THREE ESSAYS ON OWNERSHIP STRUCTURE, FIRM PERFORMANCE AND ABILITY TO INVEST

Roberto Mura

PhD

2006

YORK

CONTENTS

LIST OF TABLES

LIST OF FIGURES

ACKNOWLEDGEMENTS

I wish to express my gratitude to Dr. Aydin Ozkan for his supervision, his patience and all his encouragement during the preparation of the thesis. I would like to thank also Dr. Marco Realdon and Prof. Prof. Peter Spencer for their useful comments on the various drafts of this work. I would like to thank my two examiners Prof. Meziane Lasfer and Prof. John Hutton for very insightful comments and helpful suggestions.

Very special thanks are due to Mara Faccio for great support and helpful suggestions during the collection and computation of the ownership dataset. Kind help from Charles Bridge of the Higgs Report Review Team, Derek Rouse of Hemscott Plc Support Team and David Styles from the UK Department of Trade and Industry are also acknowledged.

Special thanks are also due to Prof. Jim Seward (editor of Financial Management) and the anonymous referee. Their valuable comments and suggestions have greatly improved the 3rd chapter of the thesis.

I am glad to acknowledge the helpful advices on the econometrics of this thesis by of Prof. Leslie G. Godfrey, Prof. Andrew Jones, Dr. David Roodman from the Center for Global Development and Prof. Frank Windmeijer from the Institute of Fiscal Studies.

I would like also to thank James Barrese, David Becher, Stijn Claessens, Jo Danbolt, Elisabeth Dedman, Benjamin Esty, Antoine Faure-Grimaud, Jana Fidrmuc, Jarl Kallberg, Samuel Lee, Guy S. Liu, Rozalia Pal, Enrico Perotti, Gordon Roberts, and Ralph Walkling for their helpful discussions and comments.

Financial support by the Department of Economics, University of York, and the Royal Economic Society are also gratefully acknowledged.

I take the opportunity of this section to express my warmest and most heartfelt gratitude to my parents and my parents in law for always being there for me during the inevitable difficult moments of a PhD.

Last but never least, this thesis would not even exist if it weren't for Maria-Teresa. She represents all the best there is in my life. I thank her for embarking with me in this extraordinary journey, for being my loving partner, my best friend and a brilliant co-author.

DECLARATION

Joint Work: Chapter 2 was written jointly with Maria-Teresa Marchica.

Refereed Publications:

A version of Chapter2 has now been published in *Corporate Governance: An International Review*, 2005, Vol.13, 1, 26-45.

A version of Chapter3 is now under revision after a second "revise and resubmit" for publication in *Financial Management*.
A version of Chapter3 was also invited by the Editor for submission to the *European Financial Management* Conference Issue.

Conference Presentations:

A version of Chapter2 was presented at the European Financial Management Association Doctoral Program, June 2003, in Helsinki. It was also presented at the 2nd International Conference on Corporate Governance, July 2004, organised by the Centre for Corporate Governance Research at the Birmingham Business School.
A version of Chapter 3 was presented at the CFS Corporate Finance Summer School, August 2004, in Frankfürt. It was also presented at the Financial Management Association European Meeting, June 2005, in Siena. It was also presented at the European Financial Management Association European Meeting, July 2005, in Milan. It was also presented at the 3rd International Corporate Governance Conference, July 2005, in Birmingham.
A version of Chapter 4 was presented at the *Financial Management Association* Doctoral Program, June 2005, in Siena. A version of Chapter 4 has been selected for presentation in the top 10% quality papers session at the Financial Management Association, USA meeting, Salt Lake City, October 2006.

Others:

This thesis was professionally proofread by Alison Walters and John F. Wilson, members of the Society for Editors and Proofreaders (SfEP) in the UK.

ABSTRACT

The aim of this study has been to provide more insights into our understanding of a number of issues pertaining to the evolution of ownership characteristics in the UK market, the impact of agency costs on firm performance and the links between the financial and investment decisions of firms. Our work contains a number of important and original aspects that potentially contribute to the literature on several grounds.

First, we provide a detailed and systematic evidence on corporate ownership and governance structure characteristics for a unique database which we hand-collected of a large sample of UK non-financial listed firms between 1991 and 2001. This work significantly contributes to the existing body of knowledge, by extending and complementing existing US evidence (Denis & Sarin, 1999) on the evolution of ownership systems showing a large variability over time both in the managerial and non-managerial ownership and in the board composition of UK companies.

Second, we directly analyse whether non-executive directors act independently from executives in determining firm performance. We exploit the documented evolution in ownership characteristics to investigate this link, using the GMM methodology (Arellano and Bond, 1991) which enables us to produce a set of systematic results which are robust both to the endogeneity of all the explanatory variables and to the presence of unobservable heterogeneity. Our analysis reveals a cubic relationship between managerial ownership and financial value. When we split the board between executives and non-executives we document that this non linear association is only linked to executives, while ownership by non-executives does not seem to have a significant impact. Nonetheless, a positive and significant effect of the number of non-executives in the board is reported. Furthermore, no evidence is consistent with the efficient monitoring hypothesis for institutional investors.

Third, we analyze the potential links between financing policy and investment ability. More in detail we investigate whether, by employing a policy of low leverage for a certain number of years, firms may accumulate financial flexibility that enables them to have access to the external market in the future, and to be able to raise funds to invest more than their internal resources alone would allow. We document that a low-leverage policy is

usually transitory. Following a period of low leverage, firms that have accumulated reserves of borrowing power appear able to make significantly more capital expenditures. Estimation results of the investment equation confirm this finding. Intertemporal descriptive analyses of firms' choices around the investment decision moment confirms that, firms with reserves of borrowing power sharply increase their capital investments after acquiring *RBP* status, issue new debt and approach their target leverage. Additionally, we detect a significant increase of abnormal investment (spikes) by firms after acquiring RBP status. A further important insight of these results is that they appear to indicate that this strategy is value enhancing.

CHAPTER 1

INTRODUCTION

The aim of this study is to provide more insights into our understanding of ownership characteristics in the UK market, the impact of agency costs on firm performance and, also, the interactions between the financial and investment decisions of firms.

Firm performance and financial decisions have long been studied under the perspective of costly agency relations that stem from the separation between ownership and control. One of the most debated aspects involves managers and shareholders. Shareholders typically invest financial capital in the firm, but generally hold a diversified portfolio, which affects their attitude towards risk. The investment in a particular firm generally represents only a fraction of their total wealth. Managers, on the other hand, are typically more exposed to the risks associated with the firm by which they are employed. Their human capital is tied up in the fortunes of the firm, as may also be part of their financial capital. This conflict of interests can lead to significant divergences when we consider, for instance, the investment policy of the firm. Shareholders, by virtue of portfolio diversification and limited liability, are mainly concerned with the positive side of the probability distribution of returns from investment, provided they have positive NPV; but managers are also concerned with the negative side of the distribution, as they have more to lose if the project fails. Therefore, managers may fail to undertake projects that might have proved worthwhile to shareholders. Furthermore, an ample free cash flow (or unnecessary financial slack), for example, may induce managers to carry on not maximizing value projects (Jensen, 1986), and to expropriate funds from the company to maximize their own utility function (Jensen and Meckling, 1976). The expropriation of funds can take different forms. For instance, managers may spend more on luxury projects rather than on value maximizing projects. Another form, known as *empire building,* entails that managers prefer to run large businesses rather than small ones, even if moving from small to large may not yield a positive-NPV undertaking, and even if the firm grows beyond its optimal size. Other less obvious examples consist in *transfer pricing* and *entrenching investment*. The former typically involves managers selling assets or output from the company they manage to a company they own at below market prices (Shleifer and Vishny, 1997); the latter usually refers to managers making manager-specific investments, which makes it costly for

shareholders to replace incumbent management (Shleifer and Vishny, 1989). The more ownership is dispersed among numerous shareholders, the more important these issues become. Indeed, in a highly dispersed company, for each atomistic shareholder the difference between the costs and the benefits of monitoring the incumbent management is so great that nobody has the incentive to promote any action and take an organizing role in removing, for example, the board of directors (collective action problem). To the extent that the market can anticipate these expected expropriation costs, the valuation of the firm will be discounted accordingly.

Although these categories are not entirely distinct, the literature has traditionally indicated two broad lines of solution to these issues: internal and external mechanisms (Jensen, 1993 and Denis, 2001). In this thesis, we will focus mainly on the role played by managerial ownership and board structure (internal mechanisms) and block ownership (external mechanism).[1]

The fact that shareholding by agents helps to align them to the interests of the principal is well documented in the literature (Jensen and Meckling, 1976). It is argued that direct equity ownership by managers reduces their natural tendency to allocate the firm's resources in their own best interests, and to divert resources away from value maximization. When managers hold shares, they bear more of the expropriation costs and their interests coincide more closely with those of outside shareholders. Jensen (1993) argues that "many problems arise from the fact that neither managers nor non-manager board members typically own substantial fractions of theirs firm's equity". Nonetheless, since Demsetz (1983) and Fama and Jensen (1983), a growing body of studies has started to recognize that the alignment effect may not be a linear function of managerial ownership. It is argued that increasing shareholding also delivers increasing voting power and effective control over the firm, which the manager may use to extract resources from the firm.

Another ownership characteristic that may be an important instrument in monitoring management is the presence of a large external shareholder. As Stiglitz (1985) argues, large shareholders have greater incentives to be involved in the control process than small ones,

---

[1] Jensen, 1993 and Denis, 2001 also highlight the importance of legal mechanisms and product market competition as further control instrument.

because they can more easily bear the high fixed costs of collecting information on management behaviour. Shleifer and Vishny (1997) provide a justification for the monitoring role of large investors, on the basis of their relevant resources invested in the firm. Kahn and Winton (1998) suggest that there is a positive relation between intervention by institutions and some firm-specific characteristics, such as poor performance, or mature or low-technology companies.

A further form of monitoring may be performed by the board of directors, which is supposed to act on behalf of the shareholders, as an important mechanism to monitor top management discretionary behavior and ratify main decisions (Hart, 1995). As a consequence, much emphasis is placed on the regulation of the "Board Structure". It is a general view that the board of directors is more independent as the number of non-executives increases (Agrawal and Knoeber, 1996; Hermalin and Weisbach, 2003). Non-executive directors should be independent "advisors" and act as "delegated monitors", by the shareholders, of the actions of executive managers. The reputation effect in the management labor market and the expertise, derived from their career history, is expected to give the non-executives the appropriate incentives to guarantee effective and independent monitoring action inside the firm (Fama and Jensen, 1983).

Other internal control mechanisms may lie in the financial decisions of firms. Easterbrook (1984) argues that corporate dividend payouts play a role in mitigating equity agency costs, by facilitating primary capital market monitoring of the firm's activities and performance. Higher dividend payouts increase the likelihood that the firm will have to sell common stock in primary capital markets. This in turn will induce a scrutiny of management by investment banks, securities exchanges and capital suppliers. Also, dividends commit the firm's management to pay out cash to shareholders, and cutting dividends may, in turn, provide a negative signal to the market. Debt, as Jensen (1986) argued, can be a good substitute for dividends, because managers bond their promises to pay out future cash flow in a very durable and enforceable way. In fact, increasing debt level means giving to the recipient credit holder the right to take the firm into bankruptcy court if manager does not meet the regular commitment to pay the due interest and

principal amount. In this way, the debt level reduces agency costs by limiting the cash flow subject to managerial discretion.

All these theories lay the grounds for the research we conduct in Chapter 2 of this thesis. As the literature considers ownership structure both a potential cause of agency conflicts, and a solution to them, detailed knowledge of ownership characteristics at the firm level are crucial in this setting, because they are a representation of the expected agency costs to which each firm is subject. An important shortcoming, especially in the UK-based studies, is the limited availability of detailed panel data of ownership. Taking this motivation as a starting point, we hand-collected detailed information on ownership structure and board composition in a panel dataset of approximately 1100 non-financial publicly traded corporations between 1991 and 2001.

The UK setting is a particularly interesting environment to study, for a number of reasons. First, during the early 1990s, it was rich in debate in the quest for effective solutions to the agency problems stemming from the separation between ownership and control. More specifically, following the corporate scandals that took place in the late 1980s and early 1990s, the UK witnessed periodical reports recommending "good corporate governance" (Cadbury, 1992; Greenbury, 1995; Hampel, 1998; Higgs, 2003). In addition, there was much criticism of the apparent low level of activism by institutional investors (see, e.g., Black and Coffee, 1994; Conyon and Peck, 1997; Short and Keasey, 1997). Despite these debates, and the measures implemented by policy-makers to improve the governance of UK firms, relatively few works have attempted to study in detail the evolution of the ownership and corporate governance structures in the UK (Dahya et al., 2002; Dedman, 2002).

Furthermore, a number of works has recently offered an alternative perspective on the separation between ownership and control, and the potential agency conflicts associated with it, by analyzing the ultimate ownership structure of companies (e.g., La Porta et al., 1999; Faccio and Lang, 2002; Claessens et al., 2002; Attig et al., 2003; Gadhoum et al., 2005). The analysis of ultimate ownership structures allows us to identify firm Z as the ultimate controller that is able to control a firm Y through its ownership relation with company X which is, in turn, a direct shareholder in firm Y itself. Complex structures, such

as pyramids, multiple control chains and cross-holdings, and multiple classes of shares, are devices that give the ultimate controller control rights in excess of its cash flow rights. Like any controller with few shares, the ultimate controller has incentives to extract private benefits from the firm at the expense of all other stakeholders. Nonetheless, theoretical studies argue that the control mechanisms proposed by the literature to mitigate managerial discretion cannot be applied to the ultimate controller. Therefore, it is shown that the agency costs associated with these particular structures are an order of magnitude larger than those related to the conflicts between managers and shareholders at the "direct level" of ownership (Bebchuck et al., 2000).

