q$.

---

$^a$ Financial support from Sparbankernas Forskningsstifelse to Daniel Wiberg’s and Johan Eklund’s dissertation work is gratefully acknowledged, together with financial support from Torsten and Ragnar Söderbergs Foundation for Per-Olof Bjuggren’s research. A research grant from the Ratio Institute and the Marcus and Amalia Wallenberg Memorial Fund Foundation and support from the Centre for Excellence for Science and Innovation Studies (CESIS) is also gratefully acknowledged.

$^b$ Affiliations: Per-Olof Bjuggren Jönköping International Business School (JIBS), Johan Eklund Jönköping International Business School (JIBS) and Centre of Excellence for Science and Innovation Studies (CESIS), Royal Institute of Technology, Stockholm, and Daniel Wiberg Jönköping International Business School (JIBS) and Centre of Excellence for Science and Innovation Studies (CESIS), Royal Institute of Technology, Stockholm.
1. INTRODUCTION

Over the last decades the role of institutional and foreign investors has grown dramatically. The growing importance of this kind of investors has been coupled with an increased interest in the role and effect’s of this “anonymous-capital”. These institutional investors, both foreign and domestic, are often called upon to solve and minimize the managerial discretion problems through their role as large and influential owners (Demsetz, 1983 and Shleifer and Vishny, 1986). The central question is whether institutional investors aggravate or reduce managerial discretion problems in listed firms?

One problem with institutional investors as owners is that they often own relatively small stakes in the individual firms in their investment portfolios. This provides weak incentives to actively exercise corporate control1. Furthermore, it is sometimes argued that even though they might exert substantial pressure on managements, the costs of monitoring often seem to outweigh the benefits.

This paper provides empirical evidence on the impact of ownership on firms’ investment performance. In particular the influence of domestic institutional and foreign owners is investigated. An additional question addressed in the paper is how dual-class shares relate to ownership and firm performance. Similar studies have used measures’ of Tobin’s average $q$, as a measure of firm performance (Morck et al (1988), Demsetz and Lehn (1985), Agrawal and Knoeber (1996), Loderer and Martin (1997), McConnell and Servaes (1990), Himmelberg et al (1999), Cho (1998), Demsetz and Villalonga (2001), Dahlqvist and Robetsson (2001), Cronqvist and Nilsson (2003)) for an extended survey see Gugler (2001). However, Tobin’s $q$ has some drawbacks. For the purpose of testing investment efficiency a marginal performance measure is more appropriate (Gugler and Yurtoglu, 2004). This paper adopts such a performance measure, marginal $q$, as developed by Mueller and Reardon (1993). This measure gives the ratio of a firm’s returns on investments to its cost of capital.

A distinctive feature of the Continental European corporate governance system, and particularly the Swedish one, is the strong concentration of ownership (Agnblad et al. 2001). Pyramids, cross-holdings and dual-class shares are three common methods used to maintain ownership whilst attracting new capital. In Sweden this has produced remarkable persistent ownership structures, in combination with a relatively vital capital market. As in most Continental European countries, large commercial banks have

---

1 For an excellent survey of shareholder activism, see Gillian and Starks (2000).
played, and still play, a fundamental role (Högfeldt, 2004). These factors make Sweden an interesting case when the impact of ownership on firm performance is investigated. The main contribution of this paper is that we provide empirical evidence on the effect of institutional ownership on firms’ investment performance. Using the marginal $q$ as a measure of performance, rather than Tobin’s average $q$, we are able to reduce some of the usual problems of omitted variables and reverse causality. By investigating a sample of Swedish listed firms we also present evidence on a negative relation between dual-class shares and investment performance.

The remainder of the paper is organized in seven sections. Section 2 gives a short description of the Swedish corporate ownership structure. In section 3 institutional investors are discussed. From this discussion we also formulate our hypothesis about how they affect firm performance. Methodology and derivation of the marginal $q$ measure are given in section 4. Variables and descriptive statistics are presented alongside a discussion about the data in section 5. Section 6 deals with the empirical results and analysis. Conclusions end the paper in section 7.

2. CORPORATE OWNERSHIP IN SWEDEN

Following the repeal of restrictions on foreign ownership in 1993, foreign investors have bought into the leading Swedish companies on a large scale. Currently foreigners own around one-third of the outstanding equity on the Stockholm Stock Exchange (Statistics Sweden, nov-2006), see Figure 1. During the same period, changes in the Swedish pension system have made substantial amounts available for private financial institutions to invest on behalf of the Swedish population. Domestic institutional and foreign owners are thus becoming the dominating owners in Sweden, accounting for about 85 per cent of the stock market capitalization.
With a stock exchange dominated by a few very large firms, the Swedish corporate governance system seems to have been remarkably successful in generating large, internationally competitive firms. Most firms, even many large firms, are often closely held by a family. The main instruments to maintain control in the Swedish firms are dual-class shares (Angblad et al., 2001) combined with pyramidal holding companies (closed-end investment funds). Sweden is in fact among the few countries that are characterised by an extensive use of both dual-class shares and pyramidal ownership (La Porta et al., 1999). A study that demonstrates the relevance of ownership structure in the allocation of firms’ resources is Alonso et al., (2005). They use a dataset, similar to this study, of 101 large non-financial publicly-traded Spanish firms and also a similar panel-data approach. However, the study takes no account of any formal separation between capital ownership and vote control. Cronqvist and Nilsson (2003) analyze the impact of controlling shareholders’ voting rights on Tobin’s $q$, for a panel of Swedish listed firms during 1991-1997. Their results show a negative effect of controlling shareholders votes on Tobin’s average $q$. The wedge between votes and cash flow rights is however found to be statistically insignificant.
Institutional Ownership and the Returns on Investment

Proponents of the Swedish governance system often argue that significant ownership stakes and control in the hands of one or few owners is vital in order to create correct incentive structures of entrepreneurs and managers. There is however no research which gives support to these claims.

Equity stakes may tilt insiders such as managers and controlling owners’ incentives towards the pursuit of share-value maximizing strategies. However, ownership concentration could also lead to expropriation of outside minority shareholders, as shown by Jensen and Meckling (1976). Thus, large voting stakes held by insiders may not necessarily lead to performance improvement. In fact, McEachern (1975) argues that large shareholdings in the hands of the insiders (managers) might actually deteriorate the performance of the firms. Since then more studies supportive of this claim, such as Morck et al., (1988) and Gugler et al., (2002), have been carried out on the relationship between managerial ownership and firm performance.

Another effect of the Swedish corporate governance model, with its strong separation of ownership and control, is that it locks in owners for long periods of time. The widespread use of dual-class shares and pyramid structures can thus have substantial costs in terms of loss of dynamics in ownership and control. Due to these minority control arrangements hostile takeovers for example are very rare. Moreover, the costs of rising outside capital may significantly constrain growth opportunities open to the Swedish firms.

3. INSTITUTIONAL INVESTORS

A features common to all institutional investors is that they provide a form of risk pooling for small investors, hence providing a better trade-off of risk and return than what is achievable via direct holdings. Today, different kinds of institutional investors deal with various markets and clients, and for various purposes. Many act on several markets simultaneously and the competition is fierce for market shares and clients. Hence, institutional investors are far from a homogeneous group. They differ in terms of contractual relations between the owners of the assets and the asset managers, in the rules determining the distribution of risk and return, as well as in the definition of their liabilities. The institutional investors this paper is concerned with can be summarized as pension funds, life insurance companies, and mutual funds.

One factor favouring institutional investors relative to individuals is their ability to absorb and process information. In many cases it is this
informational advantage that the consumer pays for. This advantage has also given rise to the expression “informed investors” which distinguishes this type of professional investor from the average individual. However, the information advantage might be large or small depending on the type of institution, and the type of information.

With the size of many institutions also follows the potential for improved control over companies in which they invest. Hirschman (1970) shows how “exit and voice” behaviour might work to reduce moral hazard problems. Berle (1960) also argues that institutional investors might discipline managers through their importance as market participants; he describes this as “power without property” (Mueller, 2003). Institutional owners might for that reason be well apt to minimize the problems associated with the separation of ownership and control, originally presented by Berle and Means (1932).

It is important to note that the institution in itself suffers from the same incentive problems between its owners and managers. This kind of incentive problems may also arise between other parties related to, and within, the institution; for instance, between the board of directors and the asset management. This leads us to another characteristic of the institutional investors, the asset management.

There are different incentive problems in the asset management relationship. On the one hand, it gives rise to an essentially fiduciary relationship to the ultimate investor, a relationship that often entails a degree of caution in the portfolio strategy and a desire to limit risks incurred. On the other hand, such delegation raises principal-agent problems. So, unless the fund manager is perfectly monitored and/or a perfect contract is drawn up, the fund manager may act in his or her own interests (e.g., in generating excessive commission income) or in the interest of financial institutions related to them. These objectives may even be contrary to those of the liability holders or at least not direct in line with their interests (Davis and Steil, 2001).

Despite the very high percentage of the total market capitalization controlled by institutions, institutional investors are not major players from an ownership perspective (Goergen and Renneboog, 2001). Although their accumulated shareholdings are significant, shareholdings in individual companies are often small (an explanation to this is that institutions more than others invest in large companies. Gompers and Metrick (2001) have provided evidence that this is the case in the U.S. stock market). In the Swedish listed firms the aggregate institutional shareholdings are on average around ten percent. Hence the potential benefits from active
monitoring can hardly outweigh the costs for institutional investors. This prompts institutions to free ride on corporate control (Shleifer and Vishny, 1997, Dahlqvist and Robertsson, 2001). Furthermore, some institutional investors, such as certain mutual funds, invest in accordance with low-cost passive strategies and thus lack the resources for active monitoring of the large number of companies in their portfolios. In order to remain cost-efficient, rather than engage in active monitoring, institutional investors prefer to simply “exit” and sell off poorly performing firms. The crucial question is therefore whether or not the potential benefits from monitoring outweigh the costs of doing so.

Another reason for the low institutional involvement in corporate governance issues is insider-trading regulations (Goergen and Renneboog, 2001). If the institutional investors do not want to immobilize parts of their portfolios, they might have to restrict active involvement in corporate strategies.

The discussion above shows that a negative relationship between institutional ownership and firm performance is likely. But there are many reasons to expect that the relationship is actually positive.

As institutional investors are constantly being evaluated by how well they succeed in creating shareholder value (Thomsen and Pedersen, 2000), there is not much room for catering to other objectives (as far as competition works as a stick). In this sense the incentives, to use “exit or voice” in value-increasing manner, are probably stronger than for other types of owners. That is, in spite of comparatively low ownership stakes, the focus of institutional investors is predominantly on shareholder value.

Furthermore, risk aversion is less likely to play a role in the governance actions of institutional owners. Risk diversification characterizes institutional owners to a larger extent than other ownership categories. Therefore they can be argued to have a more positive view of risky projects with a higher net present value. Considering these two aspects as well as favourable financing conditions, we expect, similar to Thomsen and Pedersen (2000), a positive relation between institutional ownership and investment performance.2

As most foreign investors are in fact institutions (Sundqvist, 2006) we expect the same effect on firm performance as for domestic institutional investors. In line with Thomsen and Pedersen (2000) we therefore hypothesize that domestic institutional and foreign owners will use the influence that goes along with increasing ownership shares in a value increasing manner, i.e.

---

2 See also Nickel et al., (1997), McConnell and Servaes (1990) and Levin and Levin (1982).
Hypothesis 1 = Domestic institutional and foreign ownership has a positive impact on investment performance.

Most likely this potentially positive effect will be diminishing. This notion has also been widely supported by previous literature (see amongst others Morck et al., 1988; McConnell and Servaes, 1990; and Gedajlovic and Shapiro, 1998; Pindado and de la Torre (2006); Miguel et al., (2004)). We therefore expect that the impact of institutional ownership on firm performance is non-linear (marginally diminishing). Assuming that most of the positive effects occur at a given threshold of ownership concentration, it is plausible to assume that this effect will not continue to increase linearly as ownership increase further. Hypothesis two is therefore:

Hypothesis 2 = Investment performance will increase at a diminishing rate with increasing domestic institutional and foreign ownership share.

There are also some studies that have investigated institutional ownership and vote differentiated shares i.e. Bjuggren, et al., (2007) and Gompers and Metrick (2001). A recently published working paper by Li et al., (2006) also addresses this issue. They find for U.S. data that institutions have smaller ownership stakes in firms with vote differentiated shares. Furthermore Li et al., (2006) find that institutional owners to a larger extent “exit” this type of firms. Their findings give an extra explanation to the arguments put forward in (Bjuggren et al., 2007) on why the existence of vote differentiated shares are likely to have a negative impact on investment performance. In a market where this type of control instrument is allowed, it is consequently important to control for this effect. Since the incentive structure and the ability to exert control are altered when vote rights are separated from cash-flow rights by vote-differentiated shares, we expect an impact on the ability of institutional owners to exert control:

Hypothesis 3 = Separation of cash-flow rights from control by use of dual-class shares will reduce the effects domestic institutional and foreign ownership has on firm performance.
Given the negative view of vote-differentiated shares, an explanation has to be provided why these types of share are bought by institutional investors. Gompers and Metrick (2001) find that institutions invest in liquid stock. For many Swedish companies with A- and B-shares it is only the B-shares that are regularly traded. We therefore expect that institutional and foreign owners primarily invest in capital-shares.

4. METHODOLOGY

To test the impact of institutional ownership on firm performance we estimate the firms’ marginal \( q \) (Mueller and Reardon, 1993). The marginal \( q \) is essentially a marginal version of Tobin’s average \( q \). This is a more correct measure to use when evaluating firm performance since it is the return on the marginal investment rather than the average that shows whether the firm is over- or under-investing relative to its cost of capital.

Marginal \( q \) can be derived from Tobin’s \( q \), where Tobin’s average \( q, q_a \), is defined as the market value, \( M_t \), divided by the replacement cost of the firm capital at time \( t, K_t \):

\[
M_t / K_t = q_{a,t}
\]

This measures the average return on the capital over its cost of capital. If \( q_a \) is above one this implies that the firm should be investing further. However, for adjustments of the capital stock the marginal return on capital is more relevant. Marginal \( q \) measures the marginal return on capital, i.e. investments. Marginal \( q, q_m \), can be derived from Tobin’s average \( q \). The marginal return on capital is then:

\[
q_m = \frac{\Delta M_t}{\Delta K_t} = \frac{M_t - M_{t-1} - \delta M_{t-1}}{K_t - K_{t-1}}
\]

where \(-\delta\) is the depreciation rate. Since the market value in period \( t \) can be written as:

\[
M_t = M_{t-1} + PV_t - \delta M_{t-1} + \mu_t
\]

where \( PV_t \) is the present value of the cash flows that investments in period \( t \) generate, and \( \mu \) a standard error term. The net present value rule of investments stipulates that investments should be made up to the point
where \( PV_t = I_t \). This implies \( PV_t/I_t = 1 \), which can be rewritten as \( PV_t/I_t = q_m \). By dividing both sides of equation 3 with \( M_{t-1} \) and rearranging, we get the following empirically testable equation:

\[
(4) \quad \frac{M_t - M_{t-1}}{M_{t-1}} = -\delta + q_m \frac{I_t}{M_{t-1}} + \frac{\mu_I}{M_{t-1}}
\]

Equation (4) assumes that the capital market is efficient in the sense that future cash flows are unbiased estimates. As \( t \) grows larger the term \( \mu_I/M_{t-1} \) will approach 0.

The marginal \( q, q_m \) has a number of advantages. Above all a marginal performance measure is more appropriate than an average Tobin's \( q \), when testing hypotheses about managerial discretion, since average measures of performance confuse average and marginal returns. Secondly, \( q_m \) has a straightforward interpretation. In Figure 2, \( i \) is the return on investments, \( r \) is the cost of capital, \( I \) is investments, and \( q_m = (i/r) \) is marginal \( q \). If managers invest in a project that yields a return that is less than the cost of capital, \( q_m < 1 \), which means that managers are over-investing (\( q_m < 1 \) see Figure 2). That is, the marginal investment has a return less than the cost of capital and the shareholders would have been better off if the firm had distributed these funds directly to them instead. For the firm to maximize shareholder-value, \( q_m \) must be equal to one. Conversely, if \( q_m > 1 \) managers are not making enough investments. This means that the marginal investment has a return in excess of the cost of capital and that the firm should have invested more (\( q_m > 1 \) in figure 2).

To estimate equation (4) we need data on the market value of firms and their investments. The market value of a firm is defined as all debt plus the total value of all its outstanding shares at the end of \( t \).

According to the originators, Mueller and Reardon (1993), investment is defined as: \( I = \text{After tax profits} + \text{Depreciation} - \text{Dividends} + \Delta \text{Debt} + \Delta \text{Equity} + \text{R&D} + \text{ADV} \), where \( \Delta D \) and \( \Delta E \) are funds raised using new debt and equity issues. \( \text{R&D} \) and \( \text{ADV} \) (advertising expenditures) are also forms of investment, which may contribute to a company’s market value and they are therefore included in the investment function.³

³ The data collected from Compustat Global have following mnemonic item: \text{MKVAL} (market value), \text{DVT} (total dividends), \text{DT} (total debt), \text{STTK-PRSTKC} (new equity), \text{XRD} (R&D) and \text{XSGA} (approximation of advertising and marketing expenditures).
5. DATA AND VARIABLES

All data on the firms’ market values and investments are provided by Standard and Poor’s Compustat Global database. The period covered by the data is 1999 until 2005. The time period covered in the regressions is 2000-2005, due to the first difference in the dependent variable. In order to study the same individual firms for several periods, all firms had to provide data for at least three subsequent years. Furthermore, financial firms were removed from the sample due to the particular nature of their investments. The ownership data is provided by SIS Ownership Corp (SIS-Ägarservice AB), which is a unique database covering ownership structure, on a yearly basis, on all firms listed on one of the three major lists at the Stockholm stock exchange.4

All things considered, the set-up requirements produced a sample of 110 Swedish firms. The sample firms correspond to an aggregate share of more than 85 percent of the total market capitalisation at the Stockholm Stock Exchange, and approximately 75 per cent of the total Swedish export value.

The variable institutional ownership is made up of the aggregate ownership controlled by institutions, both in terms of cash flow rights (IC)

---

4 These firms have all reported their ownership structure to VPC (Nordic Central Securities Depository), which operates under the supervision of the Swedish Financial Supervisory Authority and functions as a central securities depository and clearinghouse.
and vote rights (IV). Belonging to this group of institutional owners are: banks, pension and mutual funds, insurance companies and endowment foundations. The different ownership categories and how they are defined and grouped are summarized in Table 1.

Table 1. Ownership Categories

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition</th>
</tr>
</thead>
</table>
| Private     | All firms controlled by individuals as well as other firms. The private owner can either be the founder of the firm or an investor who has acquired control.  
   \[A\]                                                                                   |
| Foreign     | The category refers to companies controlled by a foreign owner. This owner can be an institution as well as an individual since it is hard to separate these two groups with certainty. The majority of these foreign owners are financial institutions of different kinds. |
| Institutional| All companies controlled by a Swedish financial institution belong to this category. In all cases the institutions belong to one of the three following types.  
   \n   **Insurance company**  
   Insurance company-controlled companies are all firms that have an insurance company as their largest owner. Note however that mutual funds belonging to an insurance company make a separate group of controlling owner.  
   **Mutual fund**  
   As the name indicates, all companies controlled by a mutual fund; a fund can either belong to a bank; an insurance company or the state-owned pension funds.  
   **Foundation**  
   This category includes foundations donated by private individuals as well as, for example, various types of profit-sharing funds and pension funds tied to individual companies. |

\[A\] Although no firm in the sample had a bank as a controlling owner this category would include companies directly controlled by one of the Swedish banks. This category of owners also includes the typical Swedish closed-end investment funds (CEIF’s), i.e. INVESTOR Ltd. These CEIF’s function as holding corporations for Swedish ownership spheres, and can be characterised as having objectives different form what is usually referred to by institutional owners.

5 The same notation applies for foreign ownership (FC) and (FV).
Institutional Ownership and the Returns on Investment

A list of the variables used in the regressions, together with their definitions, is provided in Table 2.

### Table 2. Variables

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mt-M_{t-1}/Mt_{t-1}</td>
<td>Change in total market value</td>
</tr>
<tr>
<td>I/M_{t-1}</td>
<td>Investments normalized by market value in previous period</td>
</tr>
<tr>
<td>C1</td>
<td>Share of capital owned by the largest owner (cash-flow rights)</td>
</tr>
<tr>
<td>V1</td>
<td>Voting rights controlled by the largest owner</td>
</tr>
<tr>
<td>FC</td>
<td>Share of capital owned by foreign investors</td>
</tr>
<tr>
<td>FV</td>
<td>Voting rights controlled by foreign investors</td>
</tr>
<tr>
<td>IC</td>
<td>Share of capital owned by institutional investors</td>
</tr>
<tr>
<td>IV</td>
<td>Voting rights controlled by institutional investors</td>
</tr>
<tr>
<td>Votes minus Capital, (V1-C1)</td>
<td>Votes controlled by largest owner minus votes related to capital share held by largest owner.</td>
</tr>
<tr>
<td>VoteDifferention</td>
<td>Dummy variable for vote-differentiated shares. 1 if dual-class shares, 0 if one-share-one-vote.</td>
</tr>
<tr>
<td>Sales</td>
<td>Total sales (millions SEK)</td>
</tr>
</tbody>
</table>

Descriptive statistics for the variables in the regressions is provided in Table 3. In addition to the variables used in the regressions descriptive statistics of the firms’ sales/turnover are provided in Table 3.
It is interesting to note the share of control rights controlled by the largest shareholder, V1. On average, the largest shareholder in the sample controls 35.69 per cent of the votes in the firm, see Table 3. This concentrated ownership is, as mentioned in the introduction remarkable, not only because of the relative level compared to other European and Anglo-Saxon countries, but also because of the relative size of the Swedish firms in the sample (mean sales SEK13,189.4 million). The sample of firms is therefore consistent with the view that the Swedish economy to a large extent is dominated by closely held, relatively large, often old industrial and multinational firms (Agnblad et al., 2001, Högfeldt, 2004, Henrekson and Jakobsson, 2006).

When considering cash flow-rights (C1), the share controlled by the largest owner is on average 23.41 per cent, substantially lower than the vote rights (V1=35.69%), but still relatively high in an international comparison. When looking at the combined holdings of the five largest owners, they on average control 47 per cent of the capital and 60 per cent of the votes.

For the foreign and domestic institutional owners cash flow rights seem to be more important than control which is in line with our expectation. The ownership of vote rights (FV=18.79% and IV=10.65%) is substantially below the level of cash flow rights (FC=21.50% and IC=13.99%). For both ownership...
Institutional Ownership and the Returns on Investment

types the difference is around three per cent, which also support the hypothesis that the two ownership types are in fact very similar. That is, the overwhelming majority of the foreign owners are in fact institutions. The incentive structure and the influence of ownership on the performance should therefore be similar for foreign and domestic institutional owners.

The correlation matrix in Table 4, see Appendix A, also confirms the negative relationship between both foreign and institutional ownership vis-à-vis control instruments such as vote-differentiation. It is interesting to note that the vote rights of the largest single owner (V1) are correlated with investments whereas capital rights (C1) are not. Furthermore, both domestic institutional and foreign capital is significantly correlated with sales.

6. RESULTS AND ANALYSIS

In order to test the impact of different types of owners a panel data estimation has been constructed. With an emphasis on data where the cross-sectional dimension is larger than the time dimension, a panel data model can be constructed to follow the same individual firm over the entire period. The major motivation for using a panel data model in this way is the ability to control for possibly correlated, time-invariant heterogeneity without observing it (Himmelberg et al., 1999).

When testing the functional relationship of ownership types and performance of firms one would then like to control for the firm or industry specific effects. We therefore use a fixed-effects model with time and industry effects. While ownership may differ significantly across firms, Zhou (2001) show that these changes in ownership (investigates managerial ownership) typically changes slowly over time within a company. By relying on within variation consequently, firm fixed effects estimators may not detect an effect of ownership on performance even if one exists. Other types of owners however, such as institutional owners, most likely alter their ownership stakes more often. Industry variation may also be substantial, making fixed effects models with industry effects viable as an alternative to firm effects. An unbalanced panel dataset consisting of 651 observations has been used for all the estimations.6

In the regressions the relative change in market value from period $t-1$ until $t$ \( (M_t - M_{t-1})/M_{t-1} \) is the dependent variable. The ratio of investments in $t$ to market value in $t-1$ \( (I_t/M_{t-1}) \) is used as an explanatory

---

6 The data set contain 110 firms over a period of 6 years. Of these 660 observations 9 were identified as outliers. These were deleted due to obvious errors in the data material.
variable. In addition to the explanatory variable, interaction terms of \( I_t/M_{t-1} \) and relevant ownership variables (measured in percentages) are employed in order to test the effects of ownership concentration and vote-differentiation.

Thus, the equations estimated have the following general form: 
\[
Y = \beta_1 + \beta_2 X + \beta_3 XZ, \quad \text{and the marginal effect} \quad \left(\frac{dY}{dX}\right) \text{is therefore} \quad \beta_2 + \beta_3 Z \quad \text{which in this case has the economic interpretation} \quad q_m.
\]

The equations are then estimated both in terms of cash-flow rights (Capital, \( C \)) and control rights (Votes, \( V \)), for each ownership type. The functional form of the impact of ownership on performance is then tested by incorporating the squared institutional or foreign ownership with \( I_t/M_{t-1} \).

The estimate equations are thus of the following form:

\[
(5) \quad \frac{M_t - M_{t-1}}{M_{t-1}} = -\delta + \beta_1 \frac{I_t}{M_{t-1}} + \beta_2 Z_i \frac{I_t}{M_{t-1}} + \ldots + \beta_{i+1} Z_i \frac{I_t}{M_{t-1}} + \epsilon_i
\]

where \( Z_i \) represent explanatory variables. The marginal effect, \( q_m \), of equation 5 is therefore:

\[
(6) \quad q_m = \beta_2 + \beta_3 Z_i + \ldots + \beta_{i+1} Z_i
\]

The intercept \( \delta \) is, as noted earlier, the rate of depreciation and therefore not relevant for the interpretation of \( q_m \).