Following this perspective, in Chapter 2 we tackle a further important aspect: to provide a detailed description of ultimate ownership structures in the UK market. We computed them at 20%, 10% and 5% cut-off levels for a sub-sample of approximately 500 firms for the years 1993, 1995, 1997, 1999 and 2001 only, given the complexity of this calculation.

Our work documents that substantial changes in ownership structures are not uncommon, and that the classic argument of ownership stability may not necessarily fully apply in the UK case. Managerial ownership shows a sharp decreasing trend, mainly driven by executives' shareholding. We provide evidence that this sharp trend is rather evenly spread across all board ownership quintiles distribution, computed in the first year that a firm enters our sample. This result is particularly interesting when we consider that our figures also indicate a constant increase in average market capitalization by firms. This may suggest that, as a consequence of their risk aversion, managers have been unwilling to subscribe to new share issues. However, as we will show in more detail in Chapter 2, this trend appears to involve mainly executive directors. In fact, the average percentage of shares held by non-executives shows a steady increase.

In addition, our results indicate that ownership by outsiders increases when it is below 45% in the first year that firms enter the sample, while it decreases sharply above the cut-off level. Furthermore, average board size is relatively constant over time, and we show a mean reversion pattern around the average size of seven members.

Additionally, evidence on ultimate ownership structure shows that widely held firms are decreasing over time at each cut-off level. Additionally, the existence of complex ownership structures in the UK is far from negligible. More than 11% of firms in our sub-sample have an ultimate controller with complex structure, although this figure is decreasing over time at all cut-off levels.

The relation between ownership structure and firm performance is the subject of an important and ongoing debate in the literature. As we discussed above, Jensen and Meckling (1976) formally derive a model in which the distribution of shares among the insiders and outsiders in a company can influence its value. More specifically, direct equity ownership should align managers' interests to those of shareholders (the alignment effect). However, according to Shleifer and Vishny (1989), an increasing percentage of shares held by the managers may also increase their discretion. This, in turn, would impair the ability of outside shareholders to monitor and influence managers (entrenchment effect). Evidence on this issue is mixed. A number of papers find a non-monotonic relation between ownership and value: among others, McConnell and Servaes (1990, 1995) observe an inverse U-shaped relationship, whereas Hermalin and Weisbach (1991), Morck et al. (1988) and Short and Keasey (1999) report a significant cubic relation. Other studies fail to detect any significant links between the two: for example, Loderer and Martin (1997), Cho (1998) and Demsetz and Villalonga (2001).

Furthermore, the vast majority of past studies have focused on ownership by the whole board or, alternatively, by executive directors only, as a proxy for managerial ownership. Very limited evidence exists on the impact of non-executive shareholding on company value. It is argued in the literature that non-executive directors should act as delegated monitors inside boards (Hart, 1995), as emphasized by Fama (1980), and that both the reputation effect in the management labor market, and expertise acquired from their career history, could give non-executives enough incentives to guarantee effective and independent monitoring within the firm. In other words, to the extent that non-executive directors are independent and appointed by shareholders, there is no need to provide them with any kind of incentive.

However, other compelling arguments in the literature indicate that the managerial labor market incentives may not work in the way that is predicted, and also that they may be insufficient to guarantee that non-executives are effectively interested in firm performance. For instance, outside directors "may owe their position to management" (Hart, 1995); also, a reputation as a director who does not make trouble for CEOs is also potentially valuable to the director (Hart, 1995; Hermalin and Weisback, 2001). Furthermore, in their seminal work, Morck et al. (1988) maintain that although it is the "fiduciary duty" of non-executives to oversee the activities of top managers, these actions require time and effort. Therefore, outside directors should be provided with strong financial interests in the firm, to ensure that they are concerned about company performance. Similarly, Jensen (1993) states that "encouraging outside board members to hold substantial equity interests would provide better incentives". This is particularly interesting when considered in the light of the important results reported in Chapter 2, which document a clear increasing trend in non-executive shareholding.

Additionally, in Chapter 3 we also exploit the evidence from Chapter 2 that ownership characteristics in the UK market are far from stable. The high degree of variability we document in our data analysis enables us to investigate the link between Tobin's q and ownership structure, using the GMM methodology (Arellano and Bond, 1991). In contrast to the previous literature, this technique provides us with a set of results on the relationship between ownership and performance that is robust to the endogeneity of all the explanatory variables, and to the presence of unobservable heterogeneity.

Therefore, in Chapter 3 we take these facts as starting points in investigating whether non-executive directors act independently from executives in determining firm performance. To this end, we first test the relationship between board ownership and firm value. Then, we divide the board of directors between executives and non-executives, and we test whether ownership by non-executives is also a relevant factor. We also check whether the mere presence of outside directors on the board is significantly linked to firm value. We also test whether the presence and identity of a large shareholder has an impact on firm performance. We also include a number of other control variables, such as capital

expenditures, leverage and firm size, which the current literature argues are potentially able to influence firm performance.

Our analysis reveals a cubic relationship between Tobin's q and ownership by executive directors. On the other hand, no significant relationship is found between ownership by non-executives and performance, whereas we report a positive and significant effect of the ratio of non-executives to total board. Our results also suggest that the presence of a large outside shareholder, and in particular of large institutional investors, is negatively related to firm performance; whereas investment in physical capital, cash flow and dividend payments exerts a positive impact. Finally, no significant impact of company size, debt ratio or RD expenditures is detected.

In Chapter 4 we focus on another important research issue: the interactions between financial and investment decisions. More specifically, we investigate the hypothesis that a low-leverage policy directed at maintaining flexibility can affect company investment.

To the extent that the Modigliani and Miller (1958) proposition on the irrelevance of financial factors to firm value holds, firms' investment decisions are independent of financial decisions. Under the assumption of perfect capital markets, in fact, external funds provide a perfect substitute for internal capital. Firms can obtain from investors the necessary capital to implement profitable investments opportunities without paying an extra premium. Their responses to changes in the cost of capital or tax-based investment incentives differ only because of differences in investment demand (Fazzari et al., 1988). In other words, firms decide how much to invest on the basis of their growth opportunities alone, regardless of the sources of capital. This implies an insignificant relationship between investment expenditures and internal funds.

Under the assumption of imperfect capital markets, in contrast, internal and external funds are no longer substitutes. The difference between the costs of internal and external finance is generally interpreted as the result of a premium on external finance that arises from contracting and asymmetric information problems, and from agency conflicts between insiders and outside investors. As modelled by Jaffee and Russell (1976) and Stiglitz and Weiss (1981) for the debt market, and by Greenwald et al. (1984), Myers (1984) and Myers and Majluf (1984) for the equity market, investors do not have as much information about a

company as its managers. Even if managers act in the shareholders' interests, for investors it is very costly, and in some cases even impossible, to assess firm quality. The cost of capital, therefore, increases with agency and asymmetric information problems, and, as a result, firms needing external resources to invest will pass up some projects with positive NPV (*debt or equity rationing*). In such conditions, the ability of firms to invest is hampered because firms are forced to base their expenditures, not only on the quality of growth opportunities, but also on the availability of capital. According to this view, the greater the capital market imperfections, the stronger the sensitivity of investment to internal resources.

However, since the seminal work by Fazzari et al. (1988), the investment literature has mostly focused its attention on the identification of different classes of firms that are more (or less) likely to face higher costs of capital, in the attempt to document how investment cash flow sensitivities change as the costs of external finance rise (see, e.g., Devereux and Schiantarelli, 1990; and Bond and Meghir, 1994, for the UK; Hoshi et al., 1991, for Japan; Chirinko and Schaller, 1995, for Canada; Elston, 1998, for Germany).

The capital structure literature, on the other hand, generally considers investment as exogenously determined, and focuses its attention on the relative costs of debt to equity, testing the hypotheses of the pecking order versus the trade off theory (e.g., Shyam-Sunder and Myers, 1999; Fama and French, 2002; Frank and Goyal, 2003; Flannery and Rangan, 2005), as well as market timing (Baker and Wurgler (2002) and the relevance of elements such as taxes and financial distress (Hovakimian et al., 2001).

However, according to Myers (1977), "too much" debt may induce firms to forego profitable investment opportunities, even when managers are fully aligned to shareholder's interests. Furthermore, according to Modigliani and Miller (1963) and Myers (1984), capital market imperfections may lead firms to consider it necessary to preserve financial flexibility, which entails "the maintenance by firms of a substantial reserve of untapped borrowing power" (Modigliani and Miller, 1963, p. 442). Recent international survey evidence on the determinants of capital structure (Graham and Harvey (2001) for the US, Bancel and Mitoo (2004) and Brounen et al. (2005) for Europe) has provided evidence to corroborate these theoretical predictions. For instance, according to the figures reported in

Graham and Harvey (2001), 59% of the respondent Chief Financial Officers say that flexibility is important (rating of 3) or very important (rating of 4), in enabling the firm to undertake investment in the future.

In Chapter 4, we take these arguments as a starting point and empirically investigate the hypothesis that firms, anticipating financial constraints in the future, respond to these potential constraints by accumulating reserve borrowing power (RBP). More specifically, by employing a policy of low leverage for a certain number of years, firms may accumulate financial flexibility that allows them to have access to the external market, and to be able to raise funds to invest more than their internal resources alone would allow.

We acknowledge that firms may have a target debt ratio, and may also deviate from it for periods of time. We employ a widely adopted set of determinants in the attempt to measure leverage targets. This is one of the distinguishing features of our work: this approach enables us to classify low-leverage firms according to the deviation between target and actual leverage. Low-leverage firms are then classified as having *reserves of borrowing power* (RBP) if they are identified as low-leverage for a period of three years. In the second stage of the analysis, we estimate an investment model, augmented with the RBP status dummy of firms, to investigate whether this borrowing power, accumulated in the previous three years, has an impact on current investment policy.

According to our analysis, the RBP policy is a transitory one. Estimation results of the investment equation reveal that those firms classified as having accumulated reserve borrowing power are able to make significantly more capital expenditures. On the other hand, the impact of the RBP status dummy on the cash flow sensitivity parameter is consistently negative and often insignificant. This further corroborates the hypothesis that these firms are not more constrained in their investment decisions than others.

We also perform an intertemporal descriptive analysis of firms' choices around the investment decision moment. This reveals how, consistent with previous econometric results, firms with reserves of borrowing power sharply increase their capital investments after acquiring *RBP* status. They do so by increasing their borrowing by issuing new debt, which also takes them closer to their target leverage. We detect also that the increase in investment of RBP firms is associated with an increase in what we define as abnormal

investment (or investment spikes). Finally, the results appear to indicate that this strategy is value enhancing, because we document an increase in average market to book ratio for this group of firms. Several alternative robustness checks confirm the previous set of results.

Chapter 5 presents the overall conclusions of this work, and draws together the various aspects examined in this study. In particular, we emphasize how the thesis enhances our understanding of the types and extent of agency conflicts inside the firm, and how these conflicts ultimately determine company value and key corporate decisions, such as investment choices.

CHAPTER 2

THE EVOLUTION OF THE OWNERSHIP AND GOVERNANCE STRUCTURES IN THE UK MARKET

2.1. Introduction

Since the seminal work by Jensen and Meckling (1976), the corporate finance literature has proposed a number of instruments related to the ownership and governance structure of firms (internal mechanisms) to mitigate the conflicts between managers and shareholders (equity agency costs). The main control mechanisms that are the object of this work are, in particular, managerial ownership, shareholding by large external investors and board composition. Several empirical studies have extensively analyzed the effectiveness of these mechanisms, both on corporate decisions and the market value of firms (for an extensive review see Short, 1994; Becht et al., 2002) and on the nature of the interaction between them (e.g., Hermalin and Weisbach, 1991; Jensen et al., 1992). They also have compared ownership structure and board composition across countries (e.g., Roe, 1993; La Porta et al., 1999; Claessens et al., 2002).

More specifically, managerial equity ownership is an instrument for aligning managerial interests with those of outside shareholders (Jensen and Meckling 1976; Morck et al., 1988; McConnell and Servaes, 1990, 1995). As managerial ownership becomes greater, directors bear a larger fraction of the costs of diverting resources away from firm value maximization. This argument has received empirical support in a number of studies in different strands of the corporate finance literature. Morck et al. (1988) and McConnell and Servaes (1990, 1995), amongst others, document a significant relation between managerial ownership structure and firm value; Berger et al. (1997) provide evidence of a link between managerial ownership and capital structure decisions; Opler et al. (1999) report a significant relationship between insider ownership and firm cash holding policy, while Jensen et al. (1992) show how leverage, dividends and managerial ownership are simultaneously determined.

Other studies have focused on ownership concentration and large shareholders, as means of reducing managerial discretion when there is separation between ownership and control. In their seminal work, Berle and Means (1932) maintain that an inverse correlation should be observed between ownership dispersion and firm performance. It is argued that the wedge between the costs and the benefits of monitoring the incumbent management becomes larger as ownership dispersion increases. On the other hand, as Stiglitz (1985) argues, larger shareholders have greater incentives to be involved in the

control process than smaller ones, because they can more easily bear the high fixed costs of collecting information on management behaviour. Shleifer and Vishny (1997) provide a justification for the monitoring role of large investors on the basis of their relevant resources invested in the firm. Empirical results in this area are mixed. McConnell and Servaes (1990, 1995) report that neither all blockholders nor the largest single blockholder have a significant effect on firm performance. Agrawal and Knoeber (1996) also conclude that blockholding plays no significant role. Nonetheless, Davies et al. (2005) document a strong negative link between blockholder ownership and firm value for UK companies. Further, Mehran (1992) finds a positive relation between the leverage ratio and ownership by large individual investors, while Goergen and Renneboog (2001a) detect a positive investment cash flow sensitivity only in those firms whose owners have large shareholdings.