For the overall sample, the estimated marginal \( q \) is 0.693, see Table 4 column A, which indicates an inefficient investment performance by the Swedish firms. In fact the estimated marginal \( q \) is remarkably consistent with previous estimations on Swedish data (\( q_m \) around 0.65), see Gugler et al., (2002), and Bjuggren et al. (2007). The estimates of marginal \( q \) are also robust with respect to the choice of estimation technique. Robust estimation methods such as quintile median regression and iteratively reweighed least square which control for non-normality and outliers generate estimates of marginal \( q \) very close to 0.70.

---

\(^7\) Note that when differentiating with respect to investments, \( I_t \), the deprecation rate, \( \delta \), disappears, and hence has no relevance for the interpretation of \( q_m \).
Institutional Ownership and the Returns on Investment

Table 4. Fixed-Effects estimation; Average Marginal q, interacted with Votes minus Capital (V1 – C1).

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Column A</th>
<th>Column B</th>
</tr>
</thead>
<tbody>
<tr>
<td>(\Delta (M_t - M_{t-1})/M_{t-1})</td>
<td>(-0.082^*)</td>
<td>(-0.087^*)</td>
</tr>
<tr>
<td>(-3.36)</td>
<td>(-3.51)</td>
<td></td>
</tr>
<tr>
<td>(I_t/M_{t-1}, q_m)</td>
<td>(0.693^*)</td>
<td>(0.759^*)</td>
</tr>
<tr>
<td>((15.99))</td>
<td>((12.95))</td>
<td></td>
</tr>
<tr>
<td>Votes-Capital interacted (V1 – C1)</td>
<td>(-0.005^{***})</td>
<td>(-1.67)</td>
</tr>
<tr>
<td>Average (q_m)</td>
<td>0.693</td>
<td>0.695</td>
</tr>
<tr>
<td>(R^2)</td>
<td>0.477</td>
<td>0.479</td>
</tr>
<tr>
<td>F-value</td>
<td>13.57</td>
<td>13.35</td>
</tr>
<tr>
<td>No. observations</td>
<td>651</td>
<td>651</td>
</tr>
<tr>
<td>No of firms</td>
<td>110</td>
<td>110</td>
</tr>
</tbody>
</table>

\(t\)-values in brackets. * indicates statistical significance at the 1 percent level, ** at 5 percent significance level, *** at 10 percent significance level

The use of vote-differentiated shares is expected to have a negative impact in all estimations. This effect is tested by taking the difference between vote rights and capital rights held by the largest owner (in a firm without vote-differentiated shares the largest owner will hold the same amount of vote as capital-rights). This difference is then interacted with \(I_t/M_{t-1}\). The results show, see Table 4 column B, that vote-differentiation creates a wedge between vote rights and capital shares that is negative for performance. Firms without vote-differentiated shares have on average a marginal \(q\) of 0.759, whilst firms that do have a vote-differentiated share structure have a marginal \(q\) of 0.695 on average. The results confirm hypothesis 3, and also verify the findings in earlier studies on ownership structure, dual-class shares and performance, such as Bjuggren et al., (2007).

Table 5 presents regression results with domestic institutional ownership concentration, in terms of cash-flow rights (IC). The results in terms of control rights (IV) are presented in Table 6. The results support the hypothesis that institutional ownership has a positive and statistically significant effect on firm performance (H1). This relationship is also non-linear as expected (H2), controlling for non-linearity and vote-differentiation more than doubles the \(R^2\)-values, suggesting that dual-class share affect the ownership-performance relationship substantially (H3).
### Table 5. Fixed-Effects estimation; Institutional Owners’ Capital Share (IC) controlling for Vote-Differentiation

<table>
<thead>
<tr>
<th>Dependent variable: ((\text{Mt-Mt-1})/\text{Mt-1})</th>
<th>Linear (\text{with Votedifferentiation})</th>
<th>Linear (\text{with Votedifferentiation})</th>
<th>Quadratic (\text{with Votedifferentiation})</th>
<th>Quadratic (\text{with Votedifferentiation})</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant. (\delta)</td>
<td>(-0.083^*) ((-3.38))</td>
<td>(-0.083^*) ((-3.37))</td>
<td>(-0.083^*) ((-3.42))</td>
<td>(-0.088^*) ((-3.56))</td>
</tr>
<tr>
<td>(\text{It/Mt-1})</td>
<td>(0.679^*) ((12.98))</td>
<td>(0.679^*) ((12.97))</td>
<td>(0.629^*) ((10.44))</td>
<td>(0.630^*) ((10.46))</td>
</tr>
<tr>
<td>(\text{IC})</td>
<td>(0.001) ((0.50))</td>
<td>(0.002) ((0.43))</td>
<td>(0.012^{**}) ((1.74))</td>
<td>(0.023^{**}) ((2.22))</td>
</tr>
<tr>
<td>(\text{IC}^2)</td>
<td>-</td>
<td>-</td>
<td>(-0.0003^{**}) ((-1.68))</td>
<td>(-0.0006^{**}) ((-2.19))</td>
</tr>
<tr>
<td>(\text{IC}) interacted with (\text{VoteDifferentiation}) dummy</td>
<td>-</td>
<td>(-0.001) ((-0.15))</td>
<td>-</td>
<td>(-0.0147) ((-1.43))</td>
</tr>
<tr>
<td>(\text{IC}^2) interacted with (\text{VoteDifferentiation}) dummy</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>(0.0005) ((-1.52))</td>
</tr>
<tr>
<td>Average (\text{qm})</td>
<td>0.693</td>
<td>0.693</td>
<td>0.738</td>
<td>0.727</td>
</tr>
<tr>
<td>(R^2)</td>
<td>0.217</td>
<td>0.478</td>
<td>0.229</td>
<td>0.482</td>
</tr>
<tr>
<td>F-value</td>
<td>13.24</td>
<td>12.95</td>
<td>13.03</td>
<td>12.51</td>
</tr>
<tr>
<td>No. observations</td>
<td>651</td>
<td>651</td>
<td>651</td>
<td>651</td>
</tr>
<tr>
<td>No of firms</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
</tr>
</tbody>
</table>

* t-values in brackets. * indicates statistical significance at the 1 percent level, ** at 5 percent significance level, *** at 10 percent significance level

Looking at vote rights (IV) (see Table 6), institutional ownership is again significantly positively related to the performance of the firms, which supports hypothesis 1. As stated earlier the relationship is found to be non-linear, which indicates a positive but diminishing effect of institutional ownership. The estimations are also remarkably robust for both types of shares, i.e. ownership measured by either votes or capital. The negative impact of vote-differentiation is not significant in the estimations with institutional ownership; however, the coefficients are negative as expected. Interacting domestic institutional ownership with the dummy for vote-differentiation doubles the \(R^2\)-values, which again proves the importance of controlling for this type of devices.
### Table 6. Fixed-Effects estimation; Institutional Owners’ Vote Rights (IV) controlling for Vote-Differentiation

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Linear with Votedifferentiation</th>
<th>Linear with Votedifferentiation</th>
<th>Quadratic with Votedifferentiation</th>
<th>Quadratic with Votedifferentiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant. δ</td>
<td>-0.085* (-3.46)</td>
<td>-0.084* (-3.39)</td>
<td>-0.084* (-3.46)</td>
<td>-0.087* (-3.52)</td>
</tr>
<tr>
<td>I/Mt-1</td>
<td>0.666* (13.39)</td>
<td>0.664* (13.23)</td>
<td>0.602* (10.69)</td>
<td>0.610* (10.63)</td>
</tr>
<tr>
<td>IV</td>
<td>0.004 (1.11)</td>
<td>0.003 (0.63)</td>
<td>0.020* (2.64)</td>
<td>0.025* (2.45)</td>
</tr>
<tr>
<td>IV2</td>
<td>-</td>
<td>-</td>
<td>-0.0005* (-2.40)</td>
<td>-0.0006** (-2.33)</td>
</tr>
<tr>
<td>IV interacted with VoteDifferentiation dummy</td>
<td>-0.002 (0.37)</td>
<td>-</td>
<td>-0.0086 (-0.74)</td>
<td></td>
</tr>
<tr>
<td>IV2 interacted with VoteDifferentiation dummy</td>
<td>-</td>
<td>-</td>
<td>0.0003 (0.75)</td>
<td></td>
</tr>
<tr>
<td>Average qm</td>
<td>0.670</td>
<td>0.717</td>
<td>0.824</td>
<td>0.751</td>
</tr>
<tr>
<td>R²</td>
<td>0.217</td>
<td>0.479</td>
<td>0.242</td>
<td>0.484</td>
</tr>
<tr>
<td>F-value</td>
<td>13.28</td>
<td>12.96</td>
<td>13.21</td>
<td>12.60</td>
</tr>
<tr>
<td>No. observations</td>
<td>651</td>
<td>651</td>
<td>651</td>
<td>651</td>
</tr>
<tr>
<td>No of firms</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
</tr>
</tbody>
</table>

_t-values in brackets. * indicates statistical significance at the 1 percent level, ** at 5 percent significance level, *** at 10 percent significance level.

Table 5 and 6 also show the estimated effect of vote-differentiate shares. It has been shown that the separation of cash-flow rights and control rights alters the incentive of owners and thereby affects investment decisions negatively (Bjuggren, et al., 2007). We test this impact again by including an interaction term with the dummy for vote-differentiation. The result of this additional test of the effect from a separation of control and cash-flow rights support earlier findings, and indicate that firms with vote-differentiated shares have a lower investment performance (H3). In Table 6, the average firm with an institutional vote-share of on average around 10 per cent (ICaverage=10.65), without vote-differential, has a marginal q of 0.808. This indicates a somewhat inferior investment performance and a return on
investments below the cost of capital. The effect of domestic institutional ownership in terms of votes is however positive. With the same level of institutional ownership but for a firm with vote-differentiation the average marginal $q$ is 0.751, noticeably below 0.808 and also below 1, which means over-investment vis-à-vis the shareholders, and a return on investments below the cost of capital. This result consequently support the proposed inferior investment performance associated with the increasing agency problems, due to entrenchment of ownership as expected from hypothesis 3.

The results for the estimation of foreign ownerships’ impact on performance and its functional form are given in Tables 7 and 8. These results are in line with those found for institutional ownership, which maintain the assumption that foreign and institutional owners are in fact very similar.
### Institutional Ownership and the Returns on Investment

**Table 7. Fixed-Effects estimation; Foreign Owners' Capital Share (FC) controlling for Vote-Differentiation**

<table>
<thead>
<tr>
<th>Dependent variable: (Mt-1-Mt-1)/Mt-1</th>
<th>Linear with Votedifferentiation</th>
<th>Linear with Votedifferentiation</th>
<th>Quadratic with Votedifferentiation</th>
<th>Quadratic with Votedifferentiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant. δ</td>
<td>-0.079* (-3.24)</td>
<td>-0.078* (-3.20)</td>
<td>-0.076* (-3.15)</td>
<td>-0.102* (-4.08)</td>
</tr>
<tr>
<td>I/Mt-1 qm</td>
<td>0.624* (10.90)</td>
<td>0.612* (10.53)</td>
<td>0.525* (7.26)</td>
<td>0.633* (8.10)</td>
</tr>
<tr>
<td>FC</td>
<td>0.003*** (1.84)</td>
<td>0.002 (1.06)</td>
<td>0.014* (2.74)</td>
<td>0.019* (2.85)</td>
</tr>
<tr>
<td>FC^2</td>
<td>-</td>
<td>-</td>
<td>-0.0002** (-2.23)</td>
<td>-0.0003* (-3.03)</td>
</tr>
<tr>
<td>FC interacted with Votedifferentiation dummy</td>
<td>- 0.003 (1.22)</td>
<td>-</td>
<td>-0.0245* (-3.48)</td>
<td></td>
</tr>
<tr>
<td>FC^2 interacted with Votedifferentiation dummy</td>
<td>- - -</td>
<td>0.0005* (3.86)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average qm</td>
<td>0.688</td>
<td>0.720</td>
<td>0.752</td>
<td>0.607</td>
</tr>
<tr>
<td>R^2</td>
<td>0.240</td>
<td>0.482</td>
<td>0.252</td>
<td>0.497</td>
</tr>
<tr>
<td>F-value</td>
<td>13.38</td>
<td>13.12</td>
<td>13.27</td>
<td>13.28</td>
</tr>
<tr>
<td>No. observations</td>
<td>651</td>
<td>651</td>
<td>651</td>
<td>651</td>
</tr>
<tr>
<td>No. of firms</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
</tr>
</tbody>
</table>

T-values in brackets. * indicates statistical significance at the 1 percent level, ** at 5 percent significance level, *** at 10 percent significance level.
### Table 8. Fixed-Effects estimation; Foreign Owners Vote Rights (FV) controlling for Vote-Differentiation

<table>
<thead>
<tr>
<th>Dependent variable: ((M_t-M_{t-1})/M_{t-1})</th>
<th>Linear</th>
<th>Linear with Votedifferentiation</th>
<th>Quadratic</th>
<th>Quadratic with Votedifferentiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant. (\delta)</td>
<td>-0.081*((-3.35))</td>
<td>-0.082*((-3.40))</td>
<td>-0.085*((-3.55))</td>
<td>-0.097*((-3.96))</td>
</tr>
<tr>
<td>(l/M_{t-2}, q_m)</td>
<td>0.606*((11.66))</td>
<td>0.593*((11.38))</td>
<td>0.486*((8.20))</td>
<td>0.534*((8.57))</td>
</tr>
<tr>
<td>FV</td>
<td>0.005*((2.97))</td>
<td>0.003((2.41))</td>
<td>0.025*((4.88))</td>
<td>0.025*((4.03))</td>
</tr>
<tr>
<td>FV(^2)</td>
<td>-</td>
<td>-</td>
<td>-0.0003*((-4.09))</td>
<td>-0.0003*((-3.89))</td>
</tr>
<tr>
<td>FV interacted with Votedifferentiation dummy</td>
<td>-</td>
<td>0.0068*((2.54))</td>
<td>-</td>
<td>-0.0130***((-1.72))</td>
</tr>
<tr>
<td>FV(^2) interacted with Votedifferentiation dummy</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.0003**((2.26))</td>
</tr>
<tr>
<td>Average q(m)</td>
<td>0.699</td>
<td>0.777</td>
<td>0.922</td>
<td>0.759</td>
</tr>
<tr>
<td>(R^2)</td>
<td>0.247</td>
<td>0.490</td>
<td>0.274</td>
<td>0.504</td>
</tr>
<tr>
<td>F-value</td>
<td>13.63</td>
<td>13.58</td>
<td>13.81</td>
<td>13.64</td>
</tr>
<tr>
<td>No. observations</td>
<td>651</td>
<td>651</td>
<td>651</td>
<td>651</td>
</tr>
<tr>
<td>No. of firms</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
</tr>
</tbody>
</table>

* t-values in brackets. \* indicates statistical significance at the 1 percent level, ** at 5 percent significance level, *** at 10 percent significance level.

The results for foreign ownership again confirm hypothesis 3 that the use of vote-differentiated shares lower the performance of firms. This effect is probably due mainly to the agency conflicts that arise from the additional separation of ownership and control in these firms (H4).\(^8\)

---

\(^8\) As robustness test we have also regressed domestic institutional and foreign ownership and dual-class shares on Tobin’s average \(q\) (measured as market-to-book ratio), controlling for sales and growth of sales. Their results corroborate our findings. Dual-class shares have a significant negative effect on Tobin’s average \(q\). divergence between C1 and V1 is negative and institutional investors have a positive but marginally diminishing effect on Tobin’s \(q\). The results are thus consistent with our findings above. The results with Tobin’s \(q\) can be obtained from the authors upon request.
Institutional Ownership and the Returns on Investment

Since foreign owners can be assumed to mainly be composed of institutional investors, it is finally appropriate to analyse the combined effect of domestic institutional and foreign owners. This is done by summarizing the domestic institutional and foreign ownership. The results for these estimations are found in Table 9 and 10.

Table 9. Fixed-Effects estimation; Domestic Institutional and Foreign Owners’ Capital Share (IC) controlling for Vote-Differentiation

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Linear</th>
<th>Linear with Votedifferentiation</th>
<th>Quadratic</th>
<th>Quadratic with Votedifferentiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant. δ</td>
<td>-0.081* (3.34)</td>
<td>-0.080* (3.29)</td>
<td>-0.079* (3.27)</td>
<td>-0.098* (3.97)</td>
</tr>
<tr>
<td>I/Mt-1</td>
<td>0.592* (8.78)</td>
<td>0.587* (8.65)</td>
<td>0.488* (4.96)</td>
<td>0.566* (5.63)</td>
</tr>
<tr>
<td>IC + FC</td>
<td>0.003** (1.96)</td>
<td>0.003 (1.40)</td>
<td>0.011** (1.99)</td>
<td>0.018* (2.86)</td>
</tr>
<tr>
<td>(IC + FC)²</td>
<td>-9.5e-05 (-1.46)</td>
<td>-0.0002* (-2.95)</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(IC + FC) interacted with Votedifferentiation dummy</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>-0.0169* (-3.10)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>(IC + FC)² interacted with Votedifferentiation dummy</th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>0.0003* (3.39)</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

| Average qm | 0.698 | 0.729 | 0.759 | 0.731 |
| R²         | 0.481 | 0.481 | 0.483 | 0.492 |
| F-value    | 13.24 | 13.09 | 13.16 | 13.04 |
| No. observations | 651 | 651 | 651 | 651 |
| No of firms | 110 | 110 | 110 | 110 |

T-values in brackets. * indicates statistical significance at the 1 percent level, ** at 5 percent significance level, *** at 10 percent significance level.
Table 10. Fixed-Effects estimation; Domestic Institutional and Foreign Owners’ Vote Rights (IV) controlling for Vote-Differentiation

<table>
<thead>
<tr>
<th>Dependent variable:</th>
<th>Linear</th>
<th>Linear with Votedifferentiation</th>
<th>Quadratic</th>
<th>Quadratic with Votedifferentiation</th>
</tr>
</thead>
<tbody>
<tr>
<td>(Mt-Mt-1)/Mt-1</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Constant. δ</td>
<td>-0.085*</td>
<td>-0.084*</td>
<td>-0.088*</td>
<td>-0.100*</td>
</tr>
<tr>
<td></td>
<td>(-3.52)</td>
<td>(-3.47)</td>
<td>(-3.68)</td>
<td>(-4.09)</td>
</tr>
<tr>
<td>I/Mt-1</td>
<td>0.574*</td>
<td>0.559*</td>
<td>0.444*</td>
<td>0.499*</td>
</tr>
<tr>
<td></td>
<td>(10.04)</td>
<td>(9.72)</td>
<td>(6.31)</td>
<td>(6.85)</td>
</tr>
<tr>
<td>IV + FV</td>
<td>0.005*</td>
<td>0.003**</td>
<td>0.019*</td>
<td>0.021*</td>
</tr>
<tr>
<td></td>
<td>(3.18)</td>
<td>(1.96)</td>
<td>(4.03)</td>
<td>(3.92)</td>
</tr>
<tr>
<td>(IV+ FV)^2</td>
<td>-</td>
<td>-</td>
<td>-0.0002*</td>
<td>-0.0003**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(-3.13)</td>
<td>(-3.62)</td>
</tr>
<tr>
<td>(IV + FV) interacted with Votedifferentiation dummy</td>
<td>-</td>
<td>0.004**</td>
<td>-</td>
<td>-0.011**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2.00)</td>
<td>(-1.97)</td>
</tr>
<tr>
<td>(IV + FV)^3 interacted with Votedifferentiation dummy</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>0.0003*</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>(2.55)</td>
</tr>
<tr>
<td>Average qm</td>
<td>0.721</td>
<td>0.765</td>
<td>0.830</td>
<td>0.793</td>
</tr>
<tr>
<td>R²</td>
<td>0.486</td>
<td>0.489</td>
<td>0.494</td>
<td>0.501</td>
</tr>
<tr>
<td>F-value</td>
<td>13.69</td>
<td>13.53</td>
<td>13.79</td>
<td>13.48</td>
</tr>
<tr>
<td>No. observations</td>
<td>651</td>
<td>651</td>
<td>651</td>
<td>651</td>
</tr>
<tr>
<td>No of firms</td>
<td>110</td>
<td>110</td>
<td>110</td>
<td>110</td>
</tr>
</tbody>
</table>

In all cases we have also tested for cubic specifications of the regression models. These estimation results have however been found to be insignificant and thus not reported. The results in all six tables are in fact remarkably stable with respect to the structural form of the model.

In all cases we have also tested for cubic specifications of the regression models. These estimation results have however been found to be insignificant and thus not reported. The results in all six tables are in fact remarkably stable with respect to the structural form of the model.

On average our estimated marginal q’s are in the range 0.7 to 0.8, and all our results are consistent with hypothesis 1, 2, and 3. Consequently, a positive but marginally diminishing effect of domestic institutional and foreign ownership is found. This positive effect disappears in firms with disproportional equity structure.

Our results also indicate a clear direction of causality: institutional investors improve investment performance. Reversed causality would imply that
institutional investors are attracted to firms that are making superior investment decisions. In this case one would expect a linear relationship between the fraction of shares held by institutions and marginal $q$. The non-linear effect of institutional ownership and performance is therefore only consistent with the proposition that investors affect investment behaviour. Naturally, this argument is further supported by the fact that we observe two distinct effects in firm with proportional ownership and firm with dual-class shares.

7. CONCLUSIONS

Institutional owners, often associated with low control incentives, can be argued to have a disciplining effect on controlling owners and managers. Consequently, a positive relationship between institutional ownership and firm performance can be expected. In this paper we examine how institutional owners affect firm performance. We look at both domestic institutional and foreign owners. The reason that we use foreign owners in addition to domestic institutional owners is that this ownership category is primarily composed of institutional owners and can therefore be expected to behave in the same fashion as domestic institutional owners. As performance measure we use marginal $q$ that measures the return on investments relative to the cost of capital. This performance measure also alleviates the problems associated with average measures of performance, such as endogeneity and reversed causality.

By utilizing a fixed-effects model which accounts for time and industry effects we find that both domestic institutional and foreign ownership have a positive and marginally diminishing effect on firm performance. The results confirm a non-linear relationship between ownership and performance. The results are also robust when testing the combined effect of domestic institutional and foreign ownership.

Examining Swedish firms also allows us to control for the effect of vote-differentiated shares. When firms have vote-differentiated shares the positive effect associated with domestic institutional and foreign ownership disappears. This is in line with agency-cost theory, which suggests that the agency-costs are substantially higher in this type of firms. As most studies on the impact of ownership structure on firm performance are done on Anglo-Saxon data, this paper adds to the existing debate regarding the effects of this type of control instruments.

Domestic institutional and foreign owners' are found to have a positive but non-linear effect on performance. This is a clear indication of the
direction of causality. It has been suggested that institutional investors have relatively higher ownership stakes in certain firms because they are attracted to firms with an already superior performance. Our results are however consistent with the view that these investors in effect influence investment behaviour positively. This result is further supported by the fact that this positive effect loses significance in firms controlled by dual-class shares.
REFERENCES


Institutional Ownership and the Returns on Investment


## APPENDIX 1

### Table 4. Correlation matrix

<table>
<thead>
<tr>
<th></th>
<th>Sales</th>
<th>M_{t-1}/M_{t-1}</th>
<th>I/M_{t-1}</th>
<th>C1</th>
<th>V1</th>
<th>FC</th>
<th>FV</th>
<th>IC</th>
<th>IV</th>
<th>V1–C1</th>
<th>FC+IC</th>
<th>FV+IV</th>
<th>VoteDiff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sales</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>M_{t-1}/M_{t-1}</td>
<td>-0.059</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>I/M_{t-1}</td>
<td>-0.017</td>
<td>0.614*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1</td>
<td>-0.112*</td>
<td>0.016</td>
<td>0.043</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V1</td>
<td>-0.023</td>
<td>0.019</td>
<td>0.100*</td>
<td>0.764*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FC</td>
<td>0.241*</td>
<td>0.046</td>
<td>-0.025</td>
<td>-0.118*</td>
<td>-0.170*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FV</td>
<td>0.072</td>
<td>0.053</td>
<td>-0.024</td>
<td>-0.058</td>
<td>-0.219*</td>
<td>0.928*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IC</td>
<td>0.205*</td>
<td>-0.057</td>
<td>-0.005</td>
<td>-0.200*</td>
<td>-0.130*</td>
<td>-0.044</td>
<td>-0.036</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>0.232*</td>
<td>-0.046</td>
<td>-0.009</td>
<td>-0.212*</td>
<td>-0.281*</td>
<td>0.020</td>
<td>0.036</td>
<td>0.894*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V1–C1</td>
<td>0.174*</td>
<td>-0.021</td>
<td>0.064</td>
<td>-0.112*</td>
<td>0.385*</td>
<td>-0.064</td>
<td>-0.154*</td>
<td>0.049</td>
<td>-0.151*</td>
<td>1.00</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FC+IC</td>
<td>0.320*</td>
<td>0.063</td>
<td>-0.080*</td>
<td>-0.220*</td>
<td>-0.220*</td>
<td>0.830*</td>
<td>0.883*</td>
<td>0.520*</td>
<td>0.515*</td>
<td>-0.075</td>
<td>1.00</td>
<td></td>
<td></td>
</tr>
<tr>
<td>FV+IV</td>
<td>0.171*</td>
<td>0.080*</td>
<td>-0.092*</td>
<td>-0.157*</td>
<td>-0.323*</td>
<td>0.812*</td>
<td>0.812*</td>
<td>0.388*</td>
<td>0.500*</td>
<td>-0.317*</td>
<td>0.911*</td>
<td>1.00</td>
<td></td>
</tr>
<tr>
<td>VoteDiff</td>
<td>0.175*</td>
<td>-0.023</td>
<td>0.002</td>
<td>-0.009</td>
<td>0.386*</td>
<td>-0.062</td>
<td>-0.151*</td>
<td>0.049</td>
<td>-0.185*</td>
<td>0.659*</td>
<td>-0.026</td>
<td>-0.203*</td>
<td>1.00</td>
</tr>
</tbody>
</table>

* indicates significance at 5 percent level
Chapter IV

INSTITUTIONAL OWNERSHIP AND DIVIDENDS

Daniel Wiberg

Abstract

This paper investigates the link between institutional ownership and dividend policy. Utilizing a dividend payout model, which accounts for earnings trends and partial adjustments of dividends, a positive but marginally diminishing relation is found between institutional ownership and dividends. This result holds when ownership is retained through the use of control enhancing mechanisms such as vote-differentiation, instruments that induce investors to demand higher payout ratios. A positive effect with respect to earnings is also recognized. By studying a comprehensive panel of listed Swedish firms, the paper presents the first evidence for the relationship between dividend payout policy and ownership in a corporate governance system which is characterized by an extensive separation of ownership from control. Most studies on the relationship between ownership and dividends have been made on US or UK data, which do not account for this Continental-European governance attribute. The paper supplements the literature by examining a unique database of ultimate ownership which makes it possible to account for ownership continuously.