Additionally, a great deal of work has focused attention on the identity of external shareholders. According to Pound (1988), institutional investors may be more efficient monitors than other shareholders, because of their greater expertise (the efficient monitoring hypothesis). However, Pound also contends that institutional investors may find it profitable (the strategic alignment hypothesis), or even be forced (the conflict of interest hypothesis), to cooperate with managers in order to protect other business relationships they may have with the firm. This aspect may be particularly relevant for the UK, where much debate was sparked during the 1990s as a consequence of the lack of activism of institutional investors (see, among others, Conyon and Peck, 1997; Plender, 1997; Goergen and Renneboog, 2001b).[1] Empirically, and in contrast to Dahya et al.'s (2002) results on the UK market, Parrino et al. (2003) find that institutional ownership in the US is an important determinant of both CEO turnover and the appointment of an executive from the market as a new CEO. Goergen and Renneboog (2001b) report a lower cash flow sensitivity of investments when institutional ownership is large.

Several studies have also investigated the role played by board composition. Hart (1995) argues that, due to the separation between ownership and control, the board of directors is supposed to act on behalf of shareholders, as an important mechanism for monitoring top management discretionary behaviour. In the UK, throughout the 1990s,

[1] Indeed, the Cadbury Report (1992), Hampel (1998) and Higgs' Codes of Best Practice (2003) all call for an increased role for institutional investors in corporate governance.

the Codes of Best Practice stressed the importance of board composition. In its guidelines, CALPERS (1998), in the US, sustains the view that companies should have boards that are composed of a large majority of independent directors.[2] This increased emphasis on the role of board composition by practitioners has sparked a large number of works by academics. On the one hand, several studies analyze the impact of board composition on how boards accomplish specific tasks. For example, Dahya et al. (2002) study the impact of compliance with the Cadbury recommendations on board composition and on CEO turnover, and report a significant increase in management turnover following adoption of the Cadbury recommendations. On the other hand, other works attempt to assess the impact of board composition on firm value. Yermack (1996), amongst others, reports evidence of a positive relation between the proportion of independent directors and Tobin's q, and a negative link between board size and firm value.

Moreover, an alternative perspective on the separation between ownership and control is provided by the analysis of the ultimate ownership structure of firms (e.g., Bebchuck, 1999; La Porta et al., 1999; Bebchuck et al., 2000; Faccio and Lang, 2002; Gadhoum et al., 2005). In this analysis ownership and control are measured in terms of cash flow and control rights. The main idea here is to take into account the impact that firm (or individual) Z can exercise on firm Y through its ownership relationship with firm X, which is itself a direct shareholder in firm Y. Firm Z is called the ultimate controller of firm Y, because it is the last shareholder that it is possible to retrieve along the control chain. Different kinds of control chains can be identified by pyramids, multiple control chains and cross-holding. Such complex structures, along with multiple classes of shares, are devices that give ultimate controllers control rights in excess of their cash flow rights. The potential conflicts between the ultimate controller and other investors in the firms are of a different nature than those described at the "direct level" of ownership. Like any controller with few shares, the ultimate controller has the incentives to extract private benefits from the firm, or, in other words, to expropriate resources at the expense of other shareholders. In this perspective, the problems and consequences of the presence of an ultimate controller are comparable with those that arise in a typical conflict between managers and shareholders identified at the "direct

[2] CALPERS is an acronym for California Public Employees Retirement System, Corporate Governance Core Principles and Guidelines.

level". However, previous research argues that the instruments that the literature has proposed to reduce managerial discretion cannot be applied in the ultimate controller case (Bebchuck 1999; Bebchuck et al., 2000). For instance, they show that because the ultimate controller may be a shareholder, it may not be subject to any market discipline (i.e, hostile takeovers) in the way that the controlling managers are. Also, it cannot benefit from any incentive scheme, such as bonuses linked to firm performance or a higher quantity of cash flow rights, that would align it with the incentives of the other shareholders. Therefore, as these studies demonstrate, the agency costs of these complex structures are an order of magnitude larger than those associated with conflicts between managers and shareholders at the "direct level" of ownership.

Despite the large interest that the literature has paid to the links between ownership structure and firm value, on one side, and financial decisions on the other, a major shortcoming, especially for the UK based studies, is the scarcity of detailed panel data of ownership. This may be due to the predominant view in this research that, by its very nature, the characteristics of ownership are relatively stable over time (e.g., La Porta et al., 1999; Zhou, 2001). Therefore, although there were several debates in the 1990s, and policy-makers and practitioners implemented a number of measures to improve the governance of UK firms, relatively few academic works have systematically documented the changes in the ownership and corporate governance structures in the UK market (Dahya et al., 2002; Dedman, 2002).

Furthermore, only little research has been undertaken to assess the impact of ultimate ownership structures on both corporate decisions and firm value (e.g., Faccio et al., 2001; Classens et al., 2002; Attig et al., 2003). In addition, it is an accepted argument in the law and finance literature that *common law* countries tend to have more widely held companies, that is, firms without an ultimate controller (e.g., La Porta et al., 1999; Shleifer and Wolfenzon, 2002). Also, studies in this literature argue that *common law* legal systems prevent the controlling shareholders from expropriating minority stakeholders through the use of complex ownership structures (e.g., Bebchuck, 1999; Wolfenzon, 1999).

Taking all these arguments as a starting point, in the initial phase of our thesis we hand-collected ownership and board composition data for a panel of approximately 1,100 non-financial UK listed firms for the years 1991-2001, for a total of 10,112

observations. Additionally, we also computed ultimate ownership structures. Because of the complexity of computation, we calculated the ultimate ownership and control of a sub-sample of approximately 550 non-financial firms for the years 1993, 1995, 1997, 1999 and 2001, for a total of 2,310 observations. The purpose of this chapter is therefore to present this unique database and to provide, through extensive descriptive statistics, stylized facts on the ownership, both direct and ultimate, and governance structures in the UK. All definitions of variables are provided in Table 2.1.

Our analysis shows a significant evolution of ownership structure and board composition over the last decade. Managerial ownership shows a sharp decreasing trend. In particular, the average shareholding by executive directors shows a decreasing trend, while the opposite holds for non-executive directors. More specifically, we single out changes between the first and last years in which a firm is present in the sample, and so document that this sharp decreasing trend is relatively evenly spread across all initial board ownership quintiles.

Unlike the case of directors, ownership by outsiders does not appear to follow a specific trend over time. Nonetheless, further investigations reveal that non-managerial shareholding increases when it is below 45% in the first year that firms enter the sample, while it decreases sharply above that level.

Furthermore, average board size is relatively constant over time, and we document a mean reversion pattern around the average size of seven members. It appears that small boards tend to increase their size, while larger boards seem to be curtailed. Among directors, non-executives constitute a progressively increasing proportion of the board, although they decrease when the proportion reaches two-thirds of the board.

Overall, we provide evidence that substantial changes in ownership structures are not uncommon, and that the argument of ownership stability developed by, among others, La Porta et al. (1999) may not necessarily apply fully in the UK case. Indeed, our work complements other US evidence that ownership is far from stable. For example, Holderness et al. (1999) report an average increase in managerial shareholding of about 13% between 1935 and 1995. Similar arguments are borne out by Denis and Sarin (1999), who report significant changes in both ownership structure and board composition for US listed companies between 1983 and 1992.

In addition, our findings indicate that, when they are reported as the largest owners non-financial shareholders and executive directors are the two main categories among largest owners. According to our figures, they appear to have control of around 40% of our sample firms, despite the fact that the undisclosed shareholding is more than 50% of the market.

Evidence on ultimate ownership structure reports that widely held firms are decreasing over time at each cut-off level. In line with Faccio and Lang's (2002) findings, our data show that the existence of complex ownership structures in the UK is far from negligible. Furthermore, our data also indicate that the presence of complex structures is decreasing in time at any cut-off level. Concentration is achieved through direct holding of shares, not through complex structures.

The remainder of this chapter is organized as follows. Section 2 contains a detailed description of the data collection and methodological issues. Section 3 provides preliminary descriptive statistics of the entire sample. Section 4 documents the evolution of ownership structure and board composition over time. Section 5 investigates the ultimate ownership structure. Section 6 sets out our conclusions.

2.2. Data Collection and Sampling

In the initial stage, a sample of approximately 1,100 non-financial firms listed on the London Stock Exchange was selected from Datastream constituent lists[3]. Ownership data were hand-collected from the Price Waterhouse Corporate Register (the December issue for each year in the sample period was used). Economic and market data were downloaded from *Datastream*.

In following companies over time, from two different datasets, it was necessary to put a great deal of effort into tracking all name changes and defunct companies. This was particularly critical for the computation of ultimate ownership, when we had to retrieve the ownership structure of a company when it or its owners changed their name in a certain year. This information was mainly collected from the London Stock Exchange Yearbook, which reports systematic information on name changes, entries removed from the companies section, companies in liquidation, in receivership and in administration. As a further check, we used the Companies House website, which also

[3] Our sample includes firms listed in the Alternative Investment Market (AIM).

provides information on companies, such as previous names and the nature of the business (SIC 03). This has the advantage over the LSE Yearbooks of making it possible to perform searches of firms using either their old or their new name.

As we described in the introduction, it has been common in the literature to consider ownership as static in time. In order to assess how much the UK market reflects this behaviour, the data were initially collected in a bi-annual fashion. The preliminary analysis conducted on this initial dataset encouraged us to proceed to collect the data for the even years too, because it became apparent that the classical "static" view does not seem to prevail in the UK.

Table 2.2 presents some introductory facts about the dataset. Information was collected on an unbalanced panel of 1,181 firms, for a total of 10,112 observations. To avoid survivorship biases, we did not require firms to be present in all time periods.

Particular care was also taken in investigating the presence of attrition biases in the sample. In particular, to verify how representative of the UK market this sample is, we introduce in Panel A the total number of UK non-financial firms, the total sample firms, the corresponding percentage of the UK market that they represent and the total non-financial entries removed from LSE. [4]

As Table 2.2 shows, the dataset used for this study includes a minimum of 682 firms, accounting for around 45% of all UK (non-financial) firms across years. Most important, however, is that this sample is representative not simply in terms of the absolute number of firms, but also in terms of trend. As reported in the 3rd column, since 1997, with a peak in 1999, there has been a significant increase of de-listed firms. As a consequence, the number of companies (that were present in previous years) drops accordingly. This trend is reflected in our sample, and it is the reason for the low figure, especially in 2001. Therefore, our sample seems to reflect what takes place in the market, and does not appear to be biased in any direction.

A further robustness check was carried out to verify the representativeness of the dataset. We compared descriptive statistics for a series of key financial variables (leverage, company size, cash holding and market-to-book ratio) for the whole sample of listed non-financial firms available in Datastream, against the sample of firms for which ownership information were collected. As reported in Table 2.2 Panel C, it

[4] This kind of detailed information is taken from the LSE Yearbooks and is not available prior to 1995.

appears that sample companies are very similar to the whole population in terms of mean, median and distribution. This further corroborates the fact that the sample we collected does not appear to be distorted and can be considered representative of the UK market.

We went to considerable lengths to check for consistency in the data, which we inspected thoroughly in several directions. For example, we double-checked that neither the individual shares nor the sum of all the shares collected exceeded 100%.[5] In such cases, we cross-checked the information with other issues of the Hemscott volumes (using the September edition of the same year or the March edition of the following year) and/or with the London Stock Exchange Yearbook, which includes some ownership information. If it proved impossible to find coherent information from the different sources of data, this observation was dropped from the sample.

Further, one of our main goals was not only to identify company blockholders, but also to distinguish between financial and non-financial shareholders. The Companies House website proved of inestimable value in this case, by enabling us to make this distinction for unlisted companies.

As we will describe later, we also aimed to describe compliance with the Codes of Best Practice. One issue was represented by the fact that a large proportion of firms did not report a Chief Executive Officer (CEO) but featured a Managing Director (MD). A small survey was then conducted, by contacting 20 of these firms via email. All the firms responded (mostly through the company secretary) that whenever the CEO was not present, the MD acted on his behalf. This was further corroborated by telephone conversations with Charles Bridge, a member of the Higgs Review Team, who confirmed that the MD should be considered as the CEO whenever this figure was not reported among the company's directors.

Additionally, to minimize the influence of human error, a series of computer programs was generated to compute and inspect first differences of each variable. This routine alerted us when significant spikes in ownership data were detected between years. This data was then checked to verify whether the changes were real or the result of typing mistakes.[6]

---

[5] This would not apply to firms reporting dual class shares.

[6] A non-negligible difficulty in the creation of the dataset was of a computational nature. In order to check, clean and merge the dataset with the Datatream database, and generate all the relevant variables, a

We collected ownership data for outsiders and insiders. We define outsiders as the shareholders who do not sit on the board of directors. More specifically, we identified financial shareholders (institutional investors, insurance companies, banks), and non-financial shareholders (non-financial corporations and individuals). For the ultimate ownership dataset, on the other hand, we collected more detailed data. In particular, for the financial shareholders, we distinguished between institutional investors, insurance companies and banks (all of them listed and unlisted), and, for non-financial shareholders, between non-financial corporations (listed and unlisted) and private individuals. In addition, we also identified any stakes held by the Government or local authorities. We collected information on ordinary shares held above 3%.[7]

In the case of directors, we have information on both "sides" of the board, executives and non-executives. Unlike non-manager owners, UK quoted companies are required to disclose in their financial statements the names of all the board members, and the proportion of shares held directly and indirectly (beneficial and non-beneficial) by executive and non-executive directors, even if the ownership stake is zero (Companies Act, 1985)[8]. This allows us to detect the presence of managers even when they hold no shares. We collected information on board composition, namely the total number of executives and non-executives. Moreover, inside the boards we are able to identify the Chief Executive Officer (or Managing Director when a CEO is not reported), and the Chairman of the Board. Additional information concerns the industry, the total number of shares, the use of multiple class shares and the number and names of creditors.[9]

---

series of computer programs had to be created. Overall, they constitute a 144-page Word document. One particularly challenging task was the "re-ranking" of ownership information. Since Hemscott reports information by dividing between outsiders and insiders, it was necessary to create a set of Stata do-files in order to invert the data matrix and re-rank it, in order to be able to single out the largest owners, also divided by category. Help by the Statalist usergroup is kindly acknowledged.

[7] The requirement to disclose share blocks was introduced in 1976, at 10%; it was then lowered to 5% until 1989, and further reduced to 3% from 1990 on (Crespi-Cladera and Renneboog, 2003; Franks et al., 2003). However, the Corporate Register (1991 edition) maintains the disclosure threshold at 5%.

[8] Non-beneficial shares give voting rights without cash rights. Typically they are held on behalf of spouses or relatives. Hemscott Corporate Register reports shareholdings and transactions by a director's spouse or children as part of that director's beneficial shareholding, unless the company has specifically expressed that the holding should be treated as non-beneficial when announcing the transaction. Own computation reveals that non-beneficial shareholding appears negligible.

[9] This allows us to identify, for example, banks that are at the same time creditors and shareholders of firms.

Given the complexity of calculating ultimate ownership, we computed the ultimate ownership structures for a sub-sample of approximately 550 firms for the years 1993, 1995, 1997, 1999 and 2001, for a total of 2310 observations.

In order to find the ultimate controller for each firm, we followed the procedure adopted by the majority of previous research that analyzed ultimate ownership structures (e.g., La Porta et al., 1999; Claessens et al., 2000; Faccio and Lang, 2002; Gadhoum et al., 2005). The first step is to define the cut-off threshold, as the amount of shares that enables the ultimate controller to have a certain control in the firm. The computation of the ultimate controller of firm Y is carried on only at ownership levels above the cut-off points. The cut-off thresholds most commonly employed in this literature are 20%, 10% and 5%. They are used also to simplify the picture of the ultimate ownership structure, and to identify only those ultimate controllers that are more likely to influence the main decisions of the company. Since the investigation of the ultimate controller consists in searching for the owner of the owner until no further link back can be retrieved, the *a priori* imposition of a cut-off level effectively limits the number of backward links to be searched. Therefore, the ultimate ownership structure of a firm can change, depending on the particular cut-off levels employed.

In the second step, cash flow and voting rights are computed. Cash flow rights refer to the claims that a shareholder has on the company's cash flow (ownership). They are the rights, for example, to receive dividends. We can measure these rights by the percentage of shares that are currently disclosed for UK companies at the 3% threshold. To compute the cash flow rights of the ultimate controller, we calculate the product of the ownership stakes in each link along the control chain, when the shares in each link are above the chosen cut-off level. Control rights, on the other hand, refer to the control that a shareholder has in the company and are defined as the shares of the weakest link along the control chain.[10] For instance, if company Z owns 20% of firm X that owns

---

[10] Alternatively, some studies have adopted probabilistic voting models (such as the Shapley or Banzhaf indices) to measure the actual control rights of shareholders (Cubbin and Leech, 1983; Leech and Leahy, 1991; Leech, 2002, 2003; Crespi-Cladera and Renneboog et al., 2003). The basic intuition of such method is to define the degree of control as the probability of the controlling shareholding securing major support in a contested vote (pivotal shareholder). However, this methodology requires the complete distribution of shares of all shareholders in a single company, in order to compute their control rights. Therefore, it cannot capture the multi-level dimension typical of an ultimate ownership structure. In fact, along each control chain, the total shares cannot be summed to 100 because the shareholders belong to different companies. They are linked to each other by ownership relationships and they are not independent, as in the direct ownership dimension.

15% of firm Y, then this company Z owns 3% of the cash flow rights of firm Y (the product of the ownership stakes along the chain) and controls 15% of firm Y (the weakest link along the control chain).

Cash flow and control rights may differ, because of pyramids and holdings through multiple control chains and cross-holdings. In particular, these complex structures are devices to enhance control rights over cash flow rights. Their definitions are included in Table 2.1. Figure 2.1 shows the ultimate ownership structure of one firm in our sample, Acal Plc in 1997, with all the disclosed shareholders above 3%. It is a useful case study in illustrating how we calculated cash flow and control rights, and how we identified pyramids and multiple control chains. Detailed explanation of the procedure is in Appendix 2.1.

2.3. Descriptive statistics

In this section, we detail some of the general characteristics of our ownership sample in a static framework.

Panel A of Table 2.3 reports information on shareholding by both outside investors and insiders. It shows that outside shareholders are the largest group of owners in the UK, with an average of around 32% of shares across the entire time series. In line with Goergen and Renneboog's (2001a) results, we document that financial firms (*Instit*) are the largest group of investors, and hold around two-thirds of all the non-managerial ownership. Our figures are also comparable with those of Short and Keasey (1999) and Stapledon (1996).[11]

This predominance by financial institutions can be traced back to the considerable increase in funds available to the institutions for investment since World War II. Another reason lies in the new disposition of insurance companies and pension funds, since the 1960s, towards equities, given the concern of institutions to protect their investments during the high inflation period, and higher performance by equities than by gilts or cash (Stapledon, 1996).

Board ownership accounts for about 12% of total shares, of which 10% are held by executive (*Exec*) and 2% by non-executive directors (*Nonex*). Of the executives, the chairman owns the highest amount of shares, an average of 3%, and when the chairman

[11] It should be kept in mind that these authors report values for outsider ownership after rescaling it to 100.

is also the chief executive officer (joint CH-CEO) he holds more than 2%. Non-executives are the shareholder category with the lowest amount of shares: in the mean and median firms they hold respectively 2.5% and 0.143%.

Panel B reports information on the composition of both outside shareholders and board of directors. It shows that, on average, UK companies have four non-managerial owners, of which three are financial institutions (*Totinstit*) and one is a non-financial owner (*Totexternal*). On the other hand, UK boards appear to be composed of an average of seven members, four executives (*Totexec*) and three non-executives (*Totnonex*). The average proportion of non-executives on the board (*Ratio*) is, therefore, 42%. These figures provide a preliminary indication of the relative dispersion of UK ownership structures, which add up to an average of ten owners.

Panel C provides other characteristics of the sample firms for which we have data. In line with other UK based studies (i.e, Ozkan and Ozkan, 2004; Davies et al., 2005), the size of the average firm, measured as the logarithm of total assets, is equal to 11.12%; the percentage of total debt to total assets is around 17%, and the market capitalization is 800 million GBP.

Table 2.4 provides, by industry, details of the average values of the same ownership and composition features presented earlier. We combined the information on sectors provided by both Datastream and Price Waterhouse Corporate Register in order to identify the industry groups reported in this table. Ownership characteristics seem to change significantly across sectors. In particular, firms belonging to the regulated sector show an average value of outside ownership of 27%, which is significantly lower than that reported for the other sectors. The same argument holds for shareholdings by financial companies and directors, which hold 14.8% and 4.1%, respectively. Overall, these figures document a certain degree of inter-industry variability of ownership structures. Shareholdings by financial investors and executive directors show the highest values of the inter-industry standard deviations, equal to 5.55 and 3.39, respectively. One possible interpretation of this preliminary analysis is that average firm size is significantly different across sectors. For this purpose, we report average size in the last column of the table. For instance, it can be seen how firms in the Utility industry are the largest ones. Consequently, it is natural to find that average shareholding levels in this industry are significantly lower than in other sectors. Our own calculations reveal

that the correlation between ownership characteristics and size is negative and statistically significant at one percent level.

A further interpretation may be that different sectors may reflect different growth opportunities for firms, and this may have an impact on the expected agency costs of firms. For example, firms with low growth options may be expected to suffer more, ceteris paribus, from the *free cash flow* problem (Jensen, 1986). This, in turn, may be reflected in different characteristics of the ownership structure by firms. However, no clear pattern appears to emerge from the average market-to-book ratio of firms.[12]

Table 2.5 further investigates different groups by size. We measure firm size by market capitalization (reported in thousands of pounds), and we divide its distribution in terziles in order to identify small, medium and large firms. As we would expect from the corporate finance literature (see, e.g., Devereux and Schiantarelli, 1990), Panel A shows that larger stakes of ownership are held in smaller firms, by both outsiders and insiders. More specifically, insider ownership seems to be more significantly affected by firm size in that, on average, board members own around 21% of small firms but only about 4% of large ones. One possible explanation for this result may relate to portfolio diversification. Investors usually tend to hold diversified portfolios to hedge against risk. This issue may be particularly important in the case of managerial ownership, because managers are typically less diversified than other stakeholders. For example, the majority of their human capital is invested in the firm. Consequently, a manager who holds an increasing number of shares of the firm he manages increases his exposure to its specific risk. Demsetz and Lehn (1985) and Himmelberg et al. (1999), among others, provide evidence that managerial ownership is determined by the riskiness of the firm.

Moreover, in Panel B, in accordance with what was reported in the Codes of Best Practice (Hampel, 1998), larger firms tend to have significantly larger boards, and also more equal representation of executives and non-executives. Our own calculations reveal that very similar patterns are identified when we use the natural logarithm of total assets as a size clustering criterion.

Panel C confirms that smaller firms (in terms of total assets) also tend to have lower leverage the difference between the two subgroups is always statistically

[12] Own calculations reveal how, the correlation between ownership characteristics and the proxy for growth opportunities is not stable in sign and only in few cases is statistically significant.

significant at any conventional level. Tests of differences in means between small and large firms (last column Panel A and Panel B) show that the difference between the two subgroups is always statistically significant at any conventional level.

2.4. Evolution of ownership and governance structures

In this section we investigate the time-series properties of the data. First, we show the main trends on an annual basis. Second, we examine the changes, on average, between the first year a firm enters our sample and the final year. Third, we document the frequency distribution of the changes for individual firm-years. Finally, we provide comparative results for the standard deviations of the main variables between and within firms.

2.4.1 Ownership structures

Table 2.6 provides detailed information on the evolution of ownership structures during the 1990s. We report data on average ownership by outsiders and insiders, which are also divided into their respective sub-categories of financial (*Instit*) and non-financial firms (*External*) for the former, and executives (*Exec*) and non-executives (*Nonex*) for the latter. We also describe the annual percentage of the undisclosed shareholding (*Float*), and finally the average total shares outstanding. The figures reported for 1991 for outside ownership are not directly comparable to the following years, due to the different disclosure still being reported by Hemscott.[13]

The figures in this table illustrate one important feature of UK companies: according to our sample, more than half of the market is held below the disclosure threshold.

On the other hand, among the disclosed shareholders, the distribution of outside ownership shows, in general, a certain degree of volatility over time, but it does not seem to reveal a clear trend. Across the different typologies, financial institutions are the largest class of investors in the UK. As already shown in Table 2.3, more than 20% of shares are held either by institutional investors, insurance or banks over time. On the other hand, non-financial investors appear to increase their average shares from about 11% in the first half of the decade to more than 13% in the second half.

---

[13] Hemscott still reports non-managerial shareholding with the 5% cut-off level in 1991, despite the fact that the disclosure rule decreased the threshold to 3% in 1990.

In contrast, insider ownership shows a marked decreasing pattern. The average ordinary shareholding by all directors decreases by approximately 6 percentage points in eleven years, and half of this decrease appears to occur between 1991 and 1993, from 16.5% to 13.6%. This trend is in line with what Franks et al. (2003) show for UK firms over the last century. These authors argue that decreasing board ownership can be explained by acquisitions, rights issues and placings, in particular in the first half of the century; rather than by the sale of shares by directors in the secondary market.

Our figures on average shares outstanding may corroborate this argument, in that they suggest that companies increased their capital from 1991 to 2001 while managers do not appear to have subscribed to the new issues.

However, the reduction in managerial ownership seems to involve mainly executive directors, whose average shareholding nearly halves in ten years. Conversely, the average percentage of shares held by non-executives, although always lower, shows a steady increase. In 1991 non-executives held, on average, one seventh of the shares that executives hold, about 2%, but by 2001 their average shareholding was almost half of it, at 3%. Consequently, the negative correlation between insider ownership and number of shares seems to hold mainly for executive directors, but not for the rest of the categories identified in our data set. One possible interpretation of this opposite trends between executives and non-executives may be that, in time, a number of executive directors became non-executives. However, with the detail of data available at the moment it is not possible to further investigate this suggestive hypothesis.

More insights on the nature of changes in different groups of shareholders are provided in Figures 2.2 and 2.3. We plot the average shareholding (for the categories shown in each Panel) in the initial and final year that a firm is present in the dataset, similarly to what presented by Denis and Sarin (1999) for US companies between 1983 and 1992. Firms are grouped according to the distribution (in 5 % intervals) of their ownership in the first sample year along the horizontal axes.