JEL classification: G23 G30 G32 G35 O16

Keywords: Payout policy, institutions, ownership, corporate governance, panel data.

---

A version of this paper is forthcoming in Bjuggren, P-O., and Mueller, D. C., Eds. (2008), “The Modern Firm, Corporate Governance and Investment,” Edward Elgar, Cheltenham, UK. Financial support from Sparbankernas Forskningsstiftelse to Daniel Wiberg’s dissertation work is gratefully acknowledged. A research grant from the Centre of Excellence for Science and Innovation Studies (CESIS), Royal Institute of Technology, Stockholm, is also gratefully acknowledged. The paper has benefitted greatly from comments from Benito Arruñada, Tom Berglind, and Steen Thomsen and from participants in the EALE 24th Annual Conference and the workshop The Economics of The Modern Firm, 2007.

Affiliations: Jönköping International Business School (JIBS), and Centre of Excellence for Science and Innovation Studies (CESIS), Royal Institute of Technology, Stockholm.
1. INTRODUCTION

During the 1990’s firms’ dividend payout ratios reached unprecedented low levels despite high earnings and price-to-dividend ratios (Arnott and Asness, 2003). Recently however, with a continuing institutionalization of capital, dividend payout ratios have soared. At present many multinational firms pay out special dividends and buy back shares on a scale previously unseen. What role does the increasing institutional ownership play in this development? This paper addresses this issue by investigating the effect of institutional ownership on dividend changes.

A large body of research exists on how corporate ownership structure influences financing, investments and dividend decisions. Especially the relationship between management ownership and dividend policy has been well documented (see e.g. Rozeff, 1982; Jensen et al., 1992; Eckbo and Verma, 1994; Moh’d et al., 1995). The link between institutional investors’ ownership and dividend policy is however somewhat neglected (two excellent studies on the relation between ownership and dividend decisions are Short et al., 2002 and Gugler and Yurtoglu, 2003). This lack of research is regrettable since there has been such an increase in the importance and presence of this type of investors in recent decades. Although studies exist they are predominantly done on US or UK data (i.e. Short et al., 2002) which although central, fail to provide comprehensive insights when the institutional framework is different from what is usually referred to as the Anglo-Saxon corporate governance system. In Continental Europe and Scandinavia the corporate governance structure is characterized by a much more concentrated ownership, often in combination with control instruments such as dual-class shares and pyramidal ownership structures. The Swedish corporate governance system is particularly interesting from this point of view, since it allows for both the use of vote differentiated shares and corporate pyramid structures, which have jointly produced a remarkably persistent and concentrated ownership structure. A seminal study is Dahlqvist and Robertsson (2001) who investigate the investment preferences of foreign owners of Swedish firms. The results show that foreign investors are predominantly institutional investors such as mutual funds.

The purpose of this paper is to investigate the impact of ownership on dividends. Particularly institutional ownership, and its relation to dividends, is considered in the context of an earnings trend model. This model allows both partial adjustments of dividends to changes in earnings as well as trends in the firms’ dividend behaviour. By examining Swedish listed firms
the paper also provides empirical evidence on the effects of control instruments such as dual-class shares on dividend policies.

In line with the assumption that institutional investors may serve a monitoring role, mitigating agency problems related to separation of ownership and control, the results show that institutional ownership has a positive effect on dividend payout policies. The relation is found to be positive but diminishing which supports previous research concerning non-linearity and ownership structure. Regarding control instruments the result, in line with agency-cost theory, indicates that vote-differentiated shares, induce investors to demand higher levels of dividends as compensation for the increased agency-costs.

Furthermore, the paper contributes to the literature by looking particularly on the Swedish case. Sweden is a civil law country which, according to La Porta et al. (1999), has weaker protection of minority owners than common law countries such as the UK and US. Opportunistic behaviour of the controlling owners is therefore more likely vis-à-vis minority owners (Miguel et al., 2004; Pindado and de la Torre, 2006). By European standards Sweden also has a vital capital market with a substantial part of the stock market equity controlled by both foreign and domestic institutional investors.

The paper is organized as follows. Section 2 continues with a discussion about the relation between institutional ownership and dividend policy. Especially the importance of agency conflicts and signalling is discussed. The statistical models for dividend payout behaviour are provided in section 3, together with definitions of the variables used in the regressions. Summary statistics and ownership concentration by different type of owners in the sample firms are examined in section 4. The empirical method, estimation results and analysis are provided in section 5. Conclusions end the paper in section 6.

2. OWNERSHIP AND CORPORATE GOVERNANCE

Given the divergence of ownership and control in listed firms, shareholders cannot perfectly control that manager's act in the strict interest of the shareholders. Hence principal-agent problems arise. Managers may divert funds in their own interest at the expense of the shareholders (Williamson, 1963, 1964; Jensen, 1986). The diversion of funds, usually referred to as
managerial discretion, may include expropriation\(^1\) or diversion of cash flows to unprofitable projects. It might be that these alternative investments provide a positive return. In relation to the shareholders cost of capital however, the return is too low and therefore in terms of shareholder value maximization, unprofitable (Mueller, 2003).

A key feature in any corporate governance system is therefore the legal protection of minority shareholders. With a separation of votes from capital, as in many firms in Sweden, agency cost might be substantial for the minority shareholders. The effectiveness of the corporate governance system may also require the presence of large investors, blockholders, other than the controlling owner(s) or management\(^2\) (La Port et al., 2000; Burkart et al., 1997). Large blockholders can influence the managers to distribute profits to the shareholders, thus limiting the recourses available for managerial discretion. The downside to large investors of this kind is of course that they might just as well override the interest of minority shareholders (La Porta et al., 1999). Indeed, Morck et al., (1988) find that profitability is higher for firms with shareholders that have up to five per cent ownership, beyond that profitability drops. This pattern indicates that larger block-holding investors might seek to generate private benefits of control that are not shared by minority shareholders.

A constraint on institutional investors is that they are often limited, either by regulation or by a desire to maintain liquidity, to holding a relatively small ownership stake in the firm’s equity (Davis and Steil, 2001). Indeed, in Sweden mutual funds which constitute the largest part of the institutional owners are regulated by the mutual funds act of 2004\(^3\). According to this act no single mutual fund can invest more than five percent of its capital in one single equity issuer. The presence of institutional investors in the ownership structure of firms might nevertheless influence managers to be more focused on shareholder value maximization. It is also likely that this relationship between institutional ownership and dividend payout is non-linear (De Miguel et al., 2004; Bjuggren et al., 2007a, 2007b). That is, although the effect in general might be positive it is most likely marginally diminishing. A non-linear relation between ownership and

---

\(^1\) Beyond the obvious cases of theft, transfer pricing, and asset sales, expropriation may take the form of perquisites, high salaries, diversion of funds to pet projects, and inefficient investments in cases in which the managers are no longer competent or qualified to run the firm.

\(^2\) In this paper managerial ownership is not considered. Ownership by the largest shareholder in terms of votes is thus considered in alignment with managerial ownership.

\(^3\) Law concerning Investment funds; Swedish reference, SFS 2004:46; (following European Union directive EGT L 375, 31.12.1985, s. 3, Celex 31985L0611).
Institutional Ownership and Dividends

dividend is also indicating that the direction of causality goes from ownership to dividends and not the opposite.

2.1 Institutional Ownership and Dividends

The increasing number of institutional investors and their growing dominance as owners has had a substantial influence on corporate governance (for extended discussion, see Davis and Steil, 2001). Compared to Anglo-Saxon countries such as the US and the UK, Continental European and Scandinavian firms pay out relatively little in dividends or via repurchase of shares (La Porta et al., 2000), despite high profitability and a very mature corporate structure. One principal reason for the low levels of dividends in Sweden is the tax system which persistently disfavour dividends in favour of investments made with retained earnings (Högfeldt, 2004; Henrekson and Jakobsson, 2006). A stated purpose of this tax policy is to foster so-called long-term investment. The effect however, is that substantial funds have been made available for managers to invest with little or no scrutiny from the external capital market⁴.

So, even if high desired levels of dividends can be seen as a sign of “short-termism” in the institutional owners attitudes (see for example Hutton 1995; Haskins 1995), it might just as well be an effect of these owners attempt to reduce the free cash-flow available to management.

Institutional owners might prefer dividends for other reasons as well. First of all, many institutional owners are tax-exempt with regards to dividends, and might thus prefer dividends to capital gains (Allen et al. 2000). In Sweden the majority of institutional owners are in fact tax-exempt mutual fund companies and insurance companies that manage pensions and other types of savings on behalf of the general public. Foreign ownership on the Swedish Stock Exchange is also predominantly made up of this type of institutions (Sundqvist, 2006). Dahlquist and Robertsson (2001) demonstrate that most of the features associated with foreign investors in Sweden are driven by the fact that they are typically mutual funds or other institutional investors.

⁴ See Arnott and Asness (2003) for an empirical investigation regarding dividends and earnings growth.
2.2 Taxation arguments

The Swedish corporate taxation system is a classical company tax system in which the companies are taxed separately from their shareholders. While firms pay a flat rate of corporation tax on their profits, individuals pay a slightly higher dividend-gains tax on dividend incomes. The dividend gains tax is higher than the corporate tax rate, and individual owners might thus prefer to postpone taxes rather than paying a dividend tax immediately. Holmén et al. (2007) find a negative cross-sectional relationship between controlling owner’s effective tax rates and dividend payout. Mutual fund companies and similar institutional investors are however tax-exempt in the sense that they do not pay tax for incomes received as dividends. The effect of this system is of course that individuals and company owners might prefer retained earnings and capital gains, whilst tax-exempt institutional owners are either neutral or positive to dividends. Empirical studies by Del Guerico (1996) and Grinstein and Michaely (2005) have shown that institutional owners prefer dividend-paying stocks. Using Swedish ownership data Dahlqvist et al. (2007) present evidence in support for the existence of tax clienteles. Changes in institutional ownership around dividend initiations and omission have been documented by Michaely et al. (1995) and Dhaliwal et al. (1999).

A related issue is the need of many institutional owners for funds on an ongoing basis. That is, institutions invest in order to provide returns to fund their liabilities. Regardless of the tax bias in favour of dividends, institutions can therefore not rely entirely on capital gains to fund their activities, and hence they require dividends. For institutional owners as a group, and particularly in the case of Sweden, a positive relation to dividend payout should consequently be expected.

2.3 Agency arguments

A second reason why institutional owners might favour dividends to reinvestments within the firm is because it might serve to curb the agency problems between controlling owners/managers and the minority

---

5 In fact a myriad of different tax rates are applied dependent on the type of firm; i.e. limited liability, private partnerships, etc. For the sake of brevity this discussion is not extended beyond this note, as it is far beyond the scope of this paper to analyze the impact of various tax rates on dividends.

6 For a paper on dividends and corporate shareholders, see Barcley, Holderness and Sheehan (2008).
Institutional Ownership and Dividends

shareholders, as suggested by Jensen (1986). Again, with high dividend payout ratios less funds are available for managerial discretion, and more funds will be allocated through the external capital market subject to market scrutiny.

Empirically the predictions of agency theories on dividend payout (Rozeff, 1982; Easterbrook, 1984; Jensen, 1986; Eckbo and Verma, 1994) support a positive association between dividends and institutional ownership. The prediction is basically that dividends substitute for poor monitoring by the firms’ shareholders. Institutional owners might act as influential principals who are able to impose their preferred payout policy upon firms. The result is less cash available within the firm for managerial discretion and a somewhat mitigated agency problem.

2.4 Signalling arguments

A third reason for why institutional owners might favour dividends is due to the potential information asymmetries that exist between owners and managements. Given these asymmetries and the equity markets preference for liquidity, dividends can act as a signal about the future prospects of the firm.

A way for managements’ to signal their private information regarding the future earnings of the firm would be through dividends (Bhattacharya, 1979, 1980 and Miller and Rock, 1985). A somewhat alternative hypothesis is put forward by Zeckhauser and Pound (1990). They argue that the presence of large outside shareholders, such as institutions, can act as a signal of the firms’ good performance. The presence of such shareholders might therefore lessen the use of dividends, and thus work as a substituting monitoring device. However, the well known incentives for institutional shareholders to free ride on monitoring activities suggests that institutional shareholders are in fact unlikely to provide direct monitoring themselves. It is also unclear, in what way institutional shareholders would act as a signal of future prospects. Is it a signal of reduced agency costs due to monitoring of the institutional shareholders? Based on the free rider arguments mentioned before, probably not. The alternative is then that the institutional shareholders have some superior information regarding the future prospects of the firm. Although this explanation has some appealing inklings, little evidence would support this scenario. Insider laws may for instance make institutional shareholders very careful in handling this type of information (if they get hold on it to start with). Also, the rapid increase of indexation, especially with respect to institutional shareholdings implies that the
presence of an institutional shareholder might not necessary mean that the particular institution believes that the firm has better than average prospects (Short et al., 2002). While possible, the notion that dividends and institutional shareholders may act as substituting devices is not very convincing. The expected results with respect to the relationship between institutional ownership and dividends in terms of signalling are subsequently be mixed as well. Sembenelli (1993) apply a similar methodology as in this paper. Based on the traditional Lintner model he derives an asymmetric model of dividend behaviour. The model allows both the speed of adjustment and the desired pay-out parameters to vary according to firm- and time-specific conditions. When tested on a sample of Italian firm, the results give no support for the signalling theory of dividends. The results are however consistent with the existence of a financial hierarchy.

These three main considerations, taxation, agency costs, and signalling are now summarized in order to construct empirically testable hypotheses regarding the association between ownership and dividends.

### 2.5 Summary and hypothesis

The association between ownership and dividends seems to depend crucially on three factors related to the corporate governance system. The first is the consideration of taxes. In a country like Sweden, with a classical company tax system, dividend payments are essentially taxed twice, both as profits within the firm and then as capital gains for the individual. Tax-exempt shareholders might for various other reasons, liabilities etc., prefer dividends to capital gains. Consequently one would expect a positive or at least neutral attitude to dividends relative to capital gains, for this type of investors.

The second factor decisively relating the corporate governance system to dividends is agency problems related to the separation of ownership from control. In corporate governance systems, such as the Swedish, where ownership is further separated from control via control instruments, the agency conflicts described by Jensen and Meckling (1976) are aggravated. From this perspective influential shareholders such as institutions may demand higher levels of dividends in order to force firms to go to the capital market for external funding. Hence be subject to monitoring by the external market, a notion that would hold particularly when there is a separation between ownership in terms of capital and control. The reduced levels of cash flow will thus mitigate the free-cash flow problem and lead to less
inefficiency, in terms of managerial discretion. Based on the arguments of the agency theory the hypothesised relation between institutional shareholdings and dividends is therefore positive when capital rights are separated from control rights.

**Hypothesis 1a** = Institutional shareholdings have a positive effect on dividend changes.

Research by amongst others Miguel et al (2004); Pindado and de la Torre (2006) and Crutchely et al (1999) have shown that the relationship between dividends and institutional ownership is non-linear, and marginally diminishing. Although positive, the impact of increasing ownership leads to a convergence of the monitoring and entrenchment effects. This notion has also been widely supported by previous literature (Morck et al., 1988; McConnell and Servaes, 1990; Gedajlovic and Shapiro, 1998). One would therefore expect that any impact of institutional ownership on dividend policy is positive but diminishing.

**Hypothesis 1b** = Institutional shareholdings have a positive but marginally diminishing effect on dividend changes.

Hypothesis 1a and 1b are expected to hold both for ownership in terms of votes and capital. The causal relation between dividends and ownership in terms of signalling is as mentioned more complex, if existent. Separate empirically testable hypothesis of this relationship is thus hard to formulate.

As the agency problems related to the separation of ownership from control would be aggravated by the use of vote-differentiated shares, institutional owners and outside investors demand higher dividends where such control instruments are in place. A positive relationship can therefore be expected between dividend changes and vote-differentiated shares. Hypothesis two is therefore:

**Hypothesis 2** = The use of vote-differentiated shares has a positive relation to dividend changes.

Again, this relationship is expected to hold for ownership in terms of votes as well as capital.
As current periods earnings are of primary importance to any eventual dividend payout, an earnings component will be incorporated in the estimated dividend model, as suggested by Fama and Babiak (1968). The interpretation of this component is straightforward; higher earnings means more funds available for dividends and consequently a positive impact on dividends changes can be expected. To control for the previous period’s earnings, an earnings trend component, will also be included in the model.

In addition to earnings another variable which must be controlled for is the previous period’s dividends. The parameter estimate of this variable represents the speed of adjustment of dividends to new levels of earnings and is thus expected to be negative, meaning that there is some reluctance to change dividends immediately in response to changes in earnings (for extended discussion see Short et al., 2002).

3. METHOD, VARIABLES AND DATA

To test the relation between institutional ownership and dividends a partial-adjustment model which accounts for earnings trends is used. The model is modified by interacted shareholdings of the different ownership types. A similar approach used by Short et al. (2002) is limited to using interactive dummy variables due to the lack of ultimate ownership data. In this paper however, the continuous shareholdings of the different ownership categories, focusing on institutional ownership, is used.

Following Short et al (2002) the derivation of the model is based on four related models for the dividend-earnings relation; the Full and Partial Adjustment models by Lintner (1956) the Waud model (1966) and the Earnings Trend model by Fama and Babiak (1968).7

3.1 The modified Earnings Trend Model

Assuming that for any year, t, the target level of dividend $D^*$ for firm i is related to the long-run expected earnings, $E^*_i$, of firm i at time t earnings, by a desired payout ratio, r:

$$D^*_i = rE^*_i$$

7 For extended discussion and derivation of the four models see Short et al (2002).
Institutional Ownership and Dividends

Based on the Waud model (1966) it is further assumed that the formation of expectations follows an adoptive expectation process of the form:

\[ E_{i,t}^* - E_{i,t-1}^* = d(E_{i,t} - E_{i,t-1}^*) \]

Then if ownership structure, by for example institutions (\( \text{Inst} \) representing the ownership of institutional investors), alters the desired payout ratio (\( r \)) firms would have another \( D^* \), so the model becomes:

\[ D_{i,t} = rE_{i,t} + r_I E_{i,t} \times \text{Inst} \]

where \( r_I \) is the impact on the firms' dividend payout policy related to institutional ownership.

This earnings generating process can then be combined with the adjustment models of dividends developed by Lintner (1956). The partial adjustment model in particular assumes that in any given year, the firm adjusts only partially to the target dividend level, like following:

\[ D_{i,t} - D_{i,t-1} = \alpha + c(D_{i,t}^* - D_{i,t-1}) \]

where \( \alpha \) is a constant representing the resistance to change dividends, and \( c \) is the "speed of adjustment" coefficient which represents management reluctance to adjust the dividends to the new target level immediately. With the target dividend level \( D^* \) for firm \( i \) at time \( t \), as in equation (1) we can substitute in equation (4) and get the following model:

\[ D_{i,t} - D_{i,t-1} = \alpha + c(r_{i,t} E_{i,t}^* - D_{i,t-1}) + \mu_{i,t} \]

where the term \( \mu_{i,t} \) is the usual residual term. So far the specification has yielded a partial-adjustment model. But one would also like to consider that earnings can follow a firm’s specific trend or process (Fama and Babiak, 1968). Assume that the specific profit generating process, for firm \( i \) at time \( t \), is of the form:

\[ E_{i,t} = (1 + \gamma)E_{i,t-1} \]

where \( \gamma \) is an earnings trend factor. If the firms' ownership structure also have a significant influence on the earnings of the firms it seems reasonable
to assume a possible difference in the earnings trend factor. The profit generating process thus becomes:

\[ E_t = E_{t-1} + \gamma E_{t-1} + \gamma_1 E_{t-1} \times \text{Inst} \]  

(7)

It is then possible to combine the Waud models adoptive expectation process in equation (2), with the partial adjustment model of equation (4) to get:

\[ D_t - D_{t-1} = \alpha + c(r(d(E_t - E_{t-1}) + E_{t-1}^*) - D_{t-1}) + \mu_t \]

(8)

Assuming that there is full adjustment of dividends to the expected change \( (c \times d = 1) \), and partial adjustment to the reminder, equation (8) can be rearranged and reduced. The reduced and empirically testable model accounting for both trends in earnings and adjustments to target dividend levels, equation (9), is consequently:

\[ D_t - D_{t-1} = \alpha + cE_t + r(1-c)E_{t-1} + r\gamma_1(1-c)E_{t-1} + \text{Inst} - cD_{t-1} + \mu_t \]

(9)

Note that the term \( \text{Inst} \) is an example of an interaction term made up of an ownership variable (institutional ownership). In the same way other ownership variables can be tested by inserting another interaction term made up of relevant ownership variable (for example \( \text{Votdiff} \) which is a dummy of vote-differentiated shares interacted with previous period’s earnings).

### 3.2 Data and Variables

All data on the firms’ book values and earnings are provided by the Compustat Global database. The period covered is 1996 until 2005. The time period in the regressions is 1997-2005, due to the first difference in the dependent variable. Financial firms are removed from the sample, due to the particular nature of their investments. The ownership data is provided by Ownership and Power in Sweden\(^8\), which is a unique database covering ownership structure, on a yearly basis, for all firms listed on one of the three major lists at the Stockholm Stock Exchange.

All aspects considered, the setup requirements produced a sample of 189 Swedish listed firms. The sample firms correspond to an aggregate share

---

\(^8\) SIS-Ägarservice.
Institutional Ownership and Dividends

of more than 90 percent of the total market capitalisation at the Stockholm Stock Exchange, and approximately more than 80 percent of the total Swedish export value.

The variable institutional ownership is made up of the aggregate ownership controlled by institutions, both in terms of cash flow rights (IC) and vote rights (IV). The same notation applies for foreign ownership (FC) and (FV), see Table 1. The group institutional investors consist of banks, pension and mutual funds, insurance companies and endowment foundations. The different ownership categories and how they are defined and grouped are summarized in Table 1.

Table 1. Ownership Categories

<table>
<thead>
<tr>
<th>Owner type</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>Private</td>
<td>All shares controlled by individuals as well as other firms. The private owner can either be the founder of the firm or an investor who has acquired control.</td>
</tr>
<tr>
<td>Foreign</td>
<td>These owners can be institutions as well as individuals since it is hard to separate these two groups with certainty.</td>
</tr>
<tr>
<td>Institutional</td>
<td>All shares controlled by Swedish financial institutions belong to this category. In all cases the institutions belong to one of the three following types.</td>
</tr>
<tr>
<td></td>
<td><strong>Insurance company</strong></td>
</tr>
<tr>
<td></td>
<td>Insurance company-controlled shares are all firms that have an insurance company as their largest owner. Note however that mutual funds belonging to an insurance company make a separate group of controlling owner.</td>
</tr>
<tr>
<td></td>
<td><strong>Mutual fund</strong></td>
</tr>
<tr>
<td></td>
<td>As the name indicates, all shares controlled by a mutual fund; a fund can either belong to a bank; an insurance company or the state-owned pension funds.</td>
</tr>
<tr>
<td></td>
<td><strong>Foundation</strong></td>
</tr>
<tr>
<td></td>
<td>This category includes foundations donated by private individuals as well as, for example, various types of profit-sharing funds and pension funds tied to individual companies.</td>
</tr>
</tbody>
</table>

9 Note that the typical Swedish ownership spheres, large scale conglomerates combining a number of control enhancing mechanisms and often controlled by a foundation, are not included in this definition. The incentives of this type of owners are presumably substantially different from what is usually refereed to as institutional investors, i.e. financial intermediaries.
Table 2 provides descriptive statistics on the variables used in the regressions, together with their definitions. Statistics is also provided for some additional variables for descriptive purposes.

**Table 2. Variables**

<table>
<thead>
<tr>
<th>Variable name</th>
<th>Definition</th>
</tr>
</thead>
<tbody>
<tr>
<td>$D_t$</td>
<td>Total amount of dividends paid by firm i in period t (million SEK).</td>
</tr>
<tr>
<td>$D_{t-1}-D_{t-1}$</td>
<td>Change in total amount of dividends paid by firm i between period t-1 and t. (million SEK)</td>
</tr>
<tr>
<td>$Prstk_t$</td>
<td>Purchase of firm i stocks by firm i in period t (million SEK)</td>
</tr>
<tr>
<td>$TPay_t$</td>
<td>Total payout, dividends and repurchase of shares, by firm i in period t. (million SEK)</td>
</tr>
<tr>
<td>$TPay_{t-1}-TPay_{t-1}$</td>
<td>Change in total payout, dividends and repurchase of shares, by firm i between period t-1 and t. (million SEK)</td>
</tr>
<tr>
<td>$E_t$</td>
<td>Earnings, calculated as net profits from ordinary trading activities after depreciation and other operating provisions (million SEK).</td>
</tr>
<tr>
<td>$E_{t-1}$</td>
<td>Earnings of firm i in period t-1. (million SEK)</td>
</tr>
<tr>
<td>$C_1$</td>
<td>Share of capital owned by the largest owner (cash-flow rights), percent.</td>
</tr>
<tr>
<td>$V_1$</td>
<td>Vote rights controlled by the largest owner (control rights), percent.</td>
</tr>
<tr>
<td>$FC$</td>
<td>Share of capital owned by foreign investor’s, percent.</td>
</tr>
<tr>
<td>$FV$</td>
<td>Vote rights controlled by foreign investor’s, percent.</td>
</tr>
<tr>
<td>$IC$</td>
<td>Share of capital owned by institutional investor’s, percent.</td>
</tr>
<tr>
<td>$IV$</td>
<td>Vote rights controlled by institutional investor’s, percent.</td>
</tr>
<tr>
<td>VoteDiff</td>
<td>Dummy variable for vote-differentiated shares, 1 if dual-class shares, 0 if one-share-one-vote.</td>
</tr>
<tr>
<td>Sales Employed</td>
<td>Total sales (million SEK). Total number of persons employed by the firm i in time t.</td>
</tr>
<tr>
<td>R&amp;D-exp</td>
<td>Research and development expenses if reported (millions SEK).</td>
</tr>
<tr>
<td>WCap</td>
<td>Working Capital (millions SEK).</td>
</tr>
</tbody>
</table>
4. DESCRIPTIVE STATISTICS AND OWNERSHIP CONCENTRATION

Before continuing to the estimation results a more thorough assessment of the descriptive statistics is warranted. Descriptive statistics for the variables in the regressions is provided in Table 3. In addition to the variables used in the regressions statistics of the firms Sales/Turnover, R&D-expenses, and Working Capital is provided in Table 3. Also descriptive statistics of the five largest owners in terms of capital share (C5) and votes (V5) is included in the Table. All figures both in the descriptive statistics and in the regressions have been deflated by 2006 years price level.