Figure 2.2 Panel A shows a marked increase in average shareholding between the first and the last year for each quintile of the distribution up to 25%. In fact, it seems that outsiders in the final year hold twice as many shares as in the initial year. For instance, in the third quintile (10-15%), non-managerial shareholding is about 12% in the initial year, while it increases to 31% in the final year. Nonetheless, this tendency

decreases as shareholding in the initial year increases, up to the ninth quintile (40%-45%), and then becomes negative. This means that firms with higher outside ownership in the initial year have then experienced a relevant decrease in the non-managerial shareholding. For instance, in the tenth quintile (between 50% and 55%), the negative change amounts to about 11% of total shares between the initial and final years. Panels B and C document similar tendencies for financial (*Instit*) and non-financial firms (*External*), respectively. Additional information we obtain from these Panels, however, shows that negative changes occur after the seventh quintile for financial ownership, but after the third quintile for non-financial.

In contrast to outside ownership, the results for board ownership in Figure 2.3 Panel A indicate a sharp decrease in managerial ownership across all ownership intervals, except for the lowest quintiles of the distribution (0-5%). Similar trends are reported for both executive (*Exec*) and non-executive (*Nonex*) shareholding in Panels B and C[14].

We also investigate the frequency distribution of yearly variations in ownership for individual firms, in the attempt to analyse how evenly these changes take place over time. Table 2.7 reports the percentage of firm-year observations that exhibit average yearly changes in the main categories analysed above. For each category, these changes are divided into intervals from 10% decrease to 10% increase.

The first column reports that in 12.3% of the observations in our sample the decrease in outside ownership is more than 10%. The magnitude of change differs significantly between outside ownership and board ownership. In fact, more firm-years experience significant variations in outside ownership. For example, in 32% of cases, outside ownership varies by more than 10% (in absolute value), while only 17% of firm-years display a variation of 2% in absolute value. This result indicates that, even if outside ownership does not follow a sharp trend over time, it is characterized by a significant degree of time-series variability that is relatively evenly spread across firms. On the other hand, as far as board ownership is concerned, the majority of firms (about 64% of observations) experience changes of 2% in absolute value every year. This may

---

[14] Some studies have linked ownership changes to firm age. For example, Denis and Sarin (1999) provide evidence of the fact that large changes (both positive and negative) of managerial ownership appear to be more common in younger firms. This argument however does not appear to hold when changes in board composition are analyzed. In their analysis the authors define firm age as the number of years that a firm has been incorporated. Unfortunately we do not currently have access to this kind of information

suggest that managerial ownership varies more slowly (though significantly) over the time span.

Taken together, all these findings suggest that substantial changes in ownership structures are not uncommon, and that the classic argument of ownership stability may not necessarily apply fully in the UK case.

2.4.2 Board composition

As far as board structure is concerned, Table 2.8 reports detailed information on board size and composition. In 1991, the board is composed, on average, of seven individuals, and this value is, albeit marginally increasing, relatively constant in time. This is in line with Peasnell et al. (2003) and Young (2000), who report an average of 8 individuals in 1991 and 1995. This difference may be due to fact that, in those studies, the initial sampling of firms starts from the largest 1000 corporations listed on the LSE, while our sampling also includes smaller firms. Our results are also in line with Lasfer (2002), who reports on average 3.99 executives and 3.01 non-executives for 1996-1997. Despite the stability of board size, board composition seems to change quite significantly. In 1991, the average firm's board consists of 4.57 executives (*Totexec*) and 2.50 non-executives (*Totnonex*), but by 2001 these two groups are almost equal, with 3.67 and 3.57 average members respectively. A similar pattern is documented for the average number of executives and non-executives who actually hold shares (*cum shares*). Consequently, the proportion of non-executives to total number of directors (*Ratio*) increases significantly over the decade, from 36% at the beginning of the 1990s to almost 50% in 2001. The same tendency is reported in Peasnell et al. (2003).

As in the previous section, we investigate the evolution of board composition, and provide further analyses of the nature of the changes that characterize it. Figure 2.4 plots the average levels of board size, number of executives and non-executives and proportion of non-executives on the board for the first and last year that the firm is present in the sample. Distributions by number of all directors, executives and non-executives are shown along the horizontal axes of the first three panels, while distribution by proportion of non-executives to total board (ratio) is in the last panel. Overall, Figure 2.4 clearly shows that board composition is subject to significant changes over time. More specifically, in Panel A the number of directors exhibits some

mean reversion. For boards with less than seven directors in the first year that a firm enters the sample, companies seem to enlarge their board size by, at most, two individuals, while for boards larger than seven members they show the opposite pattern, reducing the size by on average three directors. An analogous mean reversion tendency is detected for executives and non-executives in Panels B and C, respectively.

Furthermore, boards with a very low proportion of non-executives (*Ratio*) in the initial year show a sharp increase in the final year by on average 0.17 percentage points, while boards on which the ratio initially exceeds 50% tend to revert towards this value in the last year (Panel D).

Further insights into this evolution are provided by investigation of the frequency distribution of yearly changes in board composition proxies for individual firms. Table 2.9 presents the percentage of firm-year observations that experience average yearly changes in those variables. The changes intervals are defined as less than –2 and greater than 2 for board size, executives and non-executives, and less than –0.2 and greater than 0.2 for the ratio.

According to the results, a large percentage of firms seems to remain stable in time in terms of board size and composition. For instance, more than 43% of observations do not show on average any yearly change in the total number of directors. Nonetheless, almost the majority of firms display variations from 1 to 2 members in absolute values on the board. Only 6% of observations experience large changes by more than two members. Similar figures are reported for the number of executive directors and non-executive directors. Furthermore, the results document that a non-negligible fraction of companies, more than 8%, significantly changes the proportion of non-executives on the board (*Ratio*), although in more than 73% of cases this variation is slow.

The reason for these dynamics may lie in the increasing attention devoted to corporate governance reorganization, after the corporate scandals in the UK in the late 1980s and early 1990s. These were followed by the introduction of a number of codes of best practice. The recommendations included in the codes aim at enhancing financial accountability to shareholders, on the basis of improved information, continued self-regulation, more independent boards and audit committees (Cadbury Report, 1992;

Hampel Report, 1998; Higgs Report, 2003), and setting directors' remuneration (Greenbury Report, 1995).[15]

To investigate this issue in more detail, we singled out measurable recommendations included in the main codes, in order to be able to describe the distribution of firms that complied through time. The first recommendation, common to all the reports, regards the separation of the two leading roles of Chairman and Chief Executive Officer. Further, the Cadbury Report (1992) recommends that there should be at least three non-executives on the board (provided that the Chairman is not also the CEO). The subsequent Hampel Report (1998) recommended that at least 33% of the board should be composed of non-executives.

Table 2.10 shows that, in 1991, before the issue of the Cadbury report, 73% of firms already split the roles of Chairman and CEO. An increase in compliance with this recommendation is detected in 1993 (79% of firms now split the two roles), by which time the LSE required firms to follow it. This is in line with Conyon (1994), who reports that 77% of firms in his sample, for 1993, comply. The level of compliance reaches 90% in 2001. Similar figures are described in the Higgs Report (2003).

In addition, an increasing number of firms also complies with the board composition recommendations. At the beginning of the sample period, only 38% of the firms in our sample seem to have implemented the Cadbury recommendation. However, by the end of the decade this percentage has risen to 71%. Similar trends are documented for compliance with the Hampel Report.

In general, all the results for board composition show significant changes over time. This suggests that the hypothesis of the stability of corporate governance structures may be rejected for the UK companies.

In summary, the findings in this section document that ownership and board structures have varied considerably in the UK market over the last decade, and that these changes have affected a large majority of firms. To provide final evidence on this issue, we compute the fraction of firms in our sample that do not show any type of large change over the period analyzed. We define large changes in outside ownership as a change of more than 10% of shares; in board ownership, as a change of more than 5%; in board composition, as a change in the number of directors of more than two

[15] For an overview of the debate that occurred during the 1990s, refer to Demirag et al. (2000). For a review of compliance and performance impacts see Dedman (2002).

members; and, finally, a change in fraction of non-executives on the board of more than 0.2. Of the entire sample of 1,181 firms, only 65 firms (5.5% of our sample) show stable ownership and stable corporate governance structures over time. In contrast, almost all companies, 93% of the sample, seem to have significantly (10% of the shares in absolute terms) altered their outside shareholders' ownership at least once during their presence in the sample; 50% of firms have experienced at least once an important change in management's shareholding (5% of the shares in absolute terms), while 64% have experienced marked changes in their total number of directors (2 members in absolute terms).

2.4.3 Controller in direct ownership structure

Some of the previous analyses have already provided evidence concerning ownership dispersion. First, we show that the total average number of blockholders is 11 (Table 2.3 Panel B[16]); further, we document that half of the market is on average held below the 3% threshold (*Float*, Table 2.6). As we argued in the introduction, this is an important aspect that has potentially critical implications for, for example, manager shareholder conflicts. Therefore, in this part of our investigation, we analyse ownership concentration, and the identity of the controllers in the UK firms.

Table 2.11 Panel A provides some preliminary evidence on the average shareholding by the largest owner, divided by category. Overall, the average ownership of the largest stakeholder (*Largest Ownership*) is around 18%, and it seems to decrease slightly over time.

More specifically, among non-managerial shareholders, a financial institution, as a largest shareholder (*Large Instit*), exhibits on average a stockholding equal to 13%, which is lower than other non-managerial owners. Nonetheless, it also shows an increasing trend over time, from 12% at the beginning of the 1990s to more than 13% at the end of the sample period. Conversely, a non-financial largest shareholder (*Large External*) owns twice as much as a financial institution, with a modest decrease towards the end of the period. The results for the largest outside shareholder (*Largest*) show an average of 16.5% of shares. This finding is lower than that reported by Davies et al. (2005), 18.82% for 1997. Peasnell et al. (2003) present even lower figures, 12.85% and

[16] The average number is actually 10 when we consider figures for managers who effectively own shares (cum shares).

12.88%, for 1991 and 1995, respectively. However, the difference from our data may be because the standardization was computed on the total sample firms, rather than on the number of firms where there actually is a largest shareholder.

Moreover, we document that when managers actually are the largest owners (*Largest Manager*), their average shareholding is more than 22%, and increases somewhat over time. The data also indicate that, in line with what was previously detected, executive directors are the predominant figures on the board when they are also the largest owners (*Large Exec*), with more than 23% of shares.

In Panel B we show the distribution of firms by the identity of the largest shareholder. Most frequently, outsiders appear to be the largest owner in the firm. For example, in 1992 about 70% of firms have a non-managerial largest shareholder, while, at the end of the sample period, this figure increases to 78%. Conversely, the number of manager-controlled firms has nearly halved, from 43% in 1991 to 23% in 2001.

Financial institutions, on the other hand, more frequently appear as the largest owner in the sample firms; however, on average they tend to hold considerably fewer shares than other investors. For example, in 2001, managers hold an average of 23% of shares when they are the largest owners. Non-financial owners hold an average of 21% of shares, while financial institutions hold about 13%.

Taken together, these findings suggest that, although the undisclosed shareholding (*Float*) is more than 50% of the market in all years, there appears to be a relatively significant degree of concentration in the hands of the largest owners in the firm.

2.5. Ultimate ownership structure

In this section, we describe the main features of the ultimate ownership structure that emerged from the analysis of our database. All the results will be shown for every year by different cut-off, calculated with respect to the control rights.

2.5.1 Widely held firms and ultimate controllers

Table 2.12 shows the distribution of companies with respect to the identity of the ultimate controller. Widely Held firms are those companies without an ultimate controller at a certain cut-off level. The ultimate ownership literature refers to these

firms as firms with dispersed ownership. The difference between the figures relative to widely held firms at 20% cut-off and 10% cut-off is immediately evident. For example, in 1993 about 70% of companies do not have an ultimate controller at 20% cut-off, while only approximately 30% do not have an ultimate controller at 10% cut-off. This implies, in other words, that the ultimate controller has controlling rights of between 10% and 20% in the majority of firms. The result is relatively in line with what Gadhoum et al. (2005) report for US in 1996, although at 10% cut-off US companies seem more dispersed than UK ones. It should be underlined that their study includes all US listed firms, whereas our sample includes only non-financial companies.

Moreover, we document a decreasing trend over time of the widely held firms for each cut-off. For example, at 10% cut-off, in 1993 30.07% of companies have no ultimate controller, while the figure decreases to 21.41% in 2001. This may suggest that a degree of re-concentration of ownership has occurred over the last decade in the UK.

Keeping in mind potential bias due to the peculiar nature of the unlisted firms, we report that unlisted companies are the predominant type in every year at the lowest cut-offs. The second most recurrent type among ultimate controllers is manager, particularly at the lowest cut-off of 5%. However, this figure is gradually decreasing over time, supporting what the previous analyses reported on direct ownership. Widely held financial institutions are more common as ultimate controllers at lower cut-off levels, that is, 10% and 5%. This means that financial institutions generally are ultimate controllers with a percentage of control rights between 5% and 20%. This seems to be in line with our findings in Table 2.11 Panel A.

2.5.2 Identity of the ultimate controller

Table 2.13 documents that unlisted non-financial companies are the dominant typology at the highest cut-off of 20%. In 1997, about 28% of firms have an unlisted non-financial firm as ultimate controller. Conversely, unlisted institutional investors are the predominant category at the 10% and 5% cut-offs.[17] In 1997, at the 10% level, 30% of firms have an unlisted institutional investor as controller.

---

[17] We have to highlight the strong presence of listed Institutional shareholders in 1997, at 10% and 5% cut-off. The value is so different from the other years (5.69% and 5.16% at 10% and 5% cut-off respectively) because of the presence of Mercury Asset Mgmt as ultimate controller. In that year, Mercury Asset Mgmt had only one disclosed owner, Munich Reinsurance, with 4.17%. Due to this low

As far as widely held financial institutions are concerned, dominance by listed insurance companies and listed banks as first ultimate controllers is reported.

Finally, among managers, executives are the dominant typology in every year and at each cut-off level. Furthermore, firms with executive directors as ultimate controllers decrease over time at each cut-off, while those with non-executives display the opposite trend, in line with what we described earlier for direct equity ownership.

In general, we can say that, on the one hand, financial institutions, both listed and unlisted (defined as the sum of institutional investors, insurance and banks), are the predominant ultimate controller type in our sample. Their presence increases over the entire decade, with a slight inflexion in 2001. On the other hand, ownership by managers, both executive and non-executive, shows exactly the opposite trend. Additionally, when the control rights span between 5% and 20%, financial institutions are more frequently the ultimate controllers. Above the 20% threshold, managers become the predominant type.

2.5.3 Complex structures which separate cash-flow rights from control rights

We now investigate whether ultimate controllers in the UK adopt complex structures to enhance control over their cash-flow rights (complex ultimate controller). Table 2.14 Panel A provides details of the fraction of firms with ultimate controllers using (or not) such complex structures at each cut-off level. These figures illustrate that, although the majority of firms does not show any complex structure for the ultimate controller, a non-negligible fraction of companies do adopt them, in particular at the lowest cut-off levels. For instance, at 10% in 1995, 16.3% of companies display a complex ultimate controller, while at 5% in the same year the fraction of firms with a complex ultimate controller increases to 21%. Our findings are in general in line with Faccio and Lang (2002) in 1996, at 20% cut-off.

Nonetheless, a non-linear trend emerges in the decreasing use of such structures over the entire decade, with a peak, generally, in 1995, and with a steady increase of simple shareholding structures.

---

shareholding, Munich Reinsurance was not considered in the computation of the pyramid chain. Mercury Asset Mgmt was therefore identified as the ultimate controller. This ownership structure was different both in the previous years, when Mercury Asset Mgmt was owned by SG Warburg, with about 75%, and in the following year, when Mercury Asset Mgmt became unlisted and, consequently, untraceable for calculation of the ownership structure.

As a robustness check, we singled out a balanced panel of 264 firms that are present for the entire period. We detect, as above, similar trends in the decreasing use of complex structures, and a gradual increase of simple structures, with a rather sharp drop in the widely held firms.

On the other hand, Panel B shows the distribution of those firms with a complex ultimate controller by different categories of complex structures. In particular, it reports that the pyramidal structure is the most common device, even if its use decreases over time at the lowest cut-off levels. For example, at the 10% level in 1995, in 67.09% of firms the ultimate controller uses the pyramidal holding chain to lock its control inside the firm, while this percentage drops to 60.87% by 2001.[18] The multiple control chain shows almost the same trend over time. Cross-holding is the most complex structure of ultimate ownership, and it is the least adopted in our sample: in 1995, at 10%, 6% of firms have a complex ultimate controller.

As a further investigation, we document in Table 2.15 the percentage of firms that adopt complex structures over all their shareholdings (complex structure firms), and which category of complex structure these companies adopt most. In other words, we detect whether, in a firm, either the first or the second or other controllers use complex structures. The results in Panel A show that the number of complex structure firms is higher than that for complex ultimate controller. For the same figure as above (at 10% in 1995), 19% of firms have complex structures. In addition, the same decreasing trend detected above holds even in this case. In Panel B, symmetrically with Table 2.14, we report the distribution of complex structure firms by category of complex structures. The results are virtually identical to the previous table.

Among the complex structures described so far, we were also able to detect those companies in our sample with multiple classes of shares. For brevity, we do not include a table here, but we report that in our sample there are 26 firms with multiple shares. This finding is in line with the cross-country analysis by Nenova (2003), which reports 27 UK firms with dual class shares in 1997. These results, however, are lower than those documented by Faccio and Lang (2002), with more than 400 companies for 1997. The difference is due to the fact that Faccio and Lang's sample also includes financial firms, which seem to use multiple classes of shares more than non-financial

[18] Pyramids are common not only in the UK firms, but even in other countries, both Western European and East-Asian (Claessens et al., 2000, 2002; Faccio and Lang, 2002).

companies. Moreover, in our sample we take into account only those dual-class firms with all the classes of shares listed in the official market.

2.5.4 Divergence between ownership and control

All the complex structures described above create a divergence between cash-flow rights and control rights. Panels A and B in Table 2.16 illustrate that, across the years, the average ultimate controller has 20.6% of cash flow rights at 10% cut-off, while its control rights are 22.3% at 10% cut-off.

Panel C presents the divergence defined as the difference between control rights and cash-flow rights for the first ultimate controller, as in La Porta et al. (2002). The minimum value, zero, represents "no divergence", which means that the ultimate controller does not use complex structures. At each cut-off level, the mean of the divergence is wider in 1995, while the lowest value is in 2001. On average, this figure is 1.72 at 10% cut-off. La Porta et al. (2002) report a mean value equal to 0.1% for the same variable calculated for the 20 largest companies at 10% cut-off in 1996. This contrast in results is due to the sample differences.[19]

Taken together, these results document that the majority of our firms has indeed an ultimate controller, and also that the presence of complex structures among ultimate controllers is not uncommon.

2.6. Conclusions

We presented descriptive statistics on the direct ownership structure of a sample of approximately 1100 UK non-financial listed firms, for the decade 1991-2001, and on ultimate ownership and control of a sub-sample of approximately 550 firms for the years 1993, 1995, 1997, 1999 and 2001, for a total of 2310 observations. As far as direct ownership is concerned, our data show that outside ownership is relatively volatile but does not show a net trend over time, while inside ownership shows a clear decreasing tendency. Our analysis shows a significant evolution of ownership structure and board composition over the last decade. Managerial ownership shows a sharp decreasing trend. In particular, average shareholding by executive directors shows a decreasing trend, while the

[19] We perform calculations on o second measure used in this literature, namely the ratio of cash-flow rights to control rights. On average, this figure is 0.89 over time for each cut-off. This is in line with the findings of Faccio and Lang (2002), who report a value of 0.88.

opposite holds for non-executive directors. More specifically, we single out changes between the first and the last year in which the firm is present in the sample, and document that this sharp decreasing trend is rather evenly spread across all initial board ownership quintiles.

Unlike ownership by directors, ownership by outsiders does not appear to follow a specific trend over time. However, further investigations reveal that non-managerial shareholding increases when it is below 45% in the first year that firms enter the sample, while it decreases sharply above the cut-off level.

Furthermore, average board size is relatively constant over time, and we document a mean reversion pattern around the average size of seven members. It appears that small boards tend to increase their size, while larger boards seem to be curtailed. Among directors, non-executives constitute a progressively increasing proportion of the board, although they decrease when the proportion reaches two-thirds of the board.

Additional analyses of the stability of ownership structure in the UK also reveal that a non-negligible sub-set of our sample observations experience large changes in ownership structure or board composition. In contrast, only about 5% of all sample firms show stable ownership and governance structures.

Overall, we provide evidence that substantial changes in ownership structures are not uncommon, and that the classic argument of ownership stability may not necessarily apply fully in the UK case.

Further, our findings indicate that non-financial shareholders and executive directors are the two main categories of largest owners. According to our figures, they appear to have control of around 40% of our sample firms, despite the fact that the undisclosed shareholding is more than 50% of the market.

Evidence on ultimate ownership structure reports that widely held firms are decreasing over time at each cut-off level. Additionally, our findings do not appear to support the orthodox view in the law and finance literature, according to which we would not expect to find complex structure in *common law* countries. In fact, in line with Faccio and Lang (2002), our data show that the existence of complex ownership structures in the UK is far from negligible, although the presence of complex structures is decreasing in time at any cut-off level.

Table 2.1. Variables definitions.

Panel A. Direct ownership variables	
Outside Ownership	Sum of all external shareholding above the disclosure threshold
Instit	Total percentage of shares held by the disclosed investment companies, insurance and banks in each firm
External	Total percentage of shares held by the disclosed non-financial corporations and individuals in each firm
Board Ownership	Total percentage of ordinary shareholding by all directors (%)
Exec	Percentage of ordinary shareholding by executive directors (%)
Nonex	Percentage of ordinary shareholding by non-executive directors (%)
Float	Total percentage of ordinary shareholding held below the disclosure threshold
Number of Outsiders	Sum of all external shareholders
Totinstit	Sum of all external shareholders that are financial institutions (pension funds, banks, insurance companies, fund managers)
Totexternal	Sum of all external shareholders that are private individuals, other non-financial companies
Board Size	Sum of all executive and non-executive directors
Totexec	Sum of all executive directors
Totnonex	Sum of all non-executive directors
Ratio	The proportion of non-executive directors on total board
Num. of Executives cum Shares	Sum of all executive directors who hold shares in the firm
Num. of Non-executives cum SHares	Sum of all non-executive directors who hold shares in the firm
Largest Ownership	Percentage of shares by the largest shareholder in the firm
Largest	Percentage of shares by the first non-managerial shareholder
Large Instit	Percentage of shares by the first non-managerial shareholder when it is an institutional investor, insurance company or bank
Large External	Percentage of shares by the first non-managerial shareholder when it is a non-financial company or an individual
Largest Manager	Percentage of shares by the first shareholder when it is a manager
Large Exec	Percentage of shares by the first managerial shareholder when it is an executive
Large Nonex	Percentage of shares by the first managerial shareholder when it is a non-executive

Table 2.1. Variables definitions. (continued)

	Panel B. Ultimate ownership variables
Widely Held	Company in the sample without an ultimate controller at the chosen cut-off level
Widely Held Financial Institution	Company that has as ultimate controller a financial firm that is widely held at the chosen cut-off level
Widely Held Corporation	Company that has as ultimate controller non-financial firm that is widely held at the chosen cut-off level
Unlisted	Company that has as ultimate controller a financial or non-financial firm that has an unknown ownership structure
Managerial	Company that has a director as ultimate controller
Individual	Company that has an individual (non director) as ultimate controller
State	Company that has the State (Government or local Authorities) as a ultimate controller
Pyramid	Firm Y is said to be controlled through a "pyramid" at a certain cut-off level if it has an ultimate shareholder who controls it indirectly through another corporation (or more than one company) that he/she does not wholly control with respect to chosen cut-off level
Multiple Control Chain	Firm Y is said to be controlled through a "multiple control chain" if it has an ultimate shareholder who controls it via a multitude of control chains (both direct and indirect), each of which includes at least 3% of the control rights at each link
Cross Holding	Firm Y is said to be controlled through a "cross holding" if a firm X owns some shares (above the chosen cut-off level) of firm Y and firm Y, in turn, owns some shares (at the same cut-off level) of firm X, or firm Y holds directly its own stock (at the cut-off level)
Dual Class Shares	Company Y itself issues two or more different kind of shares with different voting rights
Complex Structure	Pyramid, multiple control chain, cross holding (cash flow rights are lower than voting rights)
Simple Structure	Direct ownership (cash flow rights are equal to voting rights)
Complex Structure Firm	Firm with at least one complex structure in its shareholding
Simple Structure Firm	Firm without complex structure in its shareholding
Complex Ultimate Controller	Firm having the first ultimate controller using a complex structure
Simple Ultimate Controller	Firm with the first ultimate controller corresponding to the direct shareholder
Cash Flow Rights	The product between different links along the holding chain with respect to the chosen cut-off level at each link
Control Rights	The minimum holding between the links along the chain
Divergence	Control rights minus cash-flow rights
CF/CO	Ratio of cash flow rights to control rights
	Panel C. Economic variables
Size	Natural logarithm of total assets in 1991 prices
Lev	Ratio of total debt to total assets
Market Value Of Equity	Product of the total number of outstanding shares and the share price. This is expressed in thousands of pounds)
Cash	Ratio of total cash and equivalents to total assets
Dividends	Ratio of ordinary dividends net of Advance Corporation Tax, to total assets