Table 3. Descriptive statistics all firms

<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Std. dev.</th>
<th>Min</th>
<th>Max</th>
<th>Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>(D_t)</td>
<td>261.26</td>
<td>9.29</td>
<td>789.66</td>
<td>0</td>
<td>7862</td>
<td>1190</td>
</tr>
<tr>
<td>(D_t-D_{t-1})</td>
<td>31.74</td>
<td>0</td>
<td>395.72</td>
<td>-5169.44</td>
<td>4939.99</td>
<td>1190</td>
</tr>
<tr>
<td>Prstki</td>
<td>28.10</td>
<td>0</td>
<td>318.10</td>
<td>0</td>
<td>6518.13</td>
<td>1190</td>
</tr>
<tr>
<td>TPayi</td>
<td>289.36</td>
<td>9.51</td>
<td>895.15</td>
<td>0</td>
<td>8996.52</td>
<td>1190</td>
</tr>
<tr>
<td>TPayi-TPayi-1</td>
<td>31.74</td>
<td>0</td>
<td>395.15</td>
<td>-5169.44</td>
<td>4939.98</td>
<td>1190</td>
</tr>
<tr>
<td>(E_t)</td>
<td>714.62</td>
<td>45.10</td>
<td>2797.37</td>
<td>-34529.32</td>
<td>30724.00</td>
<td>1190</td>
</tr>
<tr>
<td>(E_t-E_{t-1})</td>
<td>78.53</td>
<td>8.71</td>
<td>2038.43</td>
<td>-40652.38</td>
<td>37146.87</td>
<td>1190</td>
</tr>
<tr>
<td>C1</td>
<td>23.77</td>
<td>20.50</td>
<td>15.16</td>
<td>1.00</td>
<td>74.50</td>
<td>1190</td>
</tr>
<tr>
<td>V1</td>
<td>34.84</td>
<td>31.30</td>
<td>20.75</td>
<td>2.50</td>
<td>95.10</td>
<td>1190</td>
</tr>
<tr>
<td>C5</td>
<td>47.01</td>
<td>45.9</td>
<td>18.40</td>
<td>6.40</td>
<td>97.60</td>
<td>1190</td>
</tr>
<tr>
<td>V5</td>
<td>58.15</td>
<td>59.75</td>
<td>20.99</td>
<td>6.40</td>
<td>98.80</td>
<td>1190</td>
</tr>
<tr>
<td>FC</td>
<td>20.59</td>
<td>16.20</td>
<td>17.47</td>
<td>0.00</td>
<td>79.60</td>
<td>1190</td>
</tr>
<tr>
<td>FV</td>
<td>18.12</td>
<td>11.30</td>
<td>18.25</td>
<td>0.00</td>
<td>93.50</td>
<td>1190</td>
</tr>
<tr>
<td>IC</td>
<td>14.11</td>
<td>11.5</td>
<td>12.28</td>
<td>0.00</td>
<td>54.90</td>
<td>1190</td>
</tr>
<tr>
<td>IV</td>
<td>11.14</td>
<td>8.10</td>
<td>10.94</td>
<td>0.00</td>
<td>67.6</td>
<td>1190</td>
</tr>
<tr>
<td>VoteDiff</td>
<td>0.62</td>
<td>1</td>
<td>0.48</td>
<td>0</td>
<td>1</td>
<td>1190</td>
</tr>
<tr>
<td>Sales</td>
<td>11231.43</td>
<td>1204.26</td>
<td>31099.15</td>
<td>0.04</td>
<td>298428.10</td>
<td>1190</td>
</tr>
<tr>
<td>Employed</td>
<td>6.93</td>
<td>0.45</td>
<td>20.76</td>
<td>0.01</td>
<td>216.99</td>
<td>1190</td>
</tr>
<tr>
<td>R&amp;D-exp</td>
<td>406.07</td>
<td>0</td>
<td>3010.69</td>
<td>0</td>
<td>49553.76</td>
<td>1190</td>
</tr>
<tr>
<td>WCap</td>
<td>1954.50</td>
<td>166.15</td>
<td>8535.88</td>
<td>-10884.00</td>
<td>110201.90</td>
<td>1190</td>
</tr>
</tbody>
</table>

All ownership variables, votes (V) and capital (C), are given in percentage. The vote-differentiation dummy variable (Vote-diff) takes the value one if the firm has vote-differentiated shares, zero otherwise.
It is interesting to note the share of control rights controlled by the largest shareholder, V1, on average the largest shareholder in the sample firms’ control 34.84 percent of the votes in the firm, see Table 3. This concentration of ownership is remarkable, not only compared to other European and Anglo-Saxon countries, but also because of the relative size of the Swedish firms in the sample (mean Sales 11231.43 million SEK\(^{10}\)). The sample of firms is therefore consistent with the view that the Swedish economy is dominated by closely held, relatively large, often old industrial and multinational firms (Agnblad et al., 2001, Högfeldt, 2004, Jakobsson and Henrekson, 2006).

When considering cash flow-rights (C1), the share controlled by the largest owner is on average 23.77 percent, substantially lower than the vote rights (V1=34.84%), but still remarkably high in an international comparison. The median values for these two variables also support this notion, that the single largest owner controls the firm to a large extent by vote-differentiated shares (median C1=20.50% and median V1=31.30%).

For the Foreign and Institutional owners cash flow rights seem to be more important than control, in line with the expectation. The ownership of vote rights for foreign and institutional owners (FV=18.12% and IV=11.14%) is substantially below the level of cash flow rights (FC=20.59% and IC=14.11%). For both ownership types the difference is around three percent, which support the assumption that the two ownership types are similar. That is, the majority of the foreign owners are in fact institutions. The incentive structure and the influence of ownership on the performance should therefore be similar for foreign and institutional owners, as expected from hypothesis 1a and 1b.

Dividing the sample according to whether or not the firms have vote-differentiated shares reveals some additional insights. Table 4, shows the descriptive statistics of the group of firms with only one type of shares (one-share-one-vote). This group represents 37 percent of the total sample of 189 firms, or 445 observations. It seems that this group on average represents smaller firms, compared to the group of firms that have vote-differentiated shares, described in Table 5.

\(^{10}\) Approximately 1.2 Billion €, or 1.6 Billion $, January 2008.
<table>
<thead>
<tr>
<th></th>
<th>Mean</th>
<th>Median</th>
<th>Std. dev.</th>
<th>Min</th>
<th>Max</th>
<th>Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>$D_t$</td>
<td>130.14</td>
<td>0</td>
<td>544.10</td>
<td>0</td>
<td>5656.38</td>
<td>445</td>
</tr>
<tr>
<td>$D_t - D_{t-1}$</td>
<td>18.55</td>
<td>0</td>
<td>186.74</td>
<td>-1006.33</td>
<td>2812.53</td>
<td>445</td>
</tr>
<tr>
<td>$P_{stkci}$</td>
<td>9.62</td>
<td>0</td>
<td>89.04</td>
<td>0</td>
<td>1158.50</td>
<td>445</td>
</tr>
<tr>
<td>$TP_{ayi}$</td>
<td>139.76</td>
<td>0</td>
<td>555.14</td>
<td>0</td>
<td>5656.38</td>
<td>445</td>
</tr>
<tr>
<td>$TP_{ayi} - TP_{ayi-1}$</td>
<td>18.55</td>
<td>0</td>
<td>186.74</td>
<td>-1006.33</td>
<td>2812.53</td>
<td>445</td>
</tr>
<tr>
<td>$E_t$</td>
<td>312.20</td>
<td>10.69</td>
<td>1588.51</td>
<td>-5823.43</td>
<td>17972.37</td>
<td>445</td>
</tr>
<tr>
<td>$E_t - E_{t-1}$</td>
<td>44.32</td>
<td>7.77</td>
<td>1210.15</td>
<td>-14052.01</td>
<td>18860.71</td>
<td>445</td>
</tr>
<tr>
<td>$C1$</td>
<td>22.09</td>
<td>19.4</td>
<td>13.78</td>
<td>2.50</td>
<td>74.50</td>
<td>445</td>
</tr>
<tr>
<td>$V1$</td>
<td>22.09</td>
<td>19.4</td>
<td>13.78</td>
<td>2.50</td>
<td>74.50</td>
<td>445</td>
</tr>
<tr>
<td>$C5$</td>
<td>43.91</td>
<td>42.3</td>
<td>17.63</td>
<td>6.40</td>
<td>89.20</td>
<td>445</td>
</tr>
<tr>
<td>$V5$</td>
<td>43.91</td>
<td>42.3</td>
<td>17.63</td>
<td>6.40</td>
<td>89.20</td>
<td>445</td>
</tr>
<tr>
<td>$FC$</td>
<td>22.39</td>
<td>18.2</td>
<td>17.94</td>
<td>0</td>
<td>77.00</td>
<td>445</td>
</tr>
<tr>
<td>$FV$</td>
<td>22.39</td>
<td>18.2</td>
<td>17.94</td>
<td>0</td>
<td>77.00</td>
<td>445</td>
</tr>
<tr>
<td>$IC$</td>
<td>14.03</td>
<td>11.3</td>
<td>12.01</td>
<td>0</td>
<td>54.90</td>
<td>445</td>
</tr>
<tr>
<td>$IV$</td>
<td>14.03</td>
<td>11.3</td>
<td>12.01</td>
<td>0</td>
<td>54.90</td>
<td>445</td>
</tr>
<tr>
<td>VoteDiff</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>0</td>
<td>445</td>
</tr>
<tr>
<td>Sales</td>
<td>4646.75</td>
<td>650.63</td>
<td>12093.59</td>
<td>0.05</td>
<td>87661</td>
<td>445</td>
</tr>
<tr>
<td>Employed</td>
<td>2.48</td>
<td>0.39</td>
<td>5.96</td>
<td>0.03</td>
<td>39.61</td>
<td>445</td>
</tr>
<tr>
<td>R&amp;D-exp</td>
<td>81.49</td>
<td>0</td>
<td>287.87</td>
<td>0</td>
<td>2875</td>
<td>445</td>
</tr>
<tr>
<td>WCap</td>
<td>565.97</td>
<td>113.95</td>
<td>1832.96</td>
<td>-6236.19</td>
<td>13272.85</td>
<td>445</td>
</tr>
</tbody>
</table>

All ownership variables, votes (V) and capital (C), are given in percentage. The vote-differentiation dummy variable (Vote-diff) takes the value one if the firm has vote-differentiated shares, zero otherwise.

The group of firms with vote-differentiated shares consists of 745 observations which represent 63 percent of the total number of firms in the sample. Looking at the figures for Sales, R&D, and Working Capital, and comparing Table 4 and Table 5, confirm that the firms with vote-differentiated shares on average are larger than the firms without vote-differentiated shares.
Table 5. Descriptive statistics firms with vote-differentiated shares

<table>
<thead>
<tr>
<th>Variable</th>
<th>Mean</th>
<th>Median</th>
<th>Std. dev.</th>
<th>Min</th>
<th>Max</th>
<th>Obs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Dt</td>
<td>339.58</td>
<td>18.53</td>
<td>896.33</td>
<td>0</td>
<td>7862</td>
<td>745</td>
</tr>
<tr>
<td>Dt-Dt-1</td>
<td>39.62</td>
<td>0</td>
<td>478.83</td>
<td>-5169.44</td>
<td>4939.98</td>
<td>745</td>
</tr>
<tr>
<td>Prstkc0</td>
<td>39.14</td>
<td>0</td>
<td>395.79</td>
<td>0</td>
<td>6518.13</td>
<td>745</td>
</tr>
<tr>
<td>TPayu</td>
<td>378.72</td>
<td>18.54</td>
<td>1036.95</td>
<td>0</td>
<td>8996.52</td>
<td>745</td>
</tr>
<tr>
<td>TPayu-TPayu-1</td>
<td>39.62</td>
<td>0</td>
<td>478.83</td>
<td>-5169.44</td>
<td>4939.98</td>
<td>745</td>
</tr>
<tr>
<td>Et</td>
<td>954.99</td>
<td>69.40</td>
<td>3293.19</td>
<td>-34529.32</td>
<td>30724</td>
<td>745</td>
</tr>
<tr>
<td>Et-Et-1</td>
<td>98.97</td>
<td>9.75</td>
<td>2401.13</td>
<td>-40652.38</td>
<td>37146.87</td>
<td>745</td>
</tr>
<tr>
<td>C1</td>
<td>24.77</td>
<td>20.90</td>
<td>15.86</td>
<td>1</td>
<td>74.10</td>
<td>745</td>
</tr>
<tr>
<td>V1</td>
<td>42.43</td>
<td>40.70</td>
<td>20.51</td>
<td>2.90</td>
<td>95.10</td>
<td>745</td>
</tr>
<tr>
<td>C5</td>
<td>48.86</td>
<td>48.50</td>
<td>18.61</td>
<td>8.90</td>
<td>97.50</td>
<td>745</td>
</tr>
<tr>
<td>V5</td>
<td>66.58</td>
<td>69.50</td>
<td>18.09</td>
<td>9.60</td>
<td>98.80</td>
<td>745</td>
</tr>
<tr>
<td>FC</td>
<td>19.51</td>
<td>15.30</td>
<td>17.10</td>
<td>0</td>
<td>79.60</td>
<td>745</td>
</tr>
<tr>
<td>FV</td>
<td>15.54</td>
<td>9.00</td>
<td>17.94</td>
<td>0</td>
<td>93.50</td>
<td>745</td>
</tr>
<tr>
<td>IC</td>
<td>14.15</td>
<td>11.60</td>
<td>12.45</td>
<td>0</td>
<td>54.70</td>
<td>745</td>
</tr>
<tr>
<td>IV</td>
<td>9.42</td>
<td>6.80</td>
<td>9.85</td>
<td>0</td>
<td>67.60</td>
<td>745</td>
</tr>
<tr>
<td>VoteDiff</td>
<td>1</td>
<td>1</td>
<td>0</td>
<td>1</td>
<td>1</td>
<td>745</td>
</tr>
<tr>
<td>Sales</td>
<td>15164.57</td>
<td>1613.46</td>
<td>37642.09</td>
<td>1.02</td>
<td>298428.10</td>
<td>745</td>
</tr>
<tr>
<td>Employed</td>
<td>9.58</td>
<td>0.97</td>
<td>25.47</td>
<td>0.01</td>
<td>216.99</td>
<td>745</td>
</tr>
<tr>
<td>R&amp;D-exp</td>
<td>599.97</td>
<td>0</td>
<td>3786.24</td>
<td>0</td>
<td>49553.76</td>
<td>745</td>
</tr>
<tr>
<td>WCap</td>
<td>2783.89</td>
<td>204.42</td>
<td>10611.02</td>
<td>-10884.00</td>
<td>110201.90</td>
<td>745</td>
</tr>
</tbody>
</table>

All ownership variables, votes (V) and capital (C), are given in percentage. The vote-differentiation dummy variable (Vote-diff) takes the value one if the firm has vote-differentiated shares, zero otherwise.

The correlation between the different variables is provided in Table A1, provided in appendix A. The correlations confirm the negative relationship between both foreign ownership in capital and votes (FC and FV) and institutional ownership of votes and capital (IC and IV) relative to vote-differentiation. Also a high correlation between dividends and earnings is evident as expected.

Repurchase of shares (Prstkc0) only constitute a fractional part of the total payout by the sample firms. Due to regulation, this way of distributing funds back to the shareholders has previously been closed for Swedish firms. The correlation matrix (Table A1, appendix A) nonetheless confirms a
positive correlation between institutional ownership and this type of payout. As few firms in the sample have made use of this method to distribute cash to the shareholders, the focus of this paper is placed on dividend changes.

5. **EMPIRICAL RESULTS AND ANALYSIS**

In order to test for a relationship between institutional ownership and dividends the partial adjustment model is estimated with interaction terms, see Table 6 Model 1. The estimation is made in the form of a pooled-OLS, and ownership is measured both as percentage of votes and capital. The results are presented in Table 6 Model 1a and 1b. The results support hypothesis 1, with a positive effect of institutional ownership on changes in dividends, for institutional ownership measured by votes. Although robust in terms of size and sign, the coefficient on institutional ownership is insignificant when ownership is measured in terms of capital. The estimated coefficient on previous periods dividends $D(t-1)$ is negative and significant which suggest that the firms adjust dividends slowly to changes in earnings. This estimation is similar to, and confirms the findings in, Short et al., (2002).

In order to account for a potential non-linear effect of institutional ownership another interaction term of squared institutional ownership and earnings is added (Grier and Zychowicz, 1994; Schooly and Barney, 1994; Crutchely et al., 1999), see Table 6 Model 2a and 2b. This allows for a marginally diminishing effect of institutional ownership on dividends changes. Pindado and de la Torre (2006) use a somewhat different approach with optimal breakpoints of the value-ownership relation estimated in Miguel et al (2004). As institutional ownership is measured as the aggregate ownership share by this type of investor, this specification seems unwarranted. Each individual institutional owner has its specific breakpoint associated with its investment profile. Consequently only a diminishing effect of aggregate institutional ownership is tested.
Table 6. Pooled-OLS estimations; Model 1 linear and Model 2 non-linear institutional ownership (votes) and (capital)

<table>
<thead>
<tr>
<th>Dependent Variable (Divt-Divt-1)</th>
<th>Model 1a (votes)</th>
<th>Model 1b (capital)</th>
<th>Model 2a (votes)</th>
<th>Model 2b (capital)</th>
</tr>
</thead>
<tbody>
<tr>
<td>E_t</td>
<td>0.1247* (26.69)</td>
<td>0.1248* (26.60)</td>
<td>0.1236* (26.30)</td>
<td>0.1233* (26.16)</td>
</tr>
<tr>
<td>E_{t-1}</td>
<td>-0.0612* (-5.21)</td>
<td>-0.0616* (-4.89)</td>
<td>-0.0777* (-5.49)</td>
<td>-0.1072* (-5.07)</td>
</tr>
<tr>
<td>E_{t-1}*Inst</td>
<td>0.0007* (2.56)</td>
<td>0.0007 (1.45)</td>
<td>0.0028* (2.71)</td>
<td>0.0055* (2.95)</td>
</tr>
<tr>
<td>E_{t-1}*Inst^2</td>
<td>-0.00005** (-2.09)</td>
<td>-0.0001* (-2.68)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>E_{t-1}*VoteDiff</td>
<td>0.0133 (1.26)</td>
<td>0.0110 (1.02)</td>
<td>0.0193*** (1.76)</td>
<td>0.0112 (1.05)</td>
</tr>
<tr>
<td>Div_{t-1}</td>
<td>-0.2122* (-10.30)</td>
<td>-0.2067* (-10.02)</td>
<td>-0.2224* (-10.52)</td>
<td>-0.2081* (-10.12)</td>
</tr>
<tr>
<td>constant</td>
<td>13.9757 (1.48)</td>
<td>13.8101 (1.46)</td>
<td>13.5043 (1.43)</td>
<td>15.5981 (1.65)</td>
</tr>
</tbody>
</table>

Number of obs=1190
Number of groups=189

R^2=0.3990 R^2adj=0.3965 R^2=0.4012 R^2adj=0.3982 R^2=0.4004 R^2adj=0.3973

The estimates of the non-linear specification of Model 2 again reveal a positive and significant relation between institutional ownership and changes in dividends. Correctly specified institutional ownership both in terms of votes (Model 2a) and capital (Model 2b), is found positive and significant. For ownership measured in votes the coefficient related to the use of vote-differentiated shares is also significant. This suggests that firms using vote-differentiated shares have higher levels of dividends, confirming hypothesis 2. The speed of adjustment coefficient, related to previous period’s dividends is again significant and negative as expected. The same holds for this period’s earnings. Consistent with the equality and stability conditions of the model, the estimated parameter for previous period’s earnings is negative.
Institutional Ownership and Dividends

As displayed by the descriptive statistics there are substantial size and scale effects in the sample of firms. For the OLS-regression to produce efficient estimates under such conditions we need to control that the data is homoskedastic. The Breusch-Pagan/Cook-Weisberg test\(^\text{11}\) however, reveals that the sample suffers from heteroscedasticity, and consequently we cannot rely on the results of the OLS-estimation for inference. To account for this heteroscedasticity in the data a GLS-methodology is required. Utilizing both the cross-sectional and time-series properties of the data an FGLS-regression will allow heteroscedasticity in the panels (firms) as well as panel-specific correlation (AR(1)).

By including a time specific dummy variable it is also possible to control for temporal effects. That is, the effect of macroeconomic variables that might influence the firms and their dividend behavior, as well as their ownerships structures.

Table 7 provides the results for the FGLS-estimations, where ownership is measured both in terms of votes (Model 3a) and capital (Model 3b). As expected, institutional ownership is found to have a significantly positive effect on dividends payout, when ownership is measured in terms of votes, which support hypothesis 1. The presence of institutional owners is thus associated with positive dividend changes. For institutional ownership in terms of capital share, the results are insignificant but positive as expected. The use of vote-differentiated shares is again found to be positively related to dividend changes in support of hypothesis 2. This relation holds for ownership measured both in terms of votes and capital.

---

\(^{11}\) Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

\[ \text{Variables: fitted values of Divt-Div(t-1)} \]

\[ \text{Chi2(1) = 171.96} \quad \text{Prob>chi2 = 0.0000} \]

Breusch-Pagan/Cook-Weisberg test for heteroskedasticity

\[ \text{Variables: fitted values of Et E(t-1)*Inst (votes) E(t-1)*Inst2 (votes) E(t-1)*VotDiff Dummy Div(t-1)} \]

\[ \text{Chi2(1) = 171.96} \quad \text{Prob>chi2 = 0.0000} \]

Each of these tests indicates that there is a significant degree of heteroscedasticity in this model. In order to get efficient estimators and account for this heteroscedasticity GLS estimation is thus required.

117
Table 7. Cross-sectional time-series FGLS estimations; Model 3 institutional ownership (votes) and (capital)

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Model 3a (votes)</th>
<th>Model 3b (Capital)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Et</td>
<td>0.0817* (23.21)</td>
<td>0.0821* (21.47)</td>
</tr>
<tr>
<td>E(t-1)</td>
<td>-0.0412* (-6.15)</td>
<td>-0.0395* (-4.89)</td>
</tr>
<tr>
<td>E(t-1)*Inst</td>
<td>0.0007*** (1.82)</td>
<td>0.0009 (1.50)</td>
</tr>
<tr>
<td>E(t-1)*Inst²</td>
<td>-9.59e-06 (-1.06)</td>
<td>-1.4e-05 (1.08)</td>
</tr>
<tr>
<td>E(t-1)*VoteDiff</td>
<td>0.0244* (4.21)</td>
<td>0.0217* (3.47)</td>
</tr>
<tr>
<td>Div(t-1)</td>
<td>-0.1878* (-8.79)</td>
<td>-0.1906* (8.57)</td>
</tr>
<tr>
<td>constant</td>
<td>7.1562* (7.75)</td>
<td>8.0771* (7.60)</td>
</tr>
</tbody>
</table>

Number of obs=1190
Number of groups=189

* denotes significance at the 1% level, ** denotes significance at 5%, *** denotes significance at the 10% level.

In order to investigate the role of institutional owners in the context of the agency conflict related to the separation of ownership and control the sample of firms is separated into two groups depending on whether or not they have vote-differentiated shares. Naturally the interaction term with the dummy for vote-differentiation is taken out of the regressions to avoid collinearity.

Table 8 presents the results from the FGLS-estimations, Model 3a and 3b (without vote-differentiated shares) and Model 3a and 3b (with vote-differentiated shares). The estimations are made for ownership both in terms of votes and capital.
### Table 8. Cross-sectional time-series FGLS estimations; Model 3a firms with vote-differentiated shares, Model 3b firms without vote-differentiated shares

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Model 3a (votes)</th>
<th>Model 3b (Capital)</th>
<th>Model 3a (votes)</th>
<th>Model 3b (Capital)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(E_t)</td>
<td>0.0528*</td>
<td>0.0529*</td>
<td>0.0840*</td>
<td>0.0876*</td>
</tr>
<tr>
<td></td>
<td>(9.71)</td>
<td>(9.71)</td>
<td>(19.76)</td>
<td>(18.41)</td>
</tr>
<tr>
<td>(E_{t-1})</td>
<td>-0.0237**</td>
<td>-0.0235*</td>
<td>-0.0206*</td>
<td>-0.0215*</td>
</tr>
<tr>
<td></td>
<td>(-3.09)</td>
<td>(-3.07)</td>
<td>(-4.17)</td>
<td>(-2.58)</td>
</tr>
<tr>
<td>(E_{t-1})*(Inst)</td>
<td>-0.0013</td>
<td>-0.0012</td>
<td>0.0012**</td>
<td>-0.0015**</td>
</tr>
<tr>
<td></td>
<td>(-1.48)</td>
<td>(-1.57)</td>
<td>(2.35)</td>
<td>(-1.97)</td>
</tr>
<tr>
<td>(E_{t-1})*(Inst^2)</td>
<td>3.0e-05</td>
<td>3.2e-05</td>
<td>-9.15e-06</td>
<td>-2.9e-05</td>
</tr>
<tr>
<td></td>
<td>(1.52)</td>
<td>(1.60)</td>
<td>(-0.74)</td>
<td>(-1.60)</td>
</tr>
<tr>
<td>(Div_{t-1})</td>
<td>-0.0613***</td>
<td>-0.0598***</td>
<td>-0.2090*</td>
<td>-0.2282***</td>
</tr>
<tr>
<td></td>
<td>(-1.80)</td>
<td>(-1.75)</td>
<td>(-7.97)</td>
<td>(-7.80)</td>
</tr>
<tr>
<td>constant</td>
<td>2.9757*</td>
<td>2.9029*</td>
<td>8.7769*</td>
<td>9.9986*</td>
</tr>
<tr>
<td></td>
<td>(3.15)</td>
<td>(3.11)</td>
<td>(7.38)</td>
<td>(6.49)</td>
</tr>
</tbody>
</table>

Nr obs Model 4a = 443<sup>A</sup>
Nr groups Model 4a = 85
Nr obs Model 4b = 742<sup>B</sup>
Nr groups Model 4b = 116

<sup>A</sup> note: 2 obs dropped because only 1 obs in group. <sup>B</sup> note: 3 obs dropped because only 1 obs in group.