Figure 2.1. ACAL plc 1997

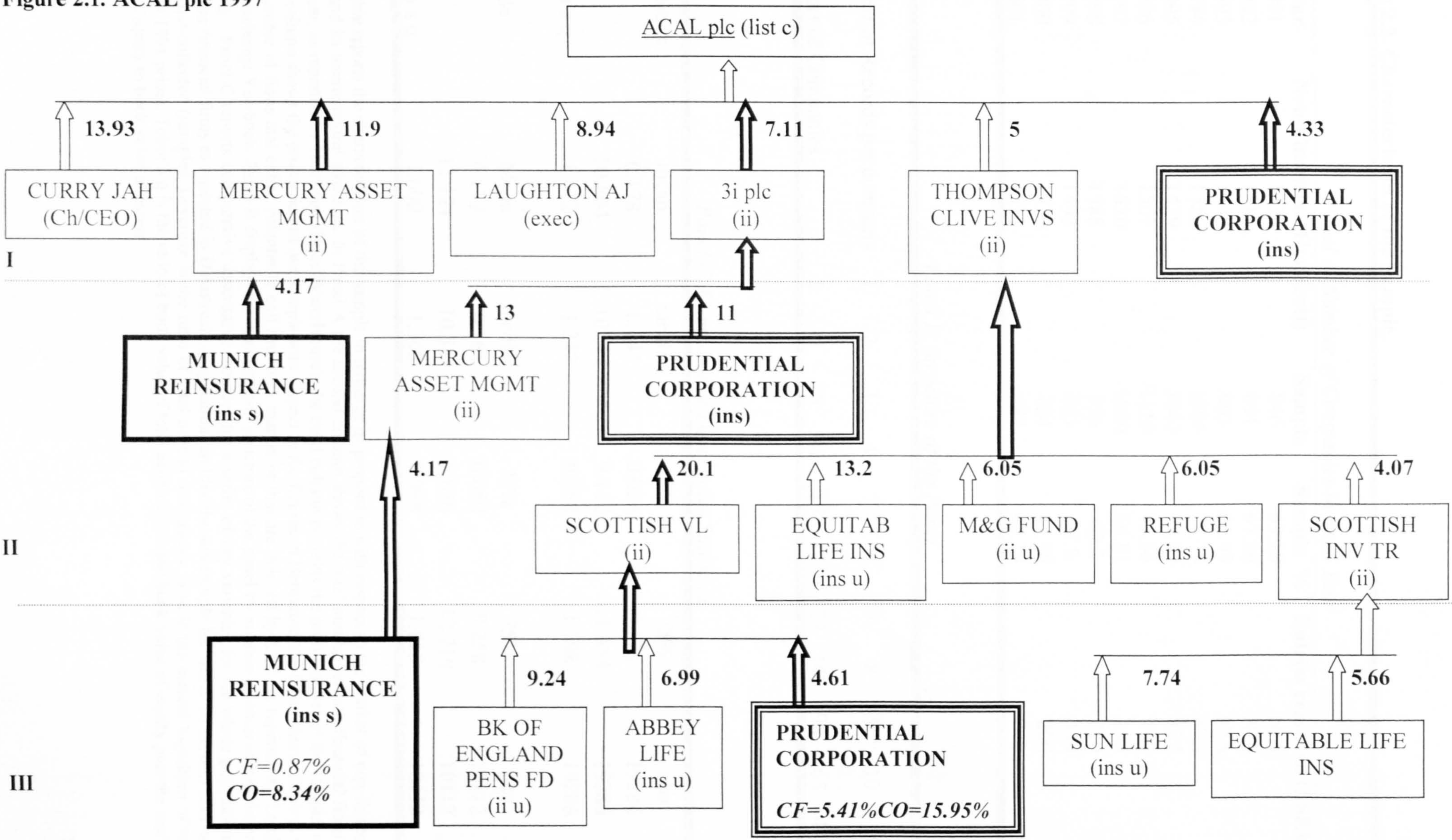


Table 2.2. Characteristics of the Sample.

Panel A. Number of Companies in Each Year

Year	Non-Financial (Hemscott)	Sample	Sample %	Entries removed (LSEY)
1991	1339	846	63.18	N/A
1992	1313	891	67.86	N/A
1993	1348	903	66.99	N/A
1994	1356	1006	74.19	N/A
1995	1429	1042	72.92	122
1996	1507	1110	73.66	112
1997	1630	1089	66.81	198
1998	1588	956	60.2	210
1999	1493	863	57.8	449
2000	1510	724	47.95	200
2001	1511	682	45.14	249

Panel B. Structure of the Panel

Number of Records per company	1	2	3	4	5	6	7	8	9	10	11
Number of Companies	2	11	26	43	77	123	122	140	98	65	474

Panel C. Comparative Descriptive Statistics

Population	mean	median	25%	75%	obs
Lev	0.178	0.141	0.024	0.271	19286
Size	10.804	10.571	9.142	11.854	19286
Tobin's q	1.612	1.242	0.958	1.798	19286
Sample	Mean	median	25%	75%	obs
Lev	0.177	0.161	0.060	0.258	10112
Size	11.121	10.841	9.856	12.210	10112
Tobin's q	1.600	1.303	0.998	1.818	10112

This table reports the characteristics of the sample in terms of its proportion with respect to the market of non-financial firms and its intertemporal structure. In Panel A the second column shows the total number of non-financial firms in each year, as reported by Hemscott (Price WaterHouse); the third column contains the total number of the sample, and fourth column shows the proportion of our sample with respect to the figures in Hemscott; the fifth column displays the total number of firms that either voluntarily exit the stock market or that are delisted by LSE, as reported by London Stock Exchange Yearbook. Panel B displays the intertemporal structure of the panel by number of observations for each company. Panel C reports comparative descriptive statistics for a series of key variables for the whole population of listed non financial firms as reported in Datastream (population) and for the sub-sample for which ownership data have been hand-collected (sample). Leverage is the ratio of total debt to total assets. Size is the natural logarithm of total assets in 1991 prices. Tobin's q is the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of assets.

Table 2.3. Descriptive Statistics.

Panel A. Average Shareholding

	Mean	Median	Min	Max	25%	75%	St.Dev.
Outside Ownership	31.97	30.5	0*	100	16.4	45.87	19.6
Instit	21.35	18.31	0*	98.66	7.28	32.57	17.05
External	10.61	4.33	0*	100	0	15.17	15.24
Board Ownership	12.60	4.546	0	90.99	0.41	17.77	17.28
Exec	10.09	2.083	0	89.61	0.169	13.42	15.85
Chairman (Executive)	3.15	0	0	84.22	0	0.22	9.27
Ceo/Md	1.96	0.027	0	76.05	0	0.51	6.12
Joint CH-CEO	2.25	0	0	79.12	0	0	8.61
Nonex	2.51	0.143	0	75.64	0.019	1.27	6.59
Chairman (Non-Executive)	0.65	0	0	75.62	0	0.05	3.67

Panel B. Ownership and Board Composition

	Mean	Median	Min	Max	25%	75%	St.Dev.
Number Of Outsiders	4.32	4	0	14	2	6	2.53
Totinstit	3.12	3	0	14	1	5	2.35
Totexternal	1.20	1	0	11	0	2	1.46
Board Size	7.17	7	0	25	5	8	2.53
Totexec	4.09	4	0	18	3	5	1.73
Totnonex	3.08	3	0	16	2	4	1.75
Ratio	0.42	0.43	0	1	0.33	0.5	0.16
Tot. obs	10,112	10,112	10,112	10,112	10,112	10,112	10,112

Panel C. Other Characteristics

	Mean	Median	Min	Max	25%	75%	St.Dev.
Lev	0.17	0.16	0	0.99	0.06	0.25	0.14
Market Value of Equity	799,805.60	55,247	260	214,000,000	14,563	232,818	5,110,625

This table reports descriptive statistics on average shareholding by different categories of owners (Panel A), average number of owners divided by category of owners (Panel B) and average values for firm size, capital structure and average market value of equity (reported in thousands of pounds). The asterisk indicates that zeroes for non-managerial ownership are not to be interpreted literally. They only represent the absence of any reported shareholding above the disclosure threshold of 3%. All definitions of variables are provided in Table 2.1.

Table 2.4. Average Shareholding by Industry.

	Outside Ownership	*Instit*	*External*	*Board Ownership*	*Exec*	*Nonex*	*Board Size*	*Totexec*	*Totnonex*	*Ratio*	*MTBV*	*Size*
Automotive, Aviation and Transportation	29.73	21.52	8.21	11.69	10.13	1.58	6.19	3.30	2.16	0.34	1.008	508,582
Beverages, Tobacco	27.67	16.01	11.66	7.41	6.41	1.01	6.20	3.76	2.27	0.35	1.292	1,596,094
Building and Construction	30.79	21.05	9.74	11.28	9.30	2.07	6.53	3.84	2.54	0.39	0.825	338,197
Chemicals, Healthcare and Pharmaceuticals	30.11	21.99	8.12	8.43	6.64	1.81	6.88	3.89	2.87	0.39	1.728	2,080,721
Computer, Electrical & Electronic Equipment	32.40	21.50	10.90	17.63	14.34	3.49	6.89	3.98	2.90	0.39	1.552	151,848
Diversified Industry	43.29	25.74	17.54	8.48	7.85	0.78	6.91	3.99	3.05	0.41	0.951	82,621
Engineering, Mining, Metallurgy and Oil-Gas Exploration	36.27	26.13	10.14	9.03	7.20	1.92	7.05	4.01	3.07	0.42	1.050	1,331,071
Food Producer & Processors and Farming & Fishing	35.88	19.64	16.23	7.95	5.60	2.43	7.24	4.03	3.11	0.42	1.019	1,122,463
Leisure, Hotels, Restaurants and Pubs	29.17	18.88	10.29	13.57	10.20	3.41	7.28	4.16	3.13	0.44	1.186	267,116
Paper, Forestry, Packaging, Printing & Publishing	30.43	19.11	11.32	17.64	13.99	3.84	7.80	4.41	3.35	0.45	1.592	810,483
Retailers, Wholesalers and Distributors	30.25	18.96	11.29	12.21	9.95	2.33	7.84	4.45	3.38	0.45	1.308	860,174
Services	32.36	21.28	11.08	14.27	11.44	2.97	7.86	4.47	3.59	0.46	1.603	381,218
Textile, Leather, Clothing & Footwear and Furniture	33.02	21.65	11.37	17.32	14.38	3.16	8.58	4.64	3.68	0.48	0.829	55,963
Utilities	26.82	14.83	11.99	4.10	2.81	1.33	8.91	5.20	4.90	0.55	1.435	5,814,391
Standard Deviation	**4.86**	**5.55**	**3.22**	**4.07**	**3.39**	**0.96**	**0.79**	**0.44**	**0.65**	**0.05**		

This table reports mean values for outside ownership, board ownership and board composition figures for each industry. Standard deviation represents the standard deviation of each variable between sectors. *Outside Ownership* is the sum of all external shareholding above the disclosure threshold; *Instit* is equal to the total percentage of shares held by the disclosed investment companies, insurance and banks in each firm; *External* is the total percentage of shares held by the disclosed non-financial corporations and individuals in each firm; *Board Ownership* is defined as the total percentage of ordinary shareholding by all directors (%); *Exec* represents the percentage of ordinary shareholding by executive directors (%); *Nonex* is the percentage of ordinary shareholding by non-executive directors (%); *Board Size* is the sum of all executive and non-executive directors; *Totexec* is the sum of all executive directors; *Totnonex* is equal to the sum of all non-executive directors; *Ratio* is defined as the proportion of non-executive directors on total board. MTBV is the ratio of market value of equity plus book value of debt (long and short term) divided by the book value of assets. Size is defined as the average market value of equity (reported in thousands of pounds).

Table 2.5. Distribution of Ownership Characteristics by Firm Size.

Panel A. Average Shareholding

	Small Firms	Medium Firms	Large Firms	Diff. In mean (p-value)
Outside Ownership	35.29	34.95	25.39	0.000
Institit	20.16	25.11	18.95	0.000
External	15.13	9.85	6.44	0.000
Board Ownership	21.27	12.74	4.46	0.000
Exec	17.38	10.20	3.64	0.000
Chairman (Executive)	4.54	3.22	1.95	0.000
Ceo/Md	3.45	2.12	0.60	0.000
Joint CH-CEO	4.35	2.09	0.62	0.000
Nonex	4.17	2.63	0.84	0.000
Chairman (Non-Executive)	0.99	0.70	0.19	0.000

Panel B. Ownership and Board Composition

	Small Firms	Medium Firms	Large Firms	p-value
Number Of Outsiders	4.52	4.89	3.68	0.000
Totinstit	2.74	3.71	2.93	0.000
Totexternal	1.78	1.18	0.74	0.000
Board Size	5.74	6.66	9.03	0.000
Totexec	3.54	3.90	4.84	0.000
Totnonex	2.20	2.76	4.19	0.000
Ratio	0.38	0.41	0.46	0.000

Panel C. Other Characteristics

	Small Firms	Medium Firms	Large Firms
Lev	0.14	0.16	0.22
Market Value of Equity	18,553	81,188	2,161,807

This table reports descriptive statistics on average shareholding by different categories of owners (Panel A), average number of owners divided by category of owners (Panel B) and average values for firm size, leverage and average market value of equity. The reported zeroes for non-managerial ownership are not to be interpreted literally. They only represent the absence of any reported shareholding above the disclosure threshold of 3%. *Outside Ownership* is the sum of all external shareholding above the disclosure threshold; *Institit* is equal to the total percentage of shares held by the disclosed investment companies, insurance and banks in each firm; *External* is the total percentage of shares held by the disclosed non-financial corporations and individuals in each firm; *Board Ownership* is defined as the total percentage of ordinary shareholding by all directors (%); *Exec* represents the percentage of ordinary shareholding by executive directors (%); *Nonex* is the percentage of ordinary shareholding by non-executive directors (%); *Number of Outsiders* is equal to the sum of all external shareholders; *Totinstit* is the sum of all external shareholders that are financial institutions (pension funds, banks, insurance companies, fund managers); *Totexternal* is equal to the sum of all external shareholders that are private individuals, other non-financial companies; *Board Size* is the sum of all executive and non-executive directors; *Totexec* is the sum of all executive directors; *Totnonex* is equal to the sum of all non-executive directors; RATIO is defined as the proportion of non-executive directors on total board; *Size* is defined as the natural logarithm of total assets in 1991 prices; *Lev* is defined as the ratio of total debt to total assets; *Market Value of Equity* is the product of the total number of outstanding shares and the share price. The last column in Panel A and Panel B represents the tests of the difference in means between large and small firms. P-values are reported.

Table 2.6.a Average Percentage of Ordinary Shares Held by Outsiders and Insiders.