* denotes significance at the 1% level, ** denotes significance at 5%, *** denotes significance at the 10% level.

As can be seen from Table 8, comparing Model 3a<sup>i</sup> and 3b<sup>i</sup> with Model 3a<sup>ii</sup> and 3b<sup>ii</sup>, institutional ownership has a positive effect on dividend changes only if the firms have vote-differentiated shares. This means that firms that separate cash-flow rights from control rights suffer more from agency problems, and that institutional owners require these firms to pay higher dividends in order to reduce the free cash available for management. This result is in accordance with the predictions of the agency-theory (Rozeff, 1982; Easterbrook, 1984; Jensen, 1986; Eckbo and Verma 1994; Zeckhauser and Pound 1990). No significance is found with respect to the non-linear parameter \((E_{t-1})*\(Inst^2\)).

The coefficients on Earnings in period \(t\) \((E_t)\), and in period \(t-1\) \((E_{t-1})\) is also significant at the one percent level. Previous periods dividend payout...
(Div(t-1)) is again significant, both statistically and in real economic terms. This indicates that the firms only partially adjust the dividends to meet changed target dividend levels.

A key assumption which must hold if the FGLS method is to provide reliable estimates is that the errors are randomly distributed. Most likely, the errors are in fact correlated with the regressors, or in other words, there are individual firm effects. To test whether this is true, a fixed effects model which allows not only time effects but also individual firm effects is tested (Model 4 in Table 9). The Hausman test confirms that the suspicion of individual effects and the Hausman-H0 of non-correlated errors can be soundly rejected.

As the Hausman test confirms the existence of significant firm effects correlated to the regressors the Fixed-Effects estimation method is appropriate. Table 9 presents the results from this estimation with individual firm and time effects. Like before the estimation is made with ownership both in terms of votes (Model 4a) and capital (Model 4b).

**Table 9. Fixed-effects estimations; Model 4 institutional ownership (votes) and (capital)**

<table>
<thead>
<tr>
<th>Dependent Variable</th>
<th>Model 4a (votes)</th>
<th>Model 4b (Capital)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.1060*</td>
<td>0.1065*</td>
</tr>
<tr>
<td></td>
<td>(7.86)</td>
<td>(8.76)</td>
</tr>
<tr>
<td>E(t-1)</td>
<td>-0.1100*</td>
<td>-0.1320*</td>
</tr>
<tr>
<td></td>
<td>(-2.85)</td>
<td>(-2.34)</td>
</tr>
<tr>
<td>E(t-1)*Inst</td>
<td>0.0066*</td>
<td>0.0079**</td>
</tr>
<tr>
<td></td>
<td>(2.77)</td>
<td>(2.23)</td>
</tr>
<tr>
<td>E(t-1)*Inst2</td>
<td>-0.0002*</td>
<td>-0.0002*</td>
</tr>
<tr>
<td></td>
<td>(-2.69)</td>
<td>(-2.76)</td>
</tr>
<tr>
<td>E(t-1)*VoteDiff</td>
<td>0.0774*</td>
<td>0.0514*</td>
</tr>
<tr>
<td></td>
<td>(3.08)</td>
<td>(2.17)</td>
</tr>
<tr>
<td>Div(t-1)</td>
<td>-0.6094*</td>
<td>-0.5582*</td>
</tr>
<tr>
<td></td>
<td>(-2.96)</td>
<td>(-2.81)</td>
</tr>
<tr>
<td>Fixed effects significant?</td>
<td>Yes*</td>
<td>Yes*</td>
</tr>
</tbody>
</table>

Robust t-statistics, in parenthesis:* denotes significance at the 1% level, ** denotes significance at 5%, *** denotes significance at the 10% level.
The results of the Fixed-effects estimation in Table 9 are highly significant. The coefficient of earnings in period t ($E_t$) is significant and positive, and earnings in t-1 ($E_{t-1}$) is significant and negative. As expected there is a significant earnings component related to dividends. The coefficients related of dividends in previous period ($Div_{t-1}$) are likewise again significant and negative with respect to dividend change. Recall that this term represents the “speed of adjustment” of dividend changes. This result is in line with those of Sembenelli (1993) who also find that managers adjust more quickly when they have to reduce dividends than when they have to increase them. The results for the estimation with institutional ownership both in terms of votes and capital share are in fact remarkably stable with regards to the size of the coefficients. The elasticity of dividends with regards to changes in earnings is around 30 percent, which seems highly plausible. This demonstrates the robustness of the model formulation.

In both estimations vote-differentiated shares have a significantly positive effect on dividend changes. Again, this is an indication that investors demand higher dividends in firms which allow vote-differentiated shares. Hence hypothesis 1a, 1b, and 2 are corroborated.

As before, the sample of firms is separated into two groups depending on weather or not they have vote-differentiated shares. The interaction term made up of earnings and the dummy for vote-differentiation is taken out of the regressions, as it would produce collinearity. Table 10 provides the results for the Fixed-effects estimation with institutional ownership, when the sample of firms is divided in two groups depending on weather or not they have vote-differentiated shares (Model 4a' and 4b' and Model 4a'' and 4b'' respectively).
Table 10. Fixed-effects estimations; Model 4a firms without vote-differentiated shares, Model 4b firms with vote-differentiated shares

<table>
<thead>
<tr>
<th>Dependent Variable (Divt-Divt-1)</th>
<th>Model 4aI (votes)</th>
<th>Model 4bI (capital)</th>
<th>Model 4aII (votes)</th>
<th>Model 4bII (capital)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Et</td>
<td>0.1285* (3.73)</td>
<td>0.1285* (3.73)</td>
<td>0.0988* (6.79)</td>
<td>0.1011* (7.91)</td>
</tr>
<tr>
<td>E(t-1)</td>
<td>-0.0835*** (-1.71)</td>
<td>-0.0835*** (-1.71)</td>
<td>-0.0243 (-1.01)</td>
<td>-0.0737 (-1.44)</td>
</tr>
<tr>
<td>E(t-1)*Inst</td>
<td>0.0006 (-0.11)</td>
<td>-0.0006 (-0.11)</td>
<td>0.0069* (2.61)</td>
<td>0.0079** (1.98)</td>
</tr>
<tr>
<td>E(t-1)*Inst2</td>
<td>5.37e-06 (0.04)</td>
<td>5.38e-06 (0.04)</td>
<td>-0.0002** (-2.45)</td>
<td>-0.0002** (-2.35)</td>
</tr>
<tr>
<td>Div(t-1)</td>
<td>-0.4287*** (-1.68)</td>
<td>-0.4287*** (-1.68)</td>
<td>-0.6594* (-2.76)</td>
<td>-0.5920** (-2.61)</td>
</tr>
<tr>
<td>Fixed effects significant?</td>
<td>Yes*</td>
<td>Yes*</td>
<td>Yes**</td>
<td>Yes**</td>
</tr>
</tbody>
</table>

Nr obs Model 4a=445
Nr groups Model 4a=87
R² within=0.6961
R² between=0.5934
R² overall=0.0827

Nr obs Model 4b=745
Nr groups Model 4b=119
R² within=0.4990
R² between=0.3745
R² overall=0.1902

Robust t-statistics in parenthesis. * denotes significance at the 1% level, ** denotes significance at 5%, and *** denotes significance at the 10% level.

Looking at the results in Table 10, there is as expected a positive but non-linear relation between institutional ownership and dividend changes if the firm have a vote-differentiated share structure (Model 4aII and 4bII). Based on the arguments of Miguel et al., (2004) and the discussion about institutional owners’ incentives hypothesis (1b) of non-linearity between institutional ownership and dividend behaviour was formulated. To control for this eventual non-linearity additional interaction terms of squared institutional ownership is added. A cubic specification of the model has been tested but yields no significant results.
confirms hypotheses 1a and 1b of a positive and diminishing effect of institutional ownership on dividend changes, both for ownership in terms of votes (Model 4a\textsuperscript{i}) and capital (Model 4b\textsuperscript{i}). For large investors in general, Morck et al., (1988) find that profitability is higher for firms with shareholders that have up to 5 percent ownership stakes, beyond that, profitability drops (see section 2 for further discussion).

As the sample is divided between firms with vote-differentiated shares (Model 4a\textsuperscript{i} and 4b\textsuperscript{i}) and firms without (Model 4a\textsuperscript{ii} and 4b\textsuperscript{ii}), the estimated parameter on previous period’s earnings loses its significance in the group of firms that have vote-differentiated shares (Model 4a\textsuperscript{i} and 4b\textsuperscript{i}).

The results for all the estimations are remarkably robust in terms of the sign and size of the coefficients. The pooled OLS results strongly support the results in the FGLS estimation. However, as there are significant individual firm effects the fixed-effects method is more appropriate, although the FGLS results point in the same direction. Furthermore the use of institutional ownership measured continuously and not simply by dummy variables related to fixed levels of ownership percentages provides a more thorough understanding of the non-linear relationship between ownership and dividend policies.

As much of the analysis is based on reported earnings, the usual caveats related to accounting figures apply. Ownership, however, is a very stable variable over time, even though institutional ownership belongs to the category of ownership that is perhaps most volatile. This and the inclusion of time and firm effects in the estimation give a good indication of the robustness in the results. All estimations have also been made with total payout\textsuperscript{13}. These results, although limited by the small number of firms involved in share repurchases in the sample, support the estimated results for dividends.

6. CONCLUSIONS

This paper investigates the relationship between institutional ownership and dividends. To test this relationship a version of the so called earnings trend model is utilized, with the inclusion of interaction terms made up of institutional ownership. Using a panel data methodology which accounts for firm-specific effects and time effects, unobservable heterogeneity is controlled for. Furthermore the relationship is tested by extending the

\textsuperscript{13} For the case of brevity these results are available from the author upon request.
investigation into a non-linear setting in which incentives, monitoring and agency-cost effects can be more accurately accounted for.

The results clearly show that institutional ownership, both in terms of votes and capital, where these two are separated, has a positive effect on dividend payout policies. So even if high desired levels of dividends can be seen as a sign of “short-termism” (Hutton, 1995 and Haskins, 1995), it might just as well be an effect of these owners’ attempts to reduce the free cash-flow available to management as argued by Jensen (1986). Institutional owners might thus serve a monitoring role, and in doing so mitigate the problems associated with the separation of ownership and control in listed firms. The relation is found to be positive but diminishing which supports previous research concerning the relation between dividends and ownership structure. The use of a comprehensive database covering institutional ownership continuously allowed for this additional test and also the rejection of other functional forms of the ownership-dividend relationship. Furthermore and in line with expectations, earnings have a positive impact on dividend changes.

By examining Swedish listed firms the paper also provides empirical evidence on the effects of control instruments such as dual-class shares on dividends policies. The result, in line with agency-cost theory, is that control instruments such as vote-differentiated shares, induce investors to demand higher payout-ratios as compensation for the increased agency-costs. This means that firms using this type of control instrument suffer more form subsequent agency-problems.
REFERENCES


Institutional Ownership and Dividends


### APPENDIX A

Table A1. Correlation matrix pairwise correlation

<table>
<thead>
<tr>
<th>Variable</th>
<th>Div</th>
<th>ΔDiv</th>
<th>Prstkc</th>
<th>TP1</th>
<th>ΔTP</th>
<th>E1</th>
<th>ΔE</th>
<th>C1</th>
<th>V1</th>
<th>C5</th>
</tr>
</thead>
<tbody>
<tr>
<td>Div</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔDiv</td>
<td>0.518*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Prstkc</td>
<td>0.152*</td>
<td>0.032</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TP1</td>
<td>0.936*</td>
<td>0.450*</td>
<td>0.490*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔTP</td>
<td>0.508</td>
<td>1.000*</td>
<td>0.032</td>
<td>0.460*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E1</td>
<td>0.778*</td>
<td>0.107*</td>
<td>0.216*</td>
<td>0.763*</td>
<td>0.481*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔE</td>
<td>0.197*</td>
<td>0.112*</td>
<td>0.066*</td>
<td>0.197*</td>
<td>0.518*</td>
<td>0.470*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C1</td>
<td>-0.021</td>
<td>0.007</td>
<td>-0.064*</td>
<td>-0.042</td>
<td>0.010</td>
<td>-0.050</td>
<td>0.018</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>V1</td>
<td>0.034</td>
<td>-0.033</td>
<td>-0.067*</td>
<td>0.006</td>
<td>0.010</td>
<td>-0.009</td>
<td>-0.017</td>
<td>0.780*</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>C5</td>
<td>-0.092*</td>
<td>-0.013</td>
<td>-0.083*</td>
<td>-0.111*</td>
<td>-0.037</td>
<td>-0.114*</td>
<td>-0.063*</td>
<td>0.792*</td>
<td>0.660*</td>
<td>1.000</td>
</tr>
<tr>
<td>V5</td>
<td>0.029</td>
<td>-0.028</td>
<td>-0.079*</td>
<td>-0.002</td>
<td>-0.011</td>
<td>0.017</td>
<td>0.029</td>
<td>0.636*</td>
<td>0.823*</td>
<td>0.789*</td>
</tr>
<tr>
<td>FC</td>
<td>0.192*</td>
<td>-0.001</td>
<td>0.072*</td>
<td>0.195*</td>
<td>0.060*</td>
<td>0.191*</td>
<td>0.048</td>
<td>-0.212*</td>
<td>-0.207*</td>
<td>-0.219*</td>
</tr>
<tr>
<td>FV</td>
<td>0.062*</td>
<td>0.018</td>
<td>0.044</td>
<td>0.070*</td>
<td>0.043</td>
<td>0.095*</td>
<td>0.047</td>
<td>-0.151*</td>
<td>-0.269*</td>
<td>-0.145*</td>
</tr>
<tr>
<td>IC</td>
<td>0.203*</td>
<td>0.042</td>
<td>0.103*</td>
<td>0.216*</td>
<td>0.056</td>
<td>0.180*</td>
<td>0.029</td>
<td>-0.216*</td>
<td>-0.163*</td>
<td>0.197*</td>
</tr>
<tr>
<td>IV</td>
<td>0.209*</td>
<td>0.040</td>
<td>0.151*</td>
<td>0.238*</td>
<td>0.056</td>
<td>0.192*</td>
<td>0.019</td>
<td>-0.242*</td>
<td>-0.328*</td>
<td>-0.239*</td>
</tr>
<tr>
<td>VotDiff</td>
<td>0.128*</td>
<td>-0.016</td>
<td>0.045</td>
<td>0.129*</td>
<td>0.026</td>
<td>0.111*</td>
<td>0.013</td>
<td>0.086*</td>
<td>0.473*</td>
<td>0.130*</td>
</tr>
<tr>
<td>Sales</td>
<td>0.734*</td>
<td>0.027</td>
<td>0.176*</td>
<td>0.710*</td>
<td>0.150*</td>
<td>0.541*</td>
<td>-0.015</td>
<td>0.115*</td>
<td>-0.010</td>
<td>-0.157*</td>
</tr>
<tr>
<td>Emp</td>
<td>0.523*</td>
<td>0.113*</td>
<td>0.117*</td>
<td>0.503*</td>
<td>0.113*</td>
<td>0.433*</td>
<td>0.022</td>
<td>-0.139*</td>
<td>-0.014</td>
<td>-0.143*</td>
</tr>
<tr>
<td>R&amp;D</td>
<td>0.409*</td>
<td>0.022</td>
<td>0.060*</td>
<td>0.382*</td>
<td>0.022</td>
<td>0.175*</td>
<td>-0.110*</td>
<td>-0.119*</td>
<td>-0.004</td>
<td>-0.134*</td>
</tr>
<tr>
<td>WCap</td>
<td>0.579*</td>
<td>0.149*</td>
<td>0.128*</td>
<td>0.556*</td>
<td>0.149*</td>
<td>0.356*</td>
<td>0.055</td>
<td>-0.133*</td>
<td>-0.015</td>
<td>-0.171*</td>
</tr>
</tbody>
</table>
Table A1. continued…

<table>
<thead>
<tr>
<th>Variable</th>
<th>V5N</th>
<th>FC</th>
<th>FV</th>
<th>IC</th>
<th>IV</th>
<th>VotDiff</th>
<th>Sales</th>
<th>Emp</th>
<th>R&amp;D-exp</th>
<th>WCap</th>
</tr>
</thead>
<tbody>
<tr>
<td>Divn</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔDiv</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>PrstkC</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>TPay5</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔTP</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>E₁</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>ΔE</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C₁</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V₁</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>C₅</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>V₅</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FC</td>
<td>-0.208*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>FV</td>
<td>-0.268*</td>
<td>0.920*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IC</td>
<td>-0.152*</td>
<td>-0.001*</td>
<td>-0.011</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IV</td>
<td>-0.321*</td>
<td>0.058*</td>
<td>0.064*</td>
<td>0.899*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>VotDiff</td>
<td>0.520*</td>
<td>-0.080*</td>
<td>-0.182*</td>
<td>0.005</td>
<td>-0.203*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Sales</td>
<td>0.039</td>
<td>0.245*</td>
<td>0.050</td>
<td>0.184*</td>
<td>0.208*</td>
<td>0.164*</td>
<td>1.000</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Emp</td>
<td>0.034</td>
<td>0.295*</td>
<td>0.108*</td>
<td>0.158*</td>
<td>0.154*</td>
<td>0.166*</td>
<td>0.743*</td>
<td>1.000</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D</td>
<td>0.075*</td>
<td>0.164*</td>
<td>-0.031</td>
<td>0.027</td>
<td>0.033</td>
<td>0.083*</td>
<td>0.668*</td>
<td>0.395*</td>
<td>1.000</td>
<td></td>
</tr>
<tr>
<td>WCap</td>
<td>0.045</td>
<td>0.204*</td>
<td>-0.003</td>
<td>0.097</td>
<td>0.117*</td>
<td>0.126*</td>
<td>0.790*</td>
<td>0.500*</td>
<td>0.902*</td>
<td>1.000</td>
</tr>
</tbody>
</table>

*Correlation coefficient significant at the 5% level
Chapter V

PERSISTENCE OF PROFITS AND THE SYSTEMATIC SEARCH FOR KNOWLEDGE - R&D AND PROFITS ABOVE THE NORM

Daniel Wiberg

Abstract
Economic theory tells us that abnormal industry and firm profits will not persist for any length of time. Any industry or firm making profits in excess of the normal rate of return will attract entrants and this competitive process will erode profits. A substantial amount of research however, has found evidence of persistent profits above the norm. Barriers to entry and exit are often put forward as explanation to this anomaly. In the absence of, or with low barriers to entry and exit, this reasoning provides little help in explaining why these above-norm profits arise and persist.

In this paper the association between profits and the systematic search for knowledge is investigated. The results show that by investing in research and development firms may succeed in creating products or services that are preferred by the market and/or find a more cost efficient method of production. Corporations that systematically invest in research and development are, by doing so, offsetting the erosion of profits and thereby have profits which persistently diverge from the competitive return. It is argued that even in the absence of significant barriers to entry and exit profits may persist. This can be accredited to a systematic search for knowledge through research and development.

JEL classification: L00 L22 L25 L4 O32
Keywords: Persistence of profits, research and development, industrial organization.

---

An earlier version of this paper is published in the Icfai Journal of Managerial Economics, Volume 6, Number 2, May 2008, pp. 40-53. The author would like to thank Sparbankernas Forskningsstiftelse for their financial support. Furthermore a research grant from the Centre of Excellence for Science and Innovation Studies (CESIS) is gratefully acknowledged. I am also grateful for rewarding comments from Dennis C. Mueller, Kingsley E. Haynes and participants in the Uddevalla Symposium 2006, and an anonymous referee.

Affiliations: Jönköping International Business School (JIBS), and Centre of Excellence for Science and Innovation Studies (CESIS), Royal Institute of Technology, Stockholm.
1. INTRODUCTION

In a competitive milieu abnormal firm and industry profits will not persist for any length of time. Any firm or industry making profits in excess of the normal rate of return will attract entrants and this competitive process will erode profits.

If firms are persistently making profits that deviate from the competitive, normal return, it implies a continuous misallocation of resources (Mueller, 1977). One would expect any economic activity that yields excess profits or is unprofitable to stimulate either entry or exit. This dynamic process will eventually restore profits to a normal level. However this does not explain why some firms’ profits persist nor does it explain how these profits arise in the first place.

One set of explanations are of course various types of entry and exit barriers as suggested in the industrial economics literature. Another explanation for abnormal returns, even in a competitive environment, might be varying levels of innovation efforts made by the firms. By investing in research and development (R&D) firms may succeed in creating products or services that are preferred by the market, or find a more cost efficient method of production. This lies at the very core of what Joseph Schumpeter means by creative destruction and “the fundamental phenomenon of economic development” (Schumpeter, 1911, 1934 and 1950). Basically, the competitive process that drives economic development is fueled and propelled by the quest for profits1.

The purpose of this paper is therefore to investigate the links between the systematic search for knowledge, through R&D efforts, and the persistence of profits. It is argued that even in the absence of significant barriers to entry and exit, profits may persist, and this can be accredited to the systematic search for knowledge through R&D.

The rest of the paper is outlined as follows. Section 2 provides an overview of previous studies related to the persistence of profits issue. Section 3 discusses the nature and convergence of profits. From this discussion, hypotheses regarding R&D efforts and the persistence of profits are formulated followed by a description of the data used. The methodology is described in section 4, followed by empirical results and analysis in section 5. Concluding remarks end the paper in section 6.

---

1 This is often referred to as the profit motive.
2. PREVIOUS STUDIES

Within industrial organization there is a large body of research on the determinants of profits. However, most studies are static and rely on cross-sectional analysis. Usually these models are structured in a way that a vector of various estimated parameters, explains the present level of profits within industries, as illustrated in equation (1):

\[ \Pi_i x_i + \mu_i = \beta \]

Here, the equilibrium level of profits \( \Pi \) of some firm \( i \) (or average level of profits for some industry \( i \)) is explained by a vector \( x \) of explanatory variables (such as, patents, market share, industry concentration, etc.) with associated unknown parameters \( \beta \). In this formulation \( \mu_i \) is an error term with the standard properties.

Although this is a very common way of formulating these kinds of cross-sectional studies, two major problems arise due to the neglect of market dynamics (Mueller, 1990). First, even though equation (1) intends to describe long run equilibrium, the data used in estimation of the model may not have been generated from a long run equilibrium relationship. This discrepancy between theory and data can, if not controlled for, generate biased estimates of the unknown parameters, which in turn leads to incorrect conclusions.2

A second reason why cross-sectional studies are inappropriate, especially when antitrust policies are designed, is that the data might not have been generated from long run equilibrium (Geroski, 1990). Using the results from static, cross sectional models to recommend intervention policies may consequently be misleading since this effect may already be occurring. Markets have intrinsic error correction mechanisms that eliminate excess profits, and the alternative to policy action is therefore to allow competition from entry and intra-industry mobility to erode the monopolistic profits that high concentration apparently induces (Geroski, 1990).

In other words, static structure-performance models must comprise considerations of both long-run equilibrium configurations and the systematic motion around them that is induced by market forces. This automatically creates a need to extend cross-sectional empirical analysis towards including a time series dimension (Geroski, 1990).

---

2 For extended discussion see Appendix A.
In contrast to the static structure-performance literature there is a relatively small but growing literature that empirically looks into the dynamics of profits from a time series perspective. This branch of research was initiated by a number of studies made by Mueller (1977, 1986, 1990) and Geroski and Jacquemin (1988). Most of the studies make use of some type of autoregressive formulation of the time path of profits, and use accounting measures of profits. The findings from these time series studies differ a great deal from the cross-sectional studies.

Using a sample of nearly 600 US firms for the period 1950 to 1972, Mueller (1990) finds that firms tend to converge to the industry-average profit rate, but that the convergence process is incomplete. Geroski and Jacquemin (1988) investigate a sample of 134 large German, French and British firms. Their results show that the British firms have less variation in profits and that these profits persist over time. The German and French firms on the contrary have larger variation in profits and also tend to converge more quickly to the industry-average profit rate. Schwalbach, Graßhoff and Mahmood (1988) also find support for profit convergence in German firms. In a similar study, using a sample of 241 American firms over a 20 year period, Jacobsen (1988) finds that industry concentration has no significant effect on the level of profitability. Jacobsen also observes that the abnormal profit rates vanish over time.

Connolly and Schwartz (1985) find an asymmetry in the convergence process between firms, where less successful firms (below industry average profitability), converge to the competitive return, whilst more profitable firms (above industry average profitability) show more persistent returns.

In a study of particular interest to this paper, Waring (1996) examines industry aggregates for some 12,000 American firms over a 20 year period. Waring finds that the convergence process is industry specific and that industry specificity, such as R&D, has a significant impact on the speed of convergence. In consequence R&D investments appear to have a direct relation to the persistence of profits. The profit dynamics seem to differ however depending on whether one looks at industry aggregates or at firm level returns. This is also supported by the findings in a more recent study by Bentzen et al. (2005). Studying a sample of Danish firms there results show that, in contrast to firm, industry aggregate returns display persistence.

Focusing on heterogeneity within industries Caves and Porter (1977) have, by stressing the importance of barriers to intra-industry mobility, pointed out the possibility of observing persistent profitability differences between firms in the same industry. This observation (see also Scott and Pascoe, 1986)
is enough to raise the suspicion that the fortunes of various firms in particular industries may diverge from each other considerably, and this in turn leads to the suspicion that the intra-industry variation in excess profits (or in the time paths of excess profits) may be more interesting to examine than between-industry variations in profitability.

A summery of previous studies and their average estimated convergence parameters ($\lambda$) is provided in Table 1. As can be seen from Table 1 few previous studies have looked at the persistence of profitability in relation to R&D investments.
<table>
<thead>
<tr>
<th>Authors</th>
<th>Country</th>
<th>Period</th>
<th>No.</th>
<th>No. firms</th>
<th>Average λ</th>
<th>R&amp;D effect on persistence</th>
</tr>
</thead>
<tbody>
<tr>
<td>Glen, Lee and Singh (2001)</td>
<td>Brazil</td>
<td>1985-95</td>
<td>11</td>
<td>56</td>
<td>0.013</td>
<td>n.a.</td>
</tr>
<tr>
<td></td>
<td>India</td>
<td>1982-92</td>
<td>11</td>
<td>40</td>
<td>0.229</td>
<td>n.a.</td>
</tr>
<tr>
<td></td>
<td>Jordan</td>
<td>1980-94</td>
<td>15</td>
<td>17</td>
<td>0.348</td>
<td>n.a.</td>
</tr>
<tr>
<td></td>
<td>Korea</td>
<td>1980-94</td>
<td>15</td>
<td>82</td>
<td>0.323</td>
<td>n.a.</td>
</tr>
<tr>
<td></td>
<td>Malaysia</td>
<td>1983-94</td>
<td>12</td>
<td>62</td>
<td>0.349</td>
<td>n.a.</td>
</tr>
<tr>
<td></td>
<td>Mexico</td>
<td>1984-94</td>
<td>11</td>
<td>39</td>
<td>0.222</td>
<td>n.a.</td>
</tr>
<tr>
<td></td>
<td>Zimbabwe</td>
<td>1980-94</td>
<td>15</td>
<td>40</td>
<td>0.421</td>
<td>n.a.</td>
</tr>
<tr>
<td>Waring (1996)</td>
<td>US</td>
<td>1970-89</td>
<td>20</td>
<td>12,986</td>
<td>0.540</td>
<td>yes*</td>
</tr>
<tr>
<td>Schohl (1990)</td>
<td>Germany</td>
<td>1961-81</td>
<td>21</td>
<td>283</td>
<td>0.509</td>
<td>n.a.</td>
</tr>
<tr>
<td>Odagiri and Yamawaki (1990)</td>
<td>Japan</td>
<td>1964-82</td>
<td>19</td>
<td>376</td>
<td>0.465</td>
<td>yes**</td>
</tr>
<tr>
<td>Cubbin and Geroski (1990)</td>
<td>UK</td>
<td>1948-77</td>
<td>30</td>
<td>243</td>
<td>0.482</td>
<td>n.a.</td>
</tr>
<tr>
<td>Mueller (1990)</td>
<td>US</td>
<td>1950-72</td>
<td>23</td>
<td>551</td>
<td>0.183</td>
<td>yes***</td>
</tr>
<tr>
<td>Schwalbach et al. (1989)</td>
<td>Germany</td>
<td>1961-82</td>
<td>22</td>
<td>299</td>
<td>0.485</td>
<td>n.a.</td>
</tr>
<tr>
<td>Yamawaki (1989)</td>
<td>Japan</td>
<td>1964-82</td>
<td>19</td>
<td>376</td>
<td>0.486</td>
<td>yes</td>
</tr>
<tr>
<td></td>
<td>US</td>
<td>1964-82</td>
<td>19</td>
<td>413</td>
<td>0.475</td>
<td>yes</td>
</tr>
<tr>
<td>Geroski and Jacquemin (1988)</td>
<td>UK</td>
<td>1947-77</td>
<td>29</td>
<td>51</td>
<td>0.488</td>
<td>n.a.</td>
</tr>
<tr>
<td></td>
<td>France</td>
<td>1965-82</td>
<td>18</td>
<td>55</td>
<td>0.412</td>
<td>n.a.</td>
</tr>
<tr>
<td></td>
<td>Germany</td>
<td>1961-81</td>
<td>21</td>
<td>28</td>
<td>0.410</td>
<td>n.a.</td>
</tr>
</tbody>
</table>

*Finds indirect positive effects of R&D intensity through market share, ** Not firms specific R&D, but R&D-intensity on industry level, ***R&D measured as patenting intensity.
3. THE COMPETITIVE PROCESS AND PROFIT CONVERGENCE

Microeconomic theory predicts that the dynamic process of competition will restore profits to a normal return. This is mainly achieved through entry and exit. From this point of view profits in excess of the opportunity cost of capital are nothing more than a transitory disequilibrium phenomenon. In a stylized manner this process can be illustrated as in Figure 1; profits above (under) the long-run equilibrium imply entry (exit)\(^3\).

![Figure 1. Process of profit convergence (source: Schwalbach et al. (1989)](image)

As time progresses, firms’ profits will move towards the equilibrium profit level, that is the industry average. Depending then on the firm structure in a particular industry this convergence process will take a certain amount of time, if it converges at all. Using time-series analysis, it is thus possible to measure if firms converge towards a common industry average, and also at what speed this adjustment process takes place. As previously mentioned, it might even be the case that certain firms maintain profits above the industry average even in the absence of significant barriers to entry and exit. One reason for this might be the sustained investments in R&D. For firms and

\(^3\) As Mueller (2003) points out it is presumably enough with the threat of entry for incumbent firms to lower prices and subsequently move above-norm profits down to the industry average or norm.
industries signified by little or no R&D, the opposite case may be true, i.e. persistent profitability below the industry average.

3.1 Measuring Persistent Profitability

In order to capture the long-run dynamics of a firm’s profitability a decomposition of the firm’s profits is necessary. Mueller (1986, 1990) has suggested that profits ($\Pi$) can be decomposed in the following way:\footnote{Several alternative formulations have been suggested. Waring (1996) has for example suggested that the transitory rent should be decomposed into industry rent and firm specific rent.}

\begin{equation}
\Pi_{j,t} = c + r_j + s_{j,t}
\end{equation}

Where $\Pi_{j,t}$ is the profit for firm $j$ at time $t$, $c$ is the normal competitive return, $r_j$ is a firm specific permanent rent for firm $j$, e.g. a premium for risk, and $s_{j,t}$ is a transitory rent. In the long-run the equilibrium profit will be equal to the competitive return ($\Pi_{j,t} = c$), for a firm working in a competitive market. Hereafter this long-run equilibrium return, of any firm $j$, is referred to as $\Pi^*_j$. The transitory component $s_{j,t}$ is assumed to decline in the following way:\footnote{Most studies on the persistence of profit find that the $\lambda$-parameter is in the region of 0.5 (Mueller (2003)).}

\begin{equation}
s_{j,t} = \lambda_j s_{j,t-1}
\end{equation}

The $\lambda$-parameter shows the speed of the profit decay. Assuming that $-1 \leq \lambda \leq 1$ profits will converge to the equilibrium rate of return as time passes.\footnote{} By substitution this gives the following first-order autoregressive function:

\begin{equation}
\Pi_{j,t} = (c + r_j)(1 - \lambda_j) + \lambda_j \Pi_{j,t-1}
\end{equation}

This reduces to the following empirically testable model:

\begin{equation}
\Pi_{j,t} = \alpha_j + \lambda_j \Pi_{j,t-1} + \epsilon_{j,t}
\end{equation}

Where $\alpha_j \equiv c + r_j \equiv \Pi^*_j$, and $\epsilon_{j,t}$ is an error term. The long-run projected profits of firm $j$, $\Pi^*_j$, can then be derived and estimated as:
3.2 R&D and the Persistence of Profits

The way patents provide an opportunity for monopoly profits and thereby also create incentives for innovative effort, is a good example of how R&D-efforts may bring about abnormal profit rates in firms. It is very likely however, that a lot of firms actively engage in product-R&D without ever applying for a patent. Therefore, this study will concentrate on profitability and reported R&D investments per se. Subsequently we are not forced to make any assumptions regarding measurements of profitable innovations, productivity, innovation-output, etc.

In “The Theory of Economic Development” Schumpeter (1934) argued and emphasized the entrepreneur as the actor who introduces radical innovations and thereby drive economic development. In this view profits are created by the innovations made by the entrepreneurs, which in turn attract imitators. Later, in “Capitalism, Socialism and Democracy”, Schumpeter (1950) argued that the role of the entrepreneurs to some extent had been replaced by routinely innovative efforts by the rise of modern large corporations. In fact, Schumpeter (1950) asserts that large corporations have standardized/routinized the search for knowledge and that this in itself is an important innovation characterizing the modern large corporations.

R&D may thus slow down the decay of profits towards the normal return. Radical innovations or sustained innovative activity, such as R&D, might then lead to a divergence of profit levels. The successfully innovating firms get a return above the industry average, and less successful firms fall behind.

From this reasoning we form three testable hypotheses. Hypothesis one, the competitive process erodes profits and causes them to converge towards a normal level. Hypothesis two and three, deal with relative R&D intense

$$\pi^j = \frac{\alpha_j}{1 - \lambda_j}.$$
firms and their profitability. As mentioned before it is likely that sustained 
R&D investments above average bring about persistent above average 
profitability levels, on both firm and industry level. Hypothesis two 
therefore is that there is persistence in R&D expenditures. Hypothesis three 
is that R&D intensive firms will have a positive effect on profits and that the 
convergence to normal profits will be slower.

3.3 Data and Method

The data used in the regressions is provided by the Bureau van Dijk OSIRIS-
database. From the database 293 large European firms were collected, for 
which data was available for a 21 year period between 1984 until 2004. The 
sample is homogenous in the sense that all firms are listed and multinational 
with a substantial market share in their respective industries. The reason for 
choosing large firms is that they systematically report on and invest in 
R&D[6].

Since this type of studies require long time series it puts a restriction on 
the number of firms that are possible to include in the sample. A larger 
sample of firms comes at a cost of shorter time series. Nevertheless, the 
sample covers firms in 44 (two-digit SIC-code) industries spanning over 14 
European countries[7]. As a measure of profits we use return on total assets 
before taxes[8]. More specifically the profit considered is the return on assets 
around the sample mean. This methodology was previously applied by 
Waring (1996) in a study which combines time series estimates of the 
persistence of industry and firm profits with a cross-sectional study of the 
determinants of above norm profitability. As a proxy for innovative effort 
we use reported R&D expenditures.

In order to remove business cycle effects from the profit data the profit 
measure is defined as:

$$\Pi_{j,t} = \Pi_{j,t} - \frac{\sum_{j=1}^{n} \Pi_{j,t}}{n}$$

[6] The sample firms are included regardless of the extent of their merger activity and thus 
include many firms with radically different product structures in 2004 than they possessed in 
1984.

[7] The countries are: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, 
Netherlands, Norway, Spain, Sweden, Switzerland, and the United Kingdom.

[8] The use of return on total assets before tax mitigates problems related to country bias due to 
differences in tax structure.
Persistence of Profits and the Systematic Search for Knowledge

Where $\Pi_{j,t}$ profit for firm $j$ at time $t$ and $n$ is the number of firms. In other words the term $\Pi_{j,t}$ measures firm $j$’s profit deviation from the sample mean. This means that profit is measured as the deviation from the overall sample mean$^9$. The dependent variable in the structural equation should consequently be nearly free of cyclical influences. If firm specific effects are important, then it is in explaining differences in permanent rents that one is most likely to observe them. Furthermore the reported R&D expenditures are normalized by dividing them with gross sales in order to reduce heteroscedasticity.

Among all firms in our sample 28 percent reported to have made investments in R&D in 2004$^{10}$, and the average R&D to Sales ratio was about 4 percent, see descriptive statistics in Table 2.

---

$^9$ To see why profit persistence is a relative term; see e.g. Jacobsen (1988).

$^{10}$ There might be an element of selection bias related to the firms reporting R&D. This bias is however expected to be small or even negligible due to the homogenous set of firms in the sample.
Table 2. Descriptive statistics of R&D-expenditures

<table>
<thead>
<tr>
<th>Year</th>
<th>R&amp;D/Sales(^a)</th>
<th>Nr of firms reporting R&amp;D investments</th>
<th>Share of firms reporting R&amp;D investments</th>
<th>All firm R&amp;D/Sales</th>
</tr>
</thead>
<tbody>
<tr>
<td>2004</td>
<td>0.039</td>
<td>81</td>
<td>0.276</td>
<td>0.011</td>
</tr>
<tr>
<td>2003</td>
<td>0.038</td>
<td>87</td>
<td>0.297</td>
<td>0.011</td>
</tr>
<tr>
<td>2002</td>
<td>0.037</td>
<td>85</td>
<td>0.290</td>
<td>0.011</td>
</tr>
<tr>
<td>2001</td>
<td>0.036</td>
<td>76</td>
<td>0.259</td>
<td>0.009</td>
</tr>
<tr>
<td>2000</td>
<td>0.039</td>
<td>67</td>
<td>0.229</td>
<td>0.009</td>
</tr>
<tr>
<td>1999</td>
<td>0.040</td>
<td>62</td>
<td>0.212</td>
<td>0.008</td>
</tr>
<tr>
<td>1998</td>
<td>0.038</td>
<td>67</td>
<td>0.229</td>
<td>0.009</td>
</tr>
<tr>
<td>1997</td>
<td>0.036</td>
<td>71</td>
<td>0.242</td>
<td>0.009</td>
</tr>
<tr>
<td>1996</td>
<td>0.039</td>
<td>65</td>
<td>0.222</td>
<td>0.009</td>
</tr>
<tr>
<td>1995</td>
<td>0.037</td>
<td>66</td>
<td>0.225</td>
<td>0.008</td>
</tr>
<tr>
<td>1994</td>
<td>0.040</td>
<td>70</td>
<td>0.229</td>
<td>0.009</td>
</tr>
<tr>
<td>1993</td>
<td>0.043</td>
<td>66</td>
<td>0.225</td>
<td>0.010</td>
</tr>
<tr>
<td>1992</td>
<td>0.043</td>
<td>59</td>
<td>0.201</td>
<td>0.009</td>
</tr>
<tr>
<td>1991</td>
<td>0.046</td>
<td>57</td>
<td>0.195</td>
<td>0.009</td>
</tr>
<tr>
<td>1990</td>
<td>0.043</td>
<td>57</td>
<td>0.195</td>
<td>0.008</td>
</tr>
<tr>
<td>1989</td>
<td>0.038</td>
<td>56</td>
<td>0.191</td>
<td>0.007</td>
</tr>
<tr>
<td>1988</td>
<td>0.039</td>
<td>46</td>
<td>0.157</td>
<td>0.006</td>
</tr>
<tr>
<td>1987</td>
<td>0.038</td>
<td>27</td>
<td>0.092</td>
<td>0.003</td>
</tr>
<tr>
<td>1986</td>
<td>0.027</td>
<td>10</td>
<td>0.034</td>
<td>0.001</td>
</tr>
<tr>
<td>1985</td>
<td>0.025</td>
<td>10</td>
<td>0.034</td>
<td>0.001</td>
</tr>
<tr>
<td>1984</td>
<td>0.023</td>
<td>4</td>
<td>0.014</td>
<td>0.000</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>0.037</strong></td>
<td><strong>57</strong></td>
<td><strong>0.193</strong></td>
<td><strong>0.007</strong></td>
</tr>
</tbody>
</table>

\(^a\) Average R&D to sales ratio.

Requiring that the firms provided data for each of the 21 years implies that the sample is a collection of survivors. The sample firms are by definition more successful than other firms over the 21 year period, substantial differences within the sample may however subsist.
4. RESULTS AND ANALYSIS

Separate regressions for the 293 firms were estimated following equation (5)$^{11}$. For each firm there are 21 annual observations. The results are summarized and reported for seven subgroups in Table 3. The seven groups have been constructed by ranking the firms by their 1984 profit rates.

In column (1) of Table 3 the estimated absolute deviation of each group from the average equilibrium profit rate is reported. Column (2) shows the average convergence parameters for each group. Column (3) display the group average profit 1984 and column (4) the number of firms in each group. Column (5) represents the number of firms in each group who suffer from autocorrelation according to the Breusch-Godfrey test:

Table 3. Estimates of profit dynamics and the speed of adjustment

<table>
<thead>
<tr>
<th>Groups</th>
<th>(1) $\hat{\Pi}_j^*$ (a)</th>
<th>(2) $\hat{\lambda}_j$</th>
<th>(3) $\bar{\Pi}_{1984}$</th>
<th>(4) No. of firms</th>
<th>(5) Autocorrelation (b)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>4.900</td>
<td>0.543</td>
<td>13.404</td>
<td>42</td>
<td>1</td>
</tr>
<tr>
<td>2</td>
<td>3.452</td>
<td>0.544</td>
<td>4.815</td>
<td>42</td>
<td>2</td>
</tr>
<tr>
<td>3</td>
<td>1.686</td>
<td>0.468</td>
<td>1.022</td>
<td>42</td>
<td>0</td>
</tr>
<tr>
<td>4</td>
<td>-1.007</td>
<td>0.378</td>
<td>-1.565</td>
<td>42</td>
<td>1</td>
</tr>
<tr>
<td>5</td>
<td>-2.500</td>
<td>0.439</td>
<td>-3.711</td>
<td>42</td>
<td>3</td>
</tr>
<tr>
<td>6</td>
<td>-1.802</td>
<td>0.505</td>
<td>-5.581</td>
<td>42</td>
<td>2</td>
</tr>
<tr>
<td>7</td>
<td>-2.837</td>
<td>0.446</td>
<td>-8.588</td>
<td>41</td>
<td>1</td>
</tr>
</tbody>
</table>

a) Average absolute deviation from sample mean: $\hat{\Pi}_j^* = \hat{\alpha}_j / (1 - \hat{\lambda}_j)$.

b) Breusch-Godfrey test indicating autocorrelation at the 5% significance level.

The average convergence parameter, $\hat{\lambda}_j$, is calculated to be 0.475, which is in line with previous studies. This means that profits are reduced each year by $1 - \hat{\lambda}_j$, and that on average 0.525 percent of the firms' profit “difference” had disappeared by the second year. This implies that profits do converge towards the average profit rate, but the convergence process is incomplete.

$^{11}$ Equation (5) can be interpreted as a restricted version of a general finite distributed lag model. It is thus important to determine the appropriate lag length on the profit coefficient. Testing different lag lengths Yurtoglu (2004) show the superiority of a first order autoregressive model formulation. Consequently, only the estimated parameters of a first-order model are reported in this paper.
Both firms with high initial profits and firms with relatively low initial profits converge. However, the process is partial and the estimated equilibrium profit rates for each of the seven groups deviates from the average returns. For example, group 1 with the highest initial profit rates in 1984 had an average profit rate that was 13.4 percentage points higher, as seen from column (3). The estimated long-run equilibrium profit for group one is projected to be 4.9 percentage points above the average.

In order to detect possible autocorrelation, a Breusch-Godfrey test was performed. At five percent significance only 10 (out of 295) regressions suffered from autocorrelation, see column 5). Given that this only corresponds to about three percent of the firms, there is no reason to believe that the model is incorrectly specified. Despite the fact that the regressions only have 20 degrees of freedom, about 70 percent (201) of the regressions are significant at 10 percent (p-values $\leq 0.1$).

To test the effects of R&D investments on the persistence of profits above the norm, a panel data model with fixed effects was estimated. The panel data model is constructed to follow the same individual firm over the entire period. The major motivation for using a panel data model in this way is the ability to control for possibly correlated, time-invariant heterogeneity without observing it. A fixed effect model is the most appropriate since it considers both time and firm specific effects.

The regression results are reported in Table 4. Interestingly, when lagged R&D is included as an explanatory variable the convergence parameter $\hat{\lambda}_j$ is lower for the panel data estimations than the average for the individual OLS estimations.
Table 4. Fixed effects estimations with deviations from firm means lagged R&D and firm plus time effects.

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.192</td>
<td>-0.134</td>
<td>-0.106</td>
</tr>
<tr>
<td></td>
<td>(-1.54)</td>
<td>(-1.13)</td>
<td>(-0.96)</td>
</tr>
<tr>
<td>$\hat{\lambda}_j$</td>
<td>0.346***</td>
<td>0.311***</td>
<td>0.313***</td>
</tr>
<tr>
<td></td>
<td>(5.76)</td>
<td>(5.40)</td>
<td>(5.18)</td>
</tr>
<tr>
<td>R&amp;D$_{t-1}$</td>
<td>25.05***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.80)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D$_{t-2}$</td>
<td></td>
<td>17.75***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.88)</td>
<td></td>
</tr>
<tr>
<td>R&amp;D$_{t-3}$</td>
<td></td>
<td></td>
<td>13.81***</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2.45)</td>
</tr>
<tr>
<td>No. obs.</td>
<td>5856</td>
<td>5561</td>
<td>5269</td>
</tr>
<tr>
<td>R²</td>
<td>0.29</td>
<td>0.28</td>
<td>0.28</td>
</tr>
<tr>
<td>F - value</td>
<td>25.75</td>
<td>17.59</td>
<td>17.22</td>
</tr>
</tbody>
</table>

Notes: *, ** and *** indicates significance at the 10, 5 and 1 percent level. Numbers in parenthesis represent heteroscedasticity consistent t-statistics. Two outlying observations have been excluded due to obvious errors in the data.

As expected the estimated coefficient on lagged R&D investments is positive and significant at 1% level. The constant, $\alpha_j$ in equation (5), is negative. This is also reasonable to assume, realizing that an unconcentrated industry achieves at best a Cournot equilibrium (Mueller, 1990).

A central question is how to specify the lag periods for the R&D variable. In most cases it can be assumed that the time between the R&D investment and the revenues it generates is fairly long. Pakes and Schankerman (1984) have found that on average it takes two years. However, statistically, the R&D lag might be of less importance because firms engaged in R&D presumably do so persistently over longer periods of time and consequently the effects will be detected anyhow in the 21 year series. It is likely that it is this persistence in R&D efforts that is important for the persistence of profits, rather than individual years’ spending on R&D which to a large extent is more of an accounting quantity. So, in addition to the lagged R&D investments, a five-year moving average of R&D investments was also tested. This was also found to have a significant effect on profits. Again, it is likely that it is continuous and sustained R&D
strategies that induce persistence in profits, rather than single or scattered R&D investments. Having 21 observations for each firm nevertheless puts a constraint on the number of R&D lags that can be used. Up to third order lags have been tested (column 2 and 3). As can be seen from Table 4 all estimations proved to be significant. Moreover the R&D coefficient seems to be economically significant.

The size of the R&D parameter declines as the length of the lag increases, which is an indicator of reversed causality. Meaning that, high profits are used to invest even more in R&D. This two-way relationship is thus one possible reason for why some firms succeed in maintaining profits persistently above average. And also, as certain firms recurrently carry out R&D, this brings about a “knowledge barrier to entry”, relative to new and less research intense firms.

As suggested by Waring (1996) the transitory component ($s_{ij}$ in equation (2)) can be decomposed into industry rents and firms specific rents. To test this notion more formally with regard to how the persistence of firm specific profits might vary across industries, the empirical model of equation (5) is modified by adding industry dummies. These industry dummies, based on two-digit SIC codes, are then interacted with the lagged profit variable.

Table 5 provides the results of this fixed effect estimation with interacted industry effects. The convergence parameter $\hat{\lambda}_j$ and the positive effect of R&D investments on profitability are remarkably consistent when industry is accounted for. This indicates that the systematic persistence of profitability that is observed arises primarily from the firm specific component of above average profits rather than from the industry specific component. This result is in accordance with the findings of Yurtoglu (2004).
### Table 5. Fixed effects estimations with deviations from firm means lagged R&D and industry plus time effects.

<table>
<thead>
<tr>
<th></th>
<th>(1)</th>
<th>(2)</th>
<th>(3)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Constant</td>
<td>-0.350</td>
<td>-0.291</td>
<td>-0.290</td>
</tr>
<tr>
<td></td>
<td>(-2.52)</td>
<td>(-2.24)</td>
<td>(-2.33)</td>
</tr>
<tr>
<td>( \hat{\lambda} )</td>
<td>0.550***</td>
<td>0.591***</td>
<td>0.563***</td>
</tr>
<tr>
<td></td>
<td>(2.72)</td>
<td>(2.96)</td>
<td>(2.75)</td>
</tr>
<tr>
<td>R&amp;D_{t-1}</td>
<td>23.91***</td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>(2.63)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>R&amp;D_{t-2}</td>
<td></td>
<td>17.53***</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td>(2.71)</td>
<td></td>
</tr>
<tr>
<td>R&amp;D_{t-3}</td>
<td></td>
<td></td>
<td>13.68**</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>(2.34)</td>
</tr>
<tr>
<td>No. obs.</td>
<td>5856</td>
<td>5561</td>
<td>5269</td>
</tr>
<tr>
<td>R²</td>
<td>0.32</td>
<td>0.31</td>
<td>0.28</td>
</tr>
<tr>
<td>F - value</td>
<td>23.33</td>
<td>20.61</td>
<td>17.22</td>
</tr>
</tbody>
</table>

Notes: *, ** and *** indicates significance at the 10, 5 and 1 percent level. Numbers in parenthesis is heteroscedasticity-consistent t-statistics. Estimated coefficients of industry interaction terms upon request, F-test of industry interaction terms are equal to zero rejected, F\[68, 5518\] = 4.30 Prob > F = 0.000. Two outlying observations have been excluded due to obvious errors in the data.

An F test is used to verify whether the coefficients of the industry interaction terms are all equal to zero (i.e., \( d_1 = d_2 = \ldots = d_I = 0 \)). Based on the F-test results\(^{12}\), the null hypothesis that persistence of firm-specific profits is equal across firms is soundly rejected. This test is valid although the data also comprises multiproduct firms, which blur the measurement of industry-level variables. In effect these multiproduct firms make the test less likely to reject the null hypothesis of no differences across industries. This is because multiproduct firms add more noise to the estimate of industry persistence, and thus raise the standard error of the estimate. The rejection of the null hypothesis is consequently even stronger since it also needed to overcome the effect of multiproduct firms making acceptance more likely.

The robustness of the fixed effects estimates in Table 4 and 5 are consistent with results obtained from pooled OLS regressions, although for brevity reasons these results are not reported. Furthermore, the estimations have

\(^{12}\) F\[68, 5518\] = 4.30 Prob > F = 0.000
been made with country effects, which again did not alter the results\textsuperscript{13}. To the extent that tax rates differ across industries, the estimates of $\alpha_i$ in equation (5) will differ across companies, which suggest the existence of firm or industry specific rents that are not due to differences in the competitive environment, but to the tax treatment of profits. This bias will thus influence the long run projected profit rates; the speed of adjustment parameter will remain unbiased (Yurtoglu, 2004). Since the data on the firms return on assets, R&D expenditures and sales are all accounting numbers, the usual caveats associated with accounting measures apply. This withstanding the results shows that profit rates persist between as well as within-industries. In addition, R&D-investment is found to have a significant and positive effect on firm-specific above norm profits.

5. CONCLUSIONS

Although economic theory tells us that profits above the industry norm cannot persist in the absence of significant barriers to entry and exit, evidence continues to accumulate contrary to this supposition. This study joins up with the growing literature that emphasizes dynamic analysis when trying to estimate the determinants of firm and industry profits.

In line with previous dynamic studies evidence is found of firms with profit levels which persistently diverge from the industry average. The empirical analysis show that although there is a convergence towards industry normal profit levels the convergence process is incomplete. The best (worst) performing firms of 20 years ago are still presenting profits above (below) the average. The results also show that the observed systematic persistence of profitability arises primarily from the firm specific component of above average profits rather than from the industry specific component.

One explanation for this persistent profit divergence and particularly for profits above the norm is sustained investments in R&D. By utilizing a fixed-effects model which accounts for time and firm effects the importance of R&D investments relative to profit persistence is demonstrated. Not only do firms with sustained R&D investments exhibit higher profit levels, the relative level of R&D is also positively related to the persistence of the firms’ profits. By investing in R&D firms may thus maintain higher levels of profits even though there might be no significant barriers to entry and exit.

\textsuperscript{13} The results from the OLS- and FE-estimation with country effects are available upon request from the author.
REFERENCES


Persistence of Profits and the Systematic Search for Knowledge


APPENDIX A

This section basically follows Geroski (1990).

Suppose profit-equation (1), $\Pi_{ip} = \beta \mu + \mu_i^1$ has only one explanatory variable say patents, denoted $P$, so it can be written as

$$\Pi_{ip} = \beta P_i + \mu_i^1$$

(2A)

The problem with estimating $\beta$, the parameter of interest in equation (2A), is that long run equilibrium profits $\Pi_{ip}$ are not observable. Current period profits $\Pi_i$ are observable but unfortunately not the same as $\Pi_{ip}$ unless every industry is in long run equilibrium when observed. If, as is commonly the case, one nevertheless uses $\Pi_i$ as a proxy of $\Pi_{ip}$, the empirical model equation (3A) will differ from the model derived from theory.

$$\Pi_i = \beta_0 + \beta P_i + \mu_i^2$$

(3A)

If equation (2A) is the “true” model as assumed, then $\mu_i^2$ contains a measurement error $\Pi_i - \Pi_{ip}$ in addition to any stochastic term inherent in equation (2A), thus

$$\mu_i^2 = \mu_i^1 + (\Pi_i - \Pi_{ip})$$

(4A)

The existence of this additional noise inflates standard errors and so biases t-statistics downward. What is worse, it can introduce bias if $\Pi_i - \Pi_{ip}$ is correlated to $P_i$; that is, if $P_i$ not only explains the level of equilibrium profits $\Pi_{ip}$, but also helps to govern dynamic movements around equilibrium. Suppose that this is true and, for example, that the deviation from equilibrium at any given time is proportional to $P_i$

$$\Pi_i - \Pi_{ip} = \alpha P_i + \mu_i^3$$

(5A)

where $\mu_i^3$ summarizes all other determinants orthogonal to $P_i$. Then, neglecting equation (5A) in the estimation of (3A) yields an estimated slope coefficient of $\alpha + \beta_i$, clearly a biased estimate of the parameter of interest in equation (3A), $\beta_i$. The only way to recover estimates of $\alpha$ and $\beta_i$ separately is...
to analyze equation (3A) and (4A) together. To put it in another way, one can only have confidence in estimates that claim to measure $\beta_i$ if either the hypothesis that all units $i$ are in equilibrium ($\prod_i = \prod_y$ for all $i$) or the hypothesis that $x_i$ has no effect on disequilibrium motion ($\alpha = 0$) cannot be rejected by the data or if a control variable (like market growth) captures the non-random variation that causes bias. For a more thorough discussion see Geroski (1990).
Chapter VI

RISK-ADJUSTED PERFORMANCE OF SWEDISH BOND FUNDS - AN APPLICATION OF THE MODIGLIANI-MEASURE

Daniel Wiberg

Abstract
This paper compares Swedish long-term bond funds’ returns against the OMRX-TBond, which is the major index of long-term bonds issued by the Swedish National Debt Office and other major Swedish bond issuers. The evaluation is made on a total return level as well as on a risk-adjusted basis. To measure risk-adjusted performance a performance measure developed by Modigliani and Modigliani (1997) is used. The main advantage with the Modigliani-measure is that it measures performance in basis points like the original return of any asset.

Using the Modigliani-measure the study illustrates the importance of risk-adjustment when comparisons are made between benchmarks, such as an index, and mutual funds or portfolios investing in that particular market. When risk-adjusted, the performance of many of the Swedish mutual funds improved noticeably, most of them however, still underperform the index OMRX-TBond by a few percentage points when risk-adjusted with the M2-model. This result gives support to the idea originally presented by Sharpe (1966) and Jensen (1968), that the majority of mutual funds significantly underperform the market.

JEL Codes: G10 G12 G23
Keywords: Mutual funds, bonds, portfolio performance, performance measures.

a Published in Corporate Ownership & Control, Journal of, Volume 4, Issue 1, Fall 2006, pp.284-292. The author would like to thank Sparbankernas Forskningsstiftelse for their financial support which is gratefully acknowledged.

b Affiliations: Jönköping International Business School (JIBS), and Centre of Excellence for Science and Innovation Studies (CESIS), Royal Institute of Technology, Stockholm.
1. INTRODUCTION

The growing interest for mutual fund investments along with alterations in the Swedish pension-system in the late 1990s made vast amounts of money available for institutional investors to manage. But when the air went out of the IT-bubble in 2000, most stock markets around the world plunged and continued to decline during 2001 and 2002. During these years of market decline bond funds become a popular investment instrument. Particularly since bond funds are marketed as low risk investments with stable returns.

Media reports, for instance by the Swedish Shareholders’ Association (1999), has shown that a majority of Swedish mutual funds underperform major stock market indices such as the SIXRX (Findatas Avkastningsindex)\(^1\). When presented these reports cause a lot of concern to the average investor, who would often have been better of if a monkey would have managed the accounts\(^2\); Meaning of curse that a random selected portfolio, the index, performed better.

One fundamental idea in modern investment theory is that investors should be able to choose their investments on the basis of their desired risk tolerance. A lower risk however will also produce a lower return. Bond funds are often marketed as investment portfolios with low risk and close to index performance. Indeed, this paper shows the majority of the Swedish long-term bond funds have a risk (standard deviation) lower than the main bond market index OMRX-TBond. However, if the risk of the bond funds has been lower than expected by the unit holders, what would the cost or benefit be of this “involuntary” risk reduction?

The question that must be raised is therefore whether or not the Swedish bond funds have produced returns lower than their market index. If so, will a risk-adjusted performance measure improve the performance of the Swedish bond funds to a level equivalent to the benchmarks?

To answer these questions the M2-model (Modigliani and Modigliani, 1997) is used, which adjusts the portfolios through hypothetical leverage to the same level of risk as the benchmark portfolio. By measuring the M2 risk-adjusted performance of Swedish bond funds this paper aims to produce a more revealing evaluation of the Swedish bond funds’ performance. The application of the M2-model will basically follow the definitions and notations of the originators.

---

\(^1\) Formerly Affärsvärldens Avkastningsindex, Findatas Avkastningsindex FDAXA and presently SIX-Returnindex SIXRX

\(^2\) A Blindfolded chimpanzee throwing darts at the WALL STREET JOURNAL can do as well as the experts (Malkiel, 1999)
After a short description of some issues related to performance evaluation and the mutual fund industry, the paper continues in section two with a discussion about portfolio risk and return. Section three deals with the most commonly used risk-adjusted performance measure today, the Sharpe ratio. Thereafter, the Modigliani and Modigliani (1997) measure is presented in more detail in section four. Section five describes the data used in the empirical investigation, followed by a brief record of the market development in the time period 2000-2003 in section six. Empirical results are presented in section seven. Analysis and results from some previous studies is provided in section eight. Conclusions end the paper in section nine.

A simple way of evaluating the performance of a managed portfolio (i.e. a mutual fund) is to take the total return during a time period and compare it to the return of an unmanaged random selected portfolio (the dartboard portfolio)\textsuperscript{3}. The comparison portfolio is referred to as the benchmark. However, this simple evaluation gives the investor very little information, nothing is said about the risk exposure, the managers’ skills or if the result is pure chance.

To improve the evaluation, the concept of efficiency might be introduced, where managers are benchmarked against the unmanaged “market” or more specifically, a capitalization-weighted portfolio consisting of the entire market. The benchmarks can then be further revised to more closely reflect the relevant investment sectors under evaluation, that is, different indices relevant for certain security classes. Most of these security classes have their own indices and there are today a very large number of stock indices offered by the various rating agencies and consulting companies. Still, even though the benchmarks have improved over the years, the performance is still focused on total return. Early research, such as Jensen (1968), and Sharpe (1966) as well as more updated Swedish studies by Aktiespararna (the Swedish Shareholders’ Association, 1999), has shown that the majority of mutual funds significantly underperform the market.

So, for a more valid performance evaluation of a mutual fund one needs a risk-adjusted performance measure (An excellent review of measures used in the financial industry can be found in Amenc and Le Sourd, 2005). The most common measure of risk-adjusted return used in the industry is the Sharpe ratio, which gives the “reward per unit of risk”. The Sharpe ratio can be difficult to interpret and even though experts might find it useful, it is not

\textsuperscript{3} Again refers to Malkiel’s metaphor of a monkey who threw darts at the Wall Street Journal as a proxy for a randomly selected portfolio, also referred to as the market portfolio (Malkiel, 1999).
much help for the average investor who is not intimately familiar with regression analysis and modern theory of finance. A more easily understood and thus more helpful measure of risk-adjusted performance is the Modigliani and Modigliani (1997), M2-measure. With this measure of risk-adjusted performance a more applicable comparison between mutual funds and their benchmarks is made possible.

2. PORTFOLIO RETURN AND RISK

Investors are not interested in the returns of a mutual fund in isolation but in comparison with some alternative investment. To even be considered, a mutual fund should at least give a return similar to or better than some minimum hurdle, such as the return on a completely safe, liquid investment available at that time (Simons, 1998). Such a return is referred to as the “risk-free rate” and is usually a short-term government security, such as a 90-day Treasury bill. However, the risk-free rate is certainly not the only relevant investment for comparison. As mentioned before most equity and bond funds measure their performance against some benchmark index such as the S&P 500 index, or for Swedish mutual funds, the more relevant SIXRX-index (Findatas Avkastningsindex) or for bond the OMRX-TBond.

But investors are not only interested in the returns; they are also concerned with the risk taken to achieve those returns. Today a number of performance measurements exist, a common feature is that they all measure fund returns relative to risk. However, they differ in how they define and measure risk, and consequently, in how they define risk-adjusted performance.

Since investors demand and receive higher returns with increased variability, variability and risk are related. The basic measure of variability is standard deviation, also known as the volatility. Both the Sharpe-ratio and the Modigliani-measure are based on the standard deviation as a risk measure in their risk-adjusting performance measurements.

Theoretically the standard deviation states that if the fund returns are normally distributed and the historical standard deviation is used as a proxy of the future risk, then with a 68% probability, the fund return will deviate

---

4 The Sharpe ratio is also known as the information ratio when measured as outperformance, for extended discussion see Gupta, Prajobi and Stubbs (1999).
5 Named after its two originators (Muralidhar, 2000).
from the mean return by plus or minus one standard deviation. A high standard deviation shows that the fund has a great variation in returns.6

More specific to this thesis, the standard deviation measures how the funds historic returns have deviated from the mean return of the fund over a period of 36 months. The standard deviation calculated and reported by Morningstar is based on monthly returns and reported on an annual basis.

2.1 Other Ways of measuring performance

Another way to use the standard deviation, which might be useful for fund managers in particular, is to measure the funds “tracking error” compared to its benchmark. What “tracking error” refers to is the standard deviation of the difference in returns between the fund and the appropriate benchmark index. Such a comparison will reveal how able the fund manager is to track the returns on some benchmark index related to the fund’s announced purposes.

Standard deviation is sometimes criticized as being an inadequate measure of risk because investors do not dislike variability per se. Rather, they dislike losses but are quite happy to receive unexpected gains (Simons, 1998). Downside risk may be a better reflection of investors’ attitudes toward risk and therefore a better measure of risk. The distinction between downside risk and standard deviation is however of little importance because the two measures are highly correlated. Sharpe (1998) found that the two measures had a correlation coefficient of 0.932. It is logical that stocks with larger downside deviations will also have larger standard deviations.

One performance measure that accounts for loss aversion is the so-called Sortino ratio (Sortino and Van der Meer, 1991). The Sortino measure modifies the Sharpe ratio by measuring risk as deviations below the benchmark. Using deviations below benchmark, “tracking-error”, can however cause some problems when ranking funds. This is because if average tracking-error are around zero, the calculated performance could be negative for some funds. As there is no simple way around this problem the

---

6 With a probability of 95% the fund returns will not deviate by more than two standard deviations from the historical mean return. Hence if the standard deviation is 20 and the expected return 10%, the actual return will end up between +30% and –10% with a likelihood of 68%.
Sortino ratio is most often calculated with the risk-free-rate rather than some more appropriate benchmark index\(^7\).

In recent years Value at Risk or VAR has gained a lot of acceptance, especially if the portfolio consists of some derivatives or bonds. Essentially, VAR gives an answer to the question of how much the value of a portfolio can decline with a given probability under a given time period (Simons, 1998). The strength of VAR is that it constructs a measure of risk for the portfolio not from its own past volatility but from the volatilities of risk factors affecting the portfolio as it is constructed today. A measure based on risk factors rather than on the portfolio’s own volatility is especially important for funds that range far and wide in their choice of investments, use futures and options, and abruptly change their commitments to various asset classes. This description applies to many hedge funds, but perhaps not that good to ordinary bond funds.

It is interesting to note that the dominant use of standard deviation as a measure of risk indicates a widespread assumption that the returns have a symmetric normal distribution.

3. THE SHARPE MEASURE OF RISK-ADJUSTED PERFORMANCE

The M2-model of risk-adjusted performance (RAP(i)) measures performance along the same basic lines as the Sharpe ratio (S\(_i\)), and even though RAP(i) and S\(_i\) provides very different measures of risk-adjusted performance, their ranking of performance coincides. The portfolio that has the best performance according to the RAP criteria is also the best by the Sharpe measure and vice versa\(^8\).

The Sharpe ratio (Sharpe, 1966) is today the most commonly used measure of risk-adjusted performance. Basically the Sharpe ratio measures the “reward per unit of risk”, thus a high Sharpe ratio means that the fund delivers a lot of return for its level of volatility. The Sharpe ratio is calculated by taking the total return then converting it into excess return by subtracting the risk-free rate, and then dividing the result by the dispersion measure, standard deviation or sigma. The Sharpe ratio can thus be expressed as:

\[ \text{Sharpe Ratio} = \frac{R - R_f}{\sigma} \]

\(^7\) For a comparison study of risk-adjusted measures and measures which accounts for less aversion see Gemmill, Hwang and Salmon (2005).

\(^8\) Both models are based on the Capital Asset Pricing Model and the assumptions underlying the models are therefore the same.
Sharpe ratio = \( S_i = \frac{e_i}{\sigma_i} \)

where

\( e_i \) = excess return of portfolio \( i \) \((e_i = r_i - r)\); and

\( \sigma_i \) = standard deviation of portfolio \( i \)'s excess return

Any portfolio positioned on the capital market line has a Sharpe ratio equal to that of the market (Sharpe ratio = 1.0) and, therefore, has a neutral performance. A higher Sharpe ratio would indicate that the fund has outperformed the market, while a lower Sharpe index would indicate underperformance, for any level of risk.

Since both the Sharpe ratio and the M2-measure are based on the CAPM, they are also constrained by the standard assumptions of this basic model. Consequently, the relevance of these risk-adjusted performance measures for choosing a mutual fund critically depends on the investors' ability to do two things: 1) combining an investment in a mutual fund with an investment in the risk-free asset, and 2) leveraging the investment by, for example, borrowing money to invest in the mutual fund (Simons, 1998). For the result to hold true, the investor must be able to borrow and lend at the same risk-free rate.

While experts may find the Sharpe measure or even some other performance measure such as the Jensen’s alpha or the Treynor ratio helpful in comparing funds, the resulting figures are difficult to interpret. So despite its near universal acceptance among academics and institutional investors, the Sharpe ratio is not well known among the general public and financial advisors. Investigations in the matter have led to cold-blooded criticism:

“The Sharpe ratio is so esoteric that most mainstream financial dictionaries ignore it, most planners can’t adequately explain it, and I am not even going to attempt it here.” (Jaffe, 1998)

---

9 Where \( r_i \) is the return of portfolio \( i \), and \( r \) is the risk free rate.

4. THE M2-MODEL

Like most conventional methods, the M2-measure evaluates the performance of any managed portfolio against that of a relevant “unmanaged” market-portfolio. However, the M2-measure makes the comparison in performance after adjusting the portfolio to the appropriate level of risk, which is the level of risk in the unmanaged benchmark portfolio. After this matching of the portfolios risk to that of the benchmark, the return of this risk-adjusted portfolio \( i \) (RAP\( (i) \)) is measured in basis points like the original return of any asset. This of course makes the M2 easy to understand and interpret.

In particular, the RAP\( (i) \) can be compared to the return of a market-portfolio over the same period of time (call it \( r_m \)). The difference tells us how much, in basis points, portfolio \( i \) outperformed the market (if the difference is positive), or underperformed the market (if the difference is negative), on a risk-adjusted basis. Since the benchmark portfolio is in principle a viable alternative investment to any portfolio \( i \), the differential performance (RAP\( (i) \) - \( r_m \)) can be regarded as a standard to assess whether the managed portfolio is worth keeping or not.

The risk-adjusting of portfolios is accomplished by theoretically levering or unlevering the original portfolio. Given any portfolio \( i \), with total return \( r_i \), and a dispersion of \( \sigma_i \), it is possible to construct a new version of that portfolio having any desired level of risk.

Before going deeper into the techniques and formula’s of the M2-model a summation of the definitions and notations used is in order (the notation and definitions follow the originators Modigliani and Midigliani, 1997):

\[
\text{RAP}(i) = \text{risk-adjusted performance of portfolio } i; \\
\text{rf} = \text{short-term risk-free interest rate}; \\
\text{ri} = \text{return of portfolio } i; \\
\text{r(i)} = \text{return of risk-equivalent (or matched) portfolio, or the risk-adjusted return of portfolio } i; \\
\text{e}_i = \text{excess return of portfolio } i \ (e_i = r_i - r_f); \\
\text{e(i)} = \text{excess return of risk-equivalent portfolio } i \ (e(i) = r(i) - r_f); \\
\sigma_i = \text{standard deviation of } r_i \text{ and } e_i;
\]
Risk-Adjusted Performance of Swedish Bond Funds

σ(i) = standard deviation of r(i) and e(i);

Si = the Sharpe ratio = e/σ;

rm = return of the market portfolio;

eM = excess return of the market portfolio (eM = rm – rf); and

σM = standard deviation of rm and eM.

4.1 Leverage and the derivation of RAP, a measure of risk-adjusted performance

The M2-model provides us with a risk-adjusted performance measure, called RAP, for any portfolio through one central operation, leverage. Unlevering or levering the initial portfolio matches the portfolio to the same level of risk as the benchmark, or more precisely the appropriate index.

Unlevering a portfolio means that one sell a portion of the portfolio and uses the proceeds to by risk-free securities (such as short-term government securities). Since the portion of risky securities is decreased and counter-balanced by a proportional increase in risk-free securities, this operation will reduce the risk of the portfolio. Consequently, unlevering the portfolio also lowers the expected return of the portfolio (provided that the original portfolio had a positive excess return). Indeed, if d% of the portfolio is sold and the proceeds are invested in risk-free securities, the dispersion (sigma) of the returns of the portfolio will decrease by d% (because d% of the returns will have been made constant/risk-free). The excess return of the portfolio is also reduced by the same d%.

Likewise, levering a portfolio means that one increases the investment in the portfolio through borrowing. Intuitively, this will increase the risk and expected return of the portfolio (again, assuming a positive excess return on the original portfolio). If an additional amount, d% is financed by borrowing and then invested in the portfolio, then both sigma and the excess return of the portfolio will increase by d%.

From these operations the M2-measure derives that the risk-adjusted return of portfolio i, or RAP(i), is the return of portfolio i, levered by an amount di (di positive or negative), where di is defined as the levering required to make portfolio i risk-equivalent to the desired benchmark portfolio. That is to make the portfolios sigma, σ(i), equal to that of the benchmark portfolio.
Again following the notations of Modigliani and Modigliani (1997), the value of $d_i$ can be inferred from the definition:

\[
\sigma(i) = (1 + d_i)\sigma_i = \sigma_M
\]

which implies:

\[
(2) \quad d_i = \frac{\sigma_M}{\sigma_i} - 1
\]

Since borrowing is not free, one must take into account the interest on $d_i$, which is the amount borrowed (if $d_i$ is positive) or lent (if $d_i$ is negative), we then find that:

\[
(3) \quad \text{RAP}(i) = r(i) = (1 + d_i)r_i - d_ir_i
\]

Substituting Equation (2) into equation (3), we can rewrite RAP as:

\[
(4) \quad \text{RAP}(i) = \left(\frac{\sigma_M}{\sigma_i}\right)r_i - \left(\frac{\sigma_M}{\sigma_i} - 1\right)r_i = \left(\frac{\sigma_M}{\sigma_i}\right)(r_i - r) + r_i
\]

Using the definition of $e_i$, RAP can also be written as:

\[
(5) \quad \text{RAP}(i) = \left(\frac{\sigma_M}{\sigma_i}\right)e_i + r_i
\]

Where

\[
(6) \quad e(i) = \left(\frac{\sigma_M}{\sigma_i}\right)e_i
\]

Using these equations and substituting them into each other one can compute the RAP(i) either from total returns, using Equation (4), or from excess returns using Equation (5).

5. DATA

The Swedish mutual funds for which risk-adjusted performance is calculated in this investigation are all open-ended mutual funds that are stipulated “Swedish Long-Term Bond Funds” (clearly stated in the investment policy of each mutual fund). This means that the funds invest in bonds denominated in SEK. The funds invest in government bonds or bonds issued by local authorities or agencies, mortgage bonds, corporate bonds of good rating, and bonds issued by supranational institutions. The funds may
further use derivative instruments to reduce risks. The investment framework upholds the OMRX-Tbond as a suitable and proper benchmark index.

The relevant funds have all been classified by Morningstar Sweden and Svensk Fondstatistik AB. Morningstar is also the provider of data for the mutual funds. Furthermore, the funds need return and risk statistics for at least 36 months (year 2000 to 2003) to be considered. This latter criterion reduces the number of relevant funds significantly since much of the expansion in the mutual fund industry has taken place during this three year period. All in all there where 35 Swedish funds registered by Morningstar, which satisfies the criterion. The fund managers and fund names can all be found in Table 1.

The risk-free rate used in the calculation of risk-adjusted performance in the period 2000-05-02 to 2003-04-30, is the average return on a 90-day Treasury Bill during the same period (SSV-3M). The risk-free rate is referred to as a fixed income security with short maturity and the compounding of 90-days Treasury Bills is the shortest fixed income security investment strategy available. The 90-days Treasury Bill had an average monthly return of 4.43% during the period 2000-05-02 to 2003-04-30 (Swedish National Debt Office).

The standard deviations of the benchmark index have, like the funds, been calculated on the basis of monthly returns. The standard deviation of the market, that is, the monthly volatility of returns for the OMRX-Tbond during the period 2000-05-02 to 2003-04-30 (36 months) was 2.8% and the total return of the market for that period was equal to 27.7% (Stockholm Stock Exchange).


The strong market development of the late 1990’s continued during the first months of 2000. The year began with a solid growth in high-tech and telecom stocks, supported in part by the development of the NASDAQ-market. But in the spring of 2000 the NASDAQ as well as the Swedish market became more volatile and prices started to decline. The decline continued and during the autumn the telecom and the high-tech sectors plunged. The sharp drop in prices during the second half of 2000 led to a negative total return in the Swedish stock market. The SIXRX-index ended up with a total return of −12%. At the bond market, the decreasing demand for loans by the Swedish Government led to smaller volumes outstanding.
However, the total turnover of the Swedish bond market was still large. During 2000 the primary dealers traded a total of SEK36 000 billion, which was an 18% drop in turnover compared to 1999. The overall total return of the OMRX-Tbond was 7.9% and the OMRX-Tbond volatility during 2000 was 2.9%.

The decline in government borrowing might be one reason for the growth in corporate bonds which took place during the three year period 2000-2003. Nonetheless, the overall decline in market volume continued in 2001 and the turnover dropped another 10% and ended up at SEK33 000 billion. The yields on the bond market also declined during 2001. As the stock market continued to fall during the year 2001, the Swedish equity market went down by around 35%, in line with the U.S. and the European markets.

During 2002 the bond market yields slowly recovered and the yearly volatility of the index was around 3.2%. The fear of a rise in inflation made the central bank raise the interest rate. Still, due to falling stock prices and sluggish market recovery the interest rates declined a drop that started during the autumn of 2002. At the time the pattern was the same in most western economies, with low interest rates and slow market recovery. In the stock market cyclic stocks started to recover and have positive price developments. For the former growth sectors high-tech and IT however, the structural problems and inferior performance persisted.

In 2003 the Swedish stock market started a slow recovery. Interest rates were still at low levels and there seemed to be no consensus about Sweden’s potential membership in EMU. This probably affected the risk level of the Swedish bond market, but it is hard to say to what extent.

7. THE SWEDISH MUTUAL FUNDS RISK-ADJUSTED PERFORMANCE FROM 2000 TO 2003

The application of the RAP measure on Swedish data for the period 2000 to 2003 followed the formulae;

\[ \text{RAP}(i) = \left( \frac{\sigma_M}{\sigma_i} \right) (r_i - r_f) + r_f \]

where, the risk free rate for the whole 36-month period (2000-04-30 to 2003-05-02) was \( r_f = 4.43\% \) and the market or benchmark volatility \( \sigma_M = 2.8\% \). The statistics and the figures can, for all funds in the sample, be found in Table 1.

Looking at total return, the average Swedish Long-Term Bond fund underperformed the market (or more exactly the OMRX-Tbond). When the
RAP measure is applied and calculated for the 35 Swedish bond funds a new but similar picture appears. On average, the risk-adjusted performance of Swedish bond funds was still inferior to the total return performance of the market. The average RAP of the 35 Swedish bond funds was 24.62%. These findings are in accordance with the findings of Modigliani and Modigliani (1997).

The Swedish bond funds are presented in Table 11. The table shows that, like the original article by Modigliani and Modigliani (1997), some of the “well performing” funds turn out to be less attractive on a risk-adjusted basis. The reversed is especially true, in the sense that many of the less “well performing” funds, manage a lot better on a risk-adjusted basis. Although the figures in Table 1 show gross performance, the funds’ management fees are presented alongside. Individual fund companies charge a variety of additional fees and to account for all is beyond the scope of this paper. For an extended discussion about the effect of management fees on performance, see section eight.

11 For the sake of brevity the Sharpe ratio is not included. The ranking of funds according to the Sharpe ratio would also correspond to the ranking by the RAP measure.
<table>
<thead>
<tr>
<th>Fund</th>
<th>Total Return, %</th>
<th>Standard Deviation, %</th>
<th>RAP, M2 %</th>
<th>Leverage Factor</th>
<th>Fund minus Benchmark, %</th>
<th>Management Fees</th>
</tr>
</thead>
<tbody>
<tr>
<td>Risk Free Rate</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(SSV-90)</td>
<td>4.43</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Benchmark</td>
<td>27.7</td>
<td>2.8</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(OMRX-Tbond, 000502-030430)</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Average</td>
<td>21.9</td>
<td>2.4</td>
<td>24.62</td>
<td>0.17</td>
<td>-5.78</td>
<td>0.55</td>
</tr>
<tr>
<td>Alfred Berg Obligationsfond</td>
<td>22.2</td>
<td>2.7</td>
<td>22.86</td>
<td>0.04</td>
<td>-5.50</td>
<td>0.50</td>
</tr>
<tr>
<td>AMF Pension Räntefond Sverige</td>
<td>24.2</td>
<td>2.7</td>
<td>24.93</td>
<td>0.04</td>
<td>-3.50</td>
<td>0.15</td>
</tr>
<tr>
<td>Aragon Avkastningsfond</td>
<td>20.5</td>
<td>2.5</td>
<td>22.43</td>
<td>0.12</td>
<td>-7.20</td>
<td>0.50</td>
</tr>
<tr>
<td>Banco Obligationsfond</td>
<td>22.2</td>
<td>2.7</td>
<td>22.86</td>
<td>0.04</td>
<td>-5.50</td>
<td>0.60</td>
</tr>
<tr>
<td>Carlson SEK Long Bond A</td>
<td>22.1</td>
<td>2.4</td>
<td>25.05</td>
<td>0.17</td>
<td>-5.60</td>
<td>0.70</td>
</tr>
<tr>
<td>Carlson SEK Long Bond B</td>
<td>22.1</td>
<td>2.3</td>
<td>25.94</td>
<td>0.22</td>
<td>-5.60</td>
<td>0.50</td>
</tr>
<tr>
<td>Enter Obligationsfond</td>
<td>22.5</td>
<td>2.5</td>
<td>24.67</td>
<td>0.12</td>
<td>-5.20</td>
<td>0.45</td>
</tr>
<tr>
<td>Erik Penser Obligationsfond Sverige</td>
<td>19.1</td>
<td>2.1</td>
<td>23.99</td>
<td>0.33</td>
<td>-8.60</td>
<td>0.35</td>
</tr>
<tr>
<td>Firstnordic Sverige Obligationer</td>
<td>20.7</td>
<td>2.4</td>
<td>23.41</td>
<td>0.17</td>
<td>-7.00</td>
<td>0.75</td>
</tr>
<tr>
<td>Folksam LO Obligation</td>
<td>26.0</td>
<td>2.4</td>
<td>29.60</td>
<td>0.17</td>
<td>-1.70</td>
<td>0.40</td>
</tr>
<tr>
<td>Folksam Obligationsfond</td>
<td>22.9</td>
<td>2.1</td>
<td>29.06</td>
<td>0.33</td>
<td>-4.80</td>
<td>0.30</td>
</tr>
<tr>
<td>Folksam Tjänstemannafond Obligation</td>
<td>26.8</td>
<td>2.4</td>
<td>30.53</td>
<td>0.17</td>
<td>-9.90</td>
<td>0.40</td>
</tr>
<tr>
<td>Handelsbanken Mega Avkastning Acc</td>
<td>19.6</td>
<td>1.9</td>
<td>26.79</td>
<td>0.47</td>
<td>-8.10</td>
<td>0.30</td>
</tr>
<tr>
<td>Handelsbanken obligationsfond</td>
<td>21.8</td>
<td>2.5</td>
<td>23.88</td>
<td>0.12</td>
<td>-5.90</td>
<td>0.75</td>
</tr>
<tr>
<td>HQ Obligationsfond</td>
<td>21.3</td>
<td>2.3</td>
<td>24.97</td>
<td>0.22</td>
<td>-6.40</td>
<td>0.80</td>
</tr>
<tr>
<td>Länsförsäkringar Mega Obligation</td>
<td>21.5</td>
<td>2.2</td>
<td>26.16</td>
<td>0.27</td>
<td>-6.20</td>
<td>0.30</td>
</tr>
<tr>
<td>Länsförsäkringar Mega Statsobligation</td>
<td>20.4</td>
<td>2.2</td>
<td>24.76</td>
<td>0.27</td>
<td>-7.30</td>
<td>0.30</td>
</tr>
<tr>
<td>Fund Name</td>
<td>Return</td>
<td>Volatility</td>
<td>Sharpe</td>
<td>Sortino Ratio</td>
<td>Information Ratio</td>
<td>Average</td>
</tr>
<tr>
<td>-----------------------------------------------</td>
<td>--------</td>
<td>------------</td>
<td>--------</td>
<td>----------------</td>
<td>-------------------</td>
<td>---------</td>
</tr>
<tr>
<td>Länsförsäkringar Obligationsfond</td>
<td>21.3</td>
<td>2.2</td>
<td>25.90</td>
<td>0.27</td>
<td>-6.40</td>
<td>0.50</td>
</tr>
<tr>
<td>Moderna Fonder Sverige Obligation</td>
<td>21.8</td>
<td>3.0</td>
<td>0.64</td>
<td>-0.07</td>
<td>-5.90</td>
<td>0.30</td>
</tr>
<tr>
<td>Nordea Obligationsinvest</td>
<td>22.0</td>
<td>2.6</td>
<td>23.35</td>
<td>0.08</td>
<td>-5.70</td>
<td>0.75</td>
</tr>
<tr>
<td>Nordea Obligationsfond</td>
<td>22.2</td>
<td>2.6</td>
<td>23.57</td>
<td>0.08</td>
<td>-5.50</td>
<td>0.75</td>
</tr>
<tr>
<td>Nordea Portföljinvest Obligation</td>
<td>22.8</td>
<td>2.7</td>
<td>23.48</td>
<td>0.04</td>
<td>-4.90</td>
<td>0.60</td>
</tr>
<tr>
<td>Nordea-1 Swedish Bond Fund Acc</td>
<td>18.3</td>
<td>2.6</td>
<td>19.37</td>
<td>0.08</td>
<td>-9.40</td>
<td>0.50</td>
</tr>
<tr>
<td>SEB Lux Bond - SEK Acc</td>
<td>20.0</td>
<td>2.2</td>
<td>24.25</td>
<td>0.27</td>
<td>-7.70</td>
<td>0.80</td>
</tr>
<tr>
<td>SEB Lux Bond Fund - SEK Inc</td>
<td>20.1</td>
<td>2.2</td>
<td>24.37</td>
<td>0.27</td>
<td>-7.00</td>
<td>0.80</td>
</tr>
<tr>
<td>SEB Lux Fund - Index Linked Bond</td>
<td>17.0</td>
<td>1.6</td>
<td>26.43</td>
<td>0.75</td>
<td>-10.70</td>
<td>0.70</td>
</tr>
<tr>
<td>SEB Obligation Stiftelsefond</td>
<td>20.8</td>
<td>2.2</td>
<td>25.26</td>
<td>0.27</td>
<td>-6.90</td>
<td>0.70</td>
</tr>
<tr>
<td>Skandia Kapitalmarknad</td>
<td>24.3</td>
<td>2.9</td>
<td>23.61</td>
<td>-0.03</td>
<td>-3.40</td>
<td>0.60</td>
</tr>
<tr>
<td>Skandia Realkreditfond</td>
<td>34.3</td>
<td>4.1</td>
<td>24.83</td>
<td>-0.32</td>
<td>6.60</td>
<td>0.60</td>
</tr>
<tr>
<td>SPP Obligationsfond</td>
<td>23.0</td>
<td>2.4</td>
<td>26.10</td>
<td>0.17</td>
<td>-4.70</td>
<td>0.20</td>
</tr>
<tr>
<td>SSF Swedish Bond Acc</td>
<td>20.9</td>
<td>2.5</td>
<td>22.88</td>
<td>0.12</td>
<td>-6.80</td>
<td>0.75</td>
</tr>
<tr>
<td>SSF Swedish Fixed Income Shares Acc</td>
<td>18.4</td>
<td>2.0</td>
<td>23.99</td>
<td>0.40</td>
<td>-9.30</td>
<td>0.75</td>
</tr>
<tr>
<td>Trevise Obligationsfond</td>
<td>21.7</td>
<td>2.7</td>
<td>22.34</td>
<td>0.04</td>
<td>-6.00</td>
<td>0.65</td>
</tr>
<tr>
<td>Öhman Obligationsfond</td>
<td>21.5</td>
<td>2.7</td>
<td>22.13</td>
<td>0.04</td>
<td>-6.20</td>
<td>0.60</td>
</tr>
<tr>
<td><strong>Average</strong></td>
<td><strong>21.9</strong></td>
<td><strong>2.4</strong></td>
<td><strong>24.62</strong></td>
<td><strong>0.17</strong></td>
<td><strong>-5.78</strong></td>
<td><strong>0.55</strong></td>
</tr>
</tbody>
</table>
Almost every fund in Table 1 underperforms the benchmarks total return of 27.7% when looking at total returns. When adjusting for risk via the M2-measure, the risk-adjusted performance is on average still inferior but to a lesser extent. This means that the Swedish long-term bond funds on average have a lower volatility of returns than the index. However, the lower levels of risk will also produce lower returns than the index. Even when the fund portfolios are adjusted to have the same level of risk as the benchmark index, the returns are lower than the index. The conclusion must therefore be that the Swedish long-term bond funds underperform their benchmark index in both total return and risk-adjusted levels. Some examples will now illustrate the analysis and application of the RAP-measure;

For example, Skandia Realräntefond had a total return of 34.3% during the concerned period, well above the benchmark (OMRX-Tbond 27.7%), but the risk-adjusted performance of the fund was only 24.83%. That is a risk-adjusted performance 2.89% lower than the benchmark. Another way of putting it would be that the investors in the fund have not been adequately rewarded for the risk they have been exposed to. If the fund would have had the same lower risk level as the benchmark, it would have underperformed it by almost 3%.

The fund Folksam Obligationsfond is an example of the opposite; underperformance in total return (22.9% almost 5% less than the total index return of 27.7%) and a superior performance on a risk-adjusted basis (29.06%). If the fund portfolio manager had been willing to accept higher risk, up to the same level as the OMRX-Tbond index, the manager could have leveraged (borrowed at the risk free rate) the fund portfolio by an additional amount of 33% (the leverage factor, 0.33) of the funds’ value, to invest in the fund-portfolio. This operation would have increased the risk-level of the fund to the same level as the benchmark and produced a 1.36% superior return (29.06%-27.7%).

Another example of a fund that performs superior to the benchmark on a risk-adjusted basis but not in total returns, is the Folksam LO Obligation which has a total return performance of 26.0% and a RAP of 29.60%, almost 2% better than the benchmarks return of 27.7%.

A fund that is much improved by the risk-adjustment procedure is also the SEB Obligationsfond. It has a total return performance of 20.8% well below the index return of 27.7%, but after adjusting for risk the funds performance is improved to 27.35% just slightly lower than the benchmark. The fund portfolio consequently has a much lower level of risk than the benchmark (2% compared to benchmarks 2.8%). The portfolio manager could therefore have leveraged the fund portfolio with as much as 40%. The
risk (standard deviation) of the portfolio (2%) would then have been the same as that of the benchmark (2.8%).

What Table 1 shows is that the Swedish long-term bond fund’s have total returns which on average are around 20% lower than the benchmarks total return. There might of course be various and very different reasons for this underperformance. However, the strongest single factor that affects the average performance of the funds must be the relative low levels of risk in the fund portfolios compared to that of the index. Only one of the 35 Swedish bond funds has a volatility greater than that of the benchmark (Skandia realräntefond Std. 4.1% compared to index Std. 2.8%). On average the standard deviation of the Swedish long-term bond funds is 2.4% compared to the index which has a standard deviation of 2.8%. How these differences in risk have come about is hard to say. The important fact is that whether or not this difference is justified the Swedish bond funds continue to underperform the market (average RAP 24.62%, compared to benchmark return of 27.7%) even on risk-adjusted levels.

8. ANALYSIS AND RELATED STUDIES

The common belief that mutual funds generally underperform the market confirms the original version of the efficient market hypothesis. The idea is that expenditures on research and trading are wasted in a market in which securities prices contain all information. This idea is attributed to two studies made in the 1960’s by Sharpe (1966) and Jensen (1968), which show that mutual funds underperformed common market indices. These two studies form a paradigm that has been dominating the impression of mutual fund performance almost until this day (Ippolito, 1993).

The inferior performance of Swedish mutual funds’ total returns in the period 2000 to 2003, can to some extent, be explained by the dominant role of government bonds in the index. Most of the trade in the Swedish long-term bond market takes place in this kind of low risk government bonds. The dominant role of these securities is so significant that fund portfolio managers seem to be reluctant towards holding more risky and less liquid securities such as corporate bonds. The performance of the Swedish bond funds might therefore not line up with the performance of the OMRX-Tbond index.

Modigliani and Modigliani (1997) demonstrate the application of RAP on a small sample of selected equity mutual funds, which suits their demonstration of the usefulness of RAP. The application and results of their study are nonetheless similar to the results of this inquiry. For instance, the
improved performance of funds with lower then benchmark volatility is in accordance with the results in the Modigliani and Modigliani article. Another result in line with the results in this study is that the funds with volatility in excess of the benchmark have a downward adjustment of performance.

In spite of this, the period 2000 to 2003 have proven to be quite good for the Swedish long-term bond funds, with average total returns (over the risk free-rate, 4.04%) of almost 18%. When risk-adjusted, the performance of many of the Swedish mutual funds improves noticeably, most of them however, are still underperforming the index OMRX-Tbond by a few percentage points when risk-adjusted with the M2-model. On average the underperformance is around 3%, sufficient enough to support the idea originally proposed by Jensen; “It’s difficult to systematically beat the market. But it’s not difficult to systematically throw money down a rat hole by generating commissions” (M. Jensen, quoted in Forbes, October 8, 1984). What Jensen means is basically that the funds themselves trade the fund portfolio to the extent that the cost of this trade burdens the result (Ippolito, 1993).

The influence played by administrative fees is shown by Dahlquist, Engström, and Söderlind (2000) to have a direct and evident effect on the return of the funds. Compared to the costless benchmark this cost is quite substantial. This paper might therefore be consistent with another proposition made by Sharpe and Jensen; “that mutual funds essentially waste their expenditures in futile efforts to find and act on new information” (Ippolito, 1993). Still, if these costs are so substantial that the average Swedish bond funds performance is about 5% lower then the benchmark’s, it would be sensible to think of some more cost efficient portfolio strategies, i.e. indexing.

If active management of the Swedish mutual funds had a significant negative effect on performance during the concerned period, it would contradict the findings of Dahlquist, Engström, and Söderlind (2000), who find evidence suggesting that actively, managed equity funds perform better than more passively managed funds. Indeed, Ippolito (1993) also propose that a majority of funds are sufficiently successful to generate an industry average which matches the returns available from indices, after subtracting expenses and adjusting for risk. These two studies are however made on equity and not bond funds. It must be stressed that this study is based on Bond portfolios. Even though much of the research and studies in mutual fund performance have been done on foreign records, mainly U.S. data, there is little evidence pointing to some specific circumstance in the Swedish financial market,
which would make the results particularly unacceptable. Still, one important circumstance in the Swedish bond market is, and will continue to be for some time, the dominant role of government bonds.

8.1 Criticism of the M2-model

As with most performance measures there are some shortcomings with the M2-model. The shortcomings of the M2-measure are however the same as for the CAPM and the Sharpe-ratio which is, as mentioned, the most broadly used theories in security pricing and performance.

The M2-model for risk-adjusted performance is based on historical data, "as any investment prospectus will tell you, is not a necessarily indicative of future performance" (Modigliani and Modigliani, 1997). Nevertheless, historical data is in many ways the best estimate of future performance available. Grinblatt and Titman (1992) have found evidence of performance persistence for mutual funds, so if not perfect, they still remain valuable and appealing information. In addition, most investors probably want some information on how various fund managers performed in the past, and whether they were adequately compensated for the risk to which they were exposed.

As mentioned, the M2-model shares its shortcomings with the Sharpe ratio that is because the model is also based on the standard deviation as a measure of risk, and return as a measure of reward. Thus, the M2-measure ranks portfolios in the same manner that the Sharpe ratio does. Some investors might feel that other measures of risk are more appropriate such as "VAR" or "downside-risk".

The risk-free rate is also an important factor for the way in which M2-model works, a factor that may need some analysis. Most investors are probably not allowed to borrow at the risk-free rate, which is essential for the model to hold exactly (through leverage). Although complicated, the model should hold for some variations and differences in interest rates as well.

For this study in particular it is also important to note that there might be an element of survivorship bias. Although important, the impact of this element is supposed to be small or at least not significant for the results and conclusions of this paper. In fact, survivorship bias would actually overstate the performance of the mutual funds.

Important to note is also that the M2-measure identifies the "best performing" portfolio for any set of portfolios with the same benchmark. Combinations of those portfolios that might be more optimal are not
considered. Hence an even better portfolio might possibly be constructed from the combination of the existing portfolios in the set.

9. CONCLUSIONS

Many observers of the Swedish financial market share the view that mutual funds on average underperform the market. The application of Modigliani and Modigliani’s Risk-Adjusted performance measure on Swedish long-term bond funds data for the period 2000 to 2003, shows that on a risk-adjusted basis this idea is confirmed. This study does not claim that all Swedish long-term bond funds significantly underperform their benchmark index OMRX-TBond. But it does suggest that, on a risk-adjusted basis, the average bond fund has a lower or at least neutral performance relative to the benchmark. Over the period studied the risk-adjusted return is on average 3% lower than the benchmarks. This finding is consistent with the results of Sharpe (1966) and Jensen (1968), which in many ways have created the notion of underperformance in mutual funds.

The risk level of the Swedish long-term bond funds is on average 0.4% lower than their benchmark the OMRX-TBond. An increase in volatility in the funds might not automatically lead to higher returns. However, if such an increase might occur, it would be consistent in the sense that it makes the Swedish long-term bond funds on average, more comparable to the Swedish market.

This thesis is the first application of the Modigliani and Modigliani measure of risk-adjusted performance on Swedish bond fund data. Not only does this measurement display the importance of risk-adjustment and risk-equivalence when evaluating and assessing portfolios, it also demonstrates the originators’ idea that a simple and easily understandable measure of risk-adjusted performance might have great implications for the individual investor’s choice of portfolio.

Interesting areas for future research on this subject would be the legal regulations concerning leverage; perhaps leverage is tool for portfolio optimization that has received an unreasonable bad reputation.
REFERENCES


Jönköping International Business School


Internet sources

http://www.morningstar.se/ Morningstar Sweden

http://www.om.se/ OM Stockholm Exchange
JIBS Dissertation Series

No. 001 Melander, Anders: Industrial wisdom and strategic change – The Swedish pulp and paper industry 1945-1990, 1997 (Business Administration)
No. 002 Marmefelt, Thomas: Bank-industry networks and economic evolution – An institutional-evolutionary approach, 1998 (Economics)
No. 003 Wiklund, Johan: Small firm growth and performance – Entrepreneurship and beyond, 1998 (Business Administration)
No. 004 Braunerhjelm, Pontus: Knowledge capital, firm performance and network production, 1999 (Economics),
No. 005 Frankelius, Per: Företagande över tid – Kontextuellt perspektiv och visuellt beskrivningspråk, 1999 (Business Administration)
No. 006 Klaesson, Johan: A study of localisation economies and the transport sector, 2001 (Economics)
No. 007 Hatemi-J, Abdulnasser: Time-series Econometrics Applied to Macroeconomic Issues, 2001 (Economics)
No. 008 Alhager, Eleonor: Mervärdesskatt vid omstruktureringar, Iustus förlag AB, 2001 (Commercial Law)
No. 009 Hugoson, Peter: Interregional Business Travel and the Economics of Business Interaction, 2001 (Economics)
No. 010 Pettersson, Lars: Location, Housing and Premises in a Dynamic Perspective, 2002 (Economics)
No. 012 Brundin, Ethel: Emotions in Motion – The Strategic Leader in a Radical Change Process, 2002 (Business Administration)
No. 013 Wiklund, Hans: Arenas for Democratic Deliberation – Decision-making in an Infrastructure Project in Sweden, 2002 (Political Science)
No. 014 Florin Samuelsson, Emilia: Accountability and Family Business Contexts - An Interpretive Approach to Accounting and Control Practices, 2002 (Business Administration)
No. 015 Ahl, Helene J.: The Making of the Female Entrepreneur – A Discourse Analysis of Research Texts on Women’s Entrepreneurship, 2002 (Business Administration)
No. 016 Olsson, Michael: Studies of Commuting and Labour Market Integration, 2002 (Economics)
No. 017 Wigren, Caroline: The Spirit of Gnosjö – The Grand Narrative and Beyond, 2003 (Business Administration)
No. 018  Hall, Annika:  *Strategising in the context of genuine relations: An interpretative study of strategic renewal through family interactions*, 2003 (Business Administration)

No. 019  Nilsson, Ulf:  *Product costing in interorganizational relationships – A supplier’s perspective*, 2003 (Business Administration)

No. 020  Samuelsson, Mikael:  *Creating new ventures: A longitudinal investigation of the nascent venturing process*, 2004 (Business Administration)

No. 021  Bruns, Volker:  *Who receives bank loans? A study of lending officers’ assessments of loans to growing small and medium-sized enterprises*, 2004 (Business Administration)

No. 022  Gustafsson, Veronica:  *Entrepreneurial Decision-Making: Individuals, tasks and cognitions*, 2004 (Business Administration)


No. 024  Ejermo, Olof:  *Perspectives on Regional and Industrial Dynamics of Innovation*, 2004 (Economics)


No. 026  Hilling, Maria:  *Free Movement and Tax Treaties in the Internal Market*, 2005 (Law)

No. 027  Brunninge, Olof:  *Organisational self-understanding and the strategy process*, 2005 (Business Administration)

No. 028  Blombäck, Anna:  *Supplier brand image – a catalyst for choice: Expanding the B2B brand discourse by studying the role corporate brand image plays in the selection of subcontractors*, 2005 (Business Administration)

No. 029  Nordqvist, Mattias:  *Understanding the role of ownership in strategizing: a study of family firms*, 2005 (Business Administration)


No. 031  Johnson, Andreas:  *Host Country Effects of Foreign Direct Investment: The Case of Developing and Transition Economies*, 2005 (Economics)

No. 032  Nyström, Kristina:  *Entry and Exit in Swedish Industrial Sectors*, 2006 (Economics)

No. 034 Gräsjö, Urban: Spatial Spillovers of Knowledge Production – An Accessibility Approach, 2006 (Economics)
No. 036 Andersson, Martin: Disentangling Trade Flows – firms, geography and technology, 2007 (Economics)
No. 037 Nilsson, Désirée: Essays on Trade Flows, Demand Structure and Income Distribution, 2007 (Economics)
No. 038 McKelvie, Alexander: Innovation in New Firms: Examining the role of knowledge and growth willingness, 2007 (Business Administration)
No. 039 Garvi, Miriam: Venture Capital for the Future - Implications of Founding Visions in the Venture Capital Setting, 2007 (Business Administration)
No. 040 Rosander, Ulrika: Generalklausul mot skatteflykt, 2007 (Law)
No. 041 Hultman, Jens: Rethinking adoption – Information and communications technology interaction processes within the Swedish automobile industry, 2007 (Business Administration)
No. 043 Sjölander, Pär: Simulation-Based Approaches in Financial Econometrics, 2007 (Economics)
No. 044 Hang, Min: Media Business Venturing: A Study on the Choice of Organizational Mode, 2007 (Business Administration)
No. 045 Lövstål, Eva: Management Control Systems in Entrepreneurial Organisations – A Balancing Challenge, 2008 (Business Administration)
No. 046 Fridriksson, Helgi-Valur: Learning processes in an inter-organizational context – A study of krAf project, 2008 (Business Administration)
No. 047 Naldi, Lucia: Growth through Internationalization: a Knowledge Perspective on SMEs, 2008 (Business Administration)
No. 048 Wiberg, Daniel: Institutional Ownership - the Anonymous Capital: Corporate Governance and Investment Performance, 2008 (Economics)