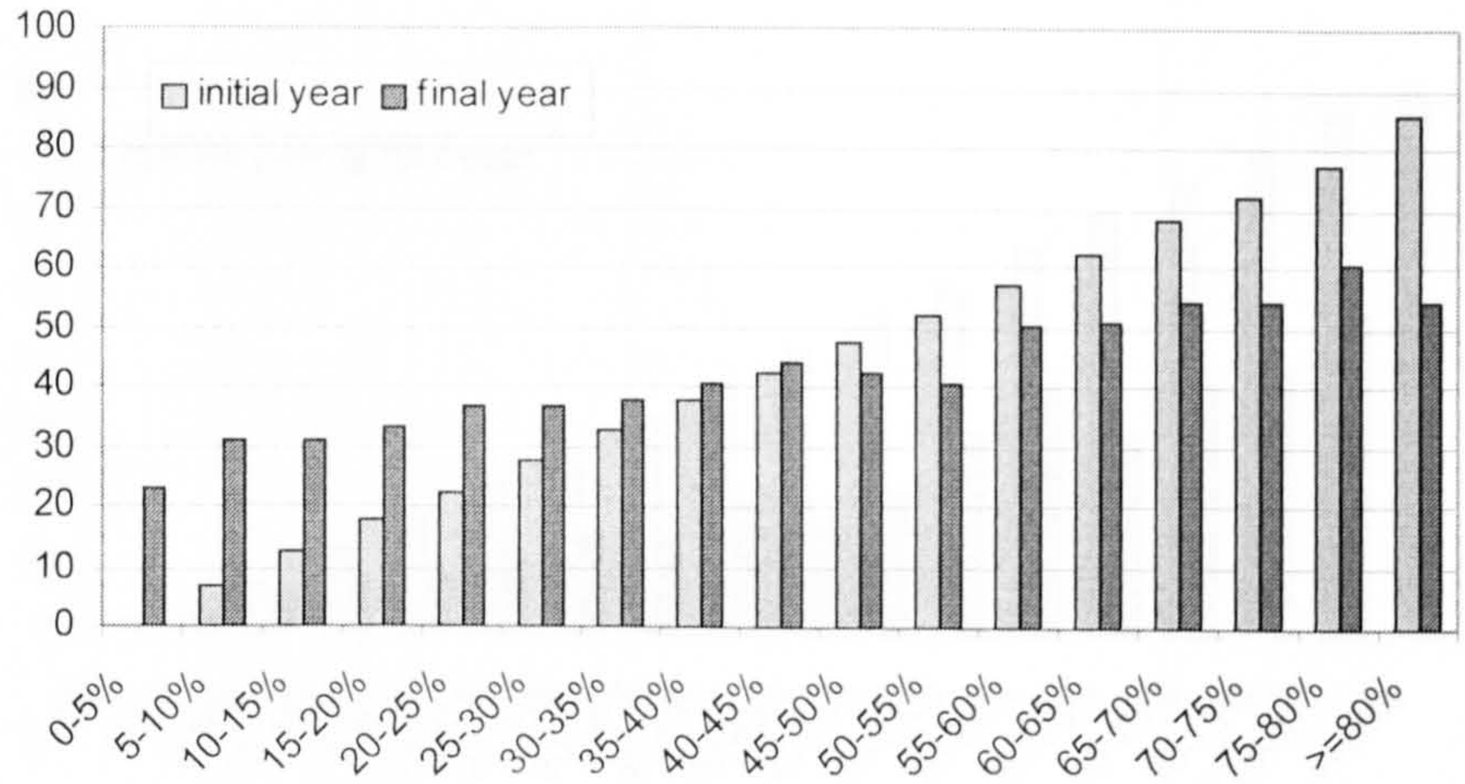
	1991*	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Outside Ownership	22.27*	32.77	34.30	32.02	31.83	31.37	33.39	34.12	35.06	34.28	32.73
Instit	12.02*	22.63	21.95	20.92	20.33	20.01	20.17	23.81	22.30	21.15	19.50
External	10.25*	10.14	12.35	11.10	11.50	11.36	13.22	10.31	12.76	13.13	13.23
Board Ownership	16.54	14.93	13.68	13.39	13.07	12.77	12.22	11.60	11.32	11.09	10.69
Exec	14.22	12.62	11.35	11.03	10.49	10.13	9.56	8.89	8.61	8.34	7.57
Nonex	2.32	2.31	2.33	2.36	2.58	2.64	2.66	2.71	2.71	2.75	3.12
Float	61.19	52.30	52.02	54.59	55.10	55.86	54.39	54.28	53.62	54.63	56.58
Average Outstanding Shares	143,839	154,234	161,182	167,295	186,300	180,777	180,202	306,345	280,797	379,755	418,355
Total Sample Firms	846	891	903	1006	1042	1110	1089	956	863	724	682

Table 2.6.b Tests for differences in means across time

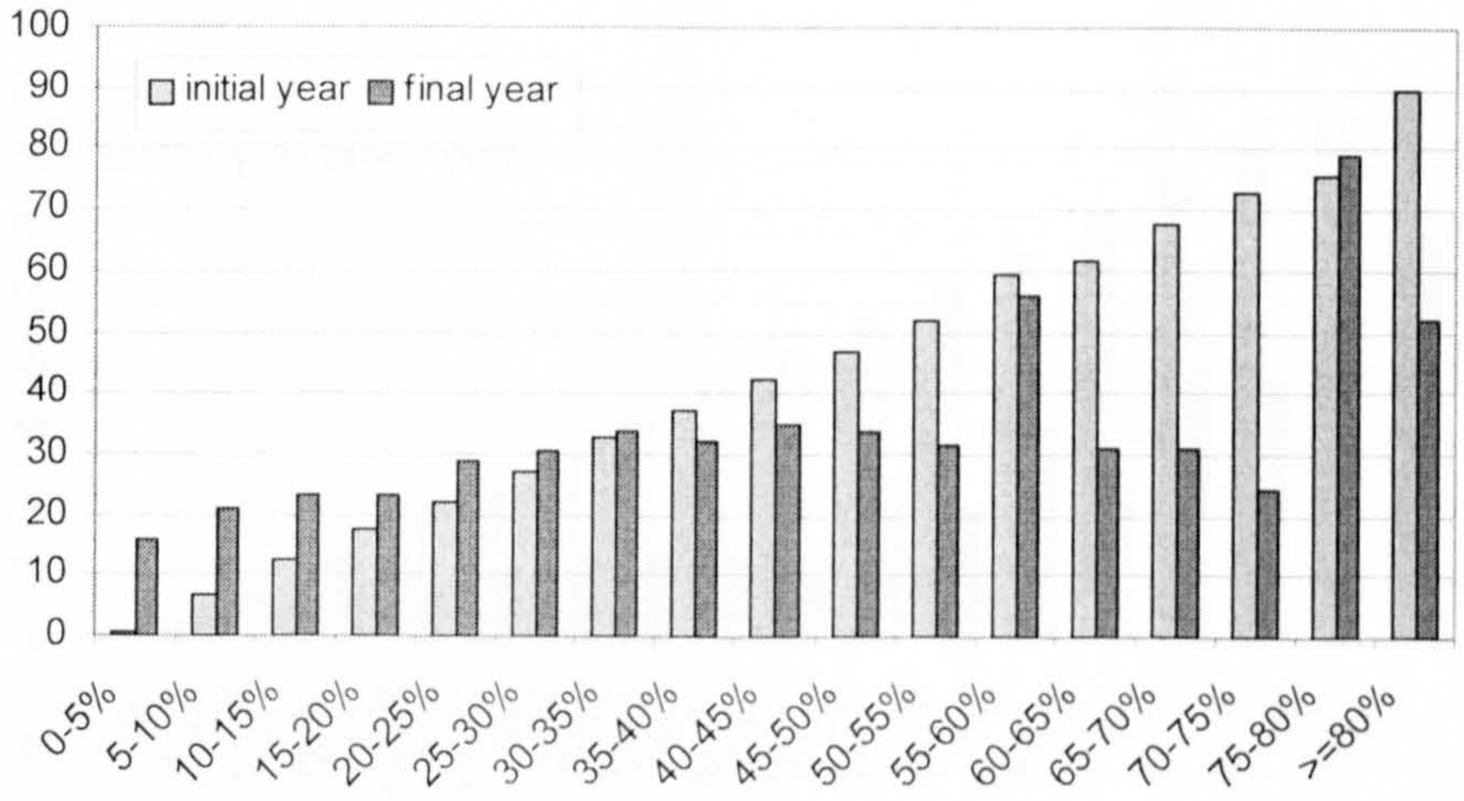
	Outside Ownership (p-val)	*Instit (p-val)*	*External(p-val)*	*Board Ownership (p-val)*	*Exec (p-val)*	*Nonex (p-val)*
1991 vs 1996	0.000	0.000	0.066	0.000	0.000	0.147
1996 vs 2001	0.069	0.000	0.000	0.007	0.002	0.016

This table reports mean values of shareholding by different categories of owners (Panel A), average number of owners by category of owners (Panel B) and average values for firm size, capital structure and average market value of equity, for each sample year. *Outside Ownership* is the sum of all external shareholding above the disclosure threshold; *Instit* is equal to the total percentage of shares held by the disclosed investment companies, insurance and banks in each firm; *External* is the total percentage of shares held by the disclosed non-financial corporations and individuals in each firm; *Board Ownership* is defined as the total percentage of ordinary shareholding by all directors (%); *Exec* represents the percentage of ordinary shareholding by executive directors (%); *Nonex* is the percentage of ordinary shareholding by non-executive directors (%); *Float* is equal to the total percentage of ordinary shareholding held below the disclosure threshold. * Reported disclosure rule is 5%. Panel b shows tests for differences in means across time. P-values are reported.

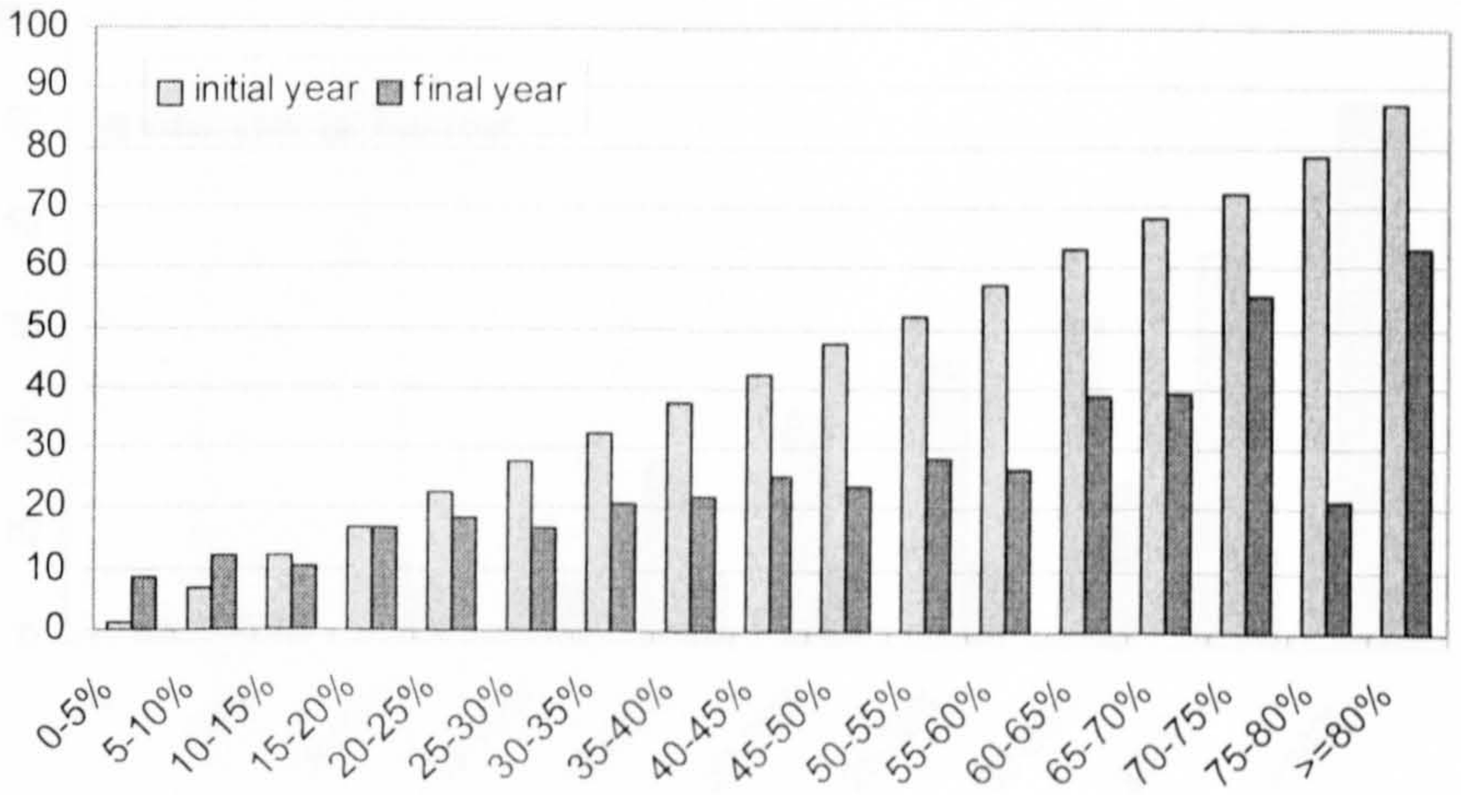
Figure 2.2. Changes in Outside Ownership. *Panel A. Outside Ownership*



Panel B. Institutional Ownership (Instit)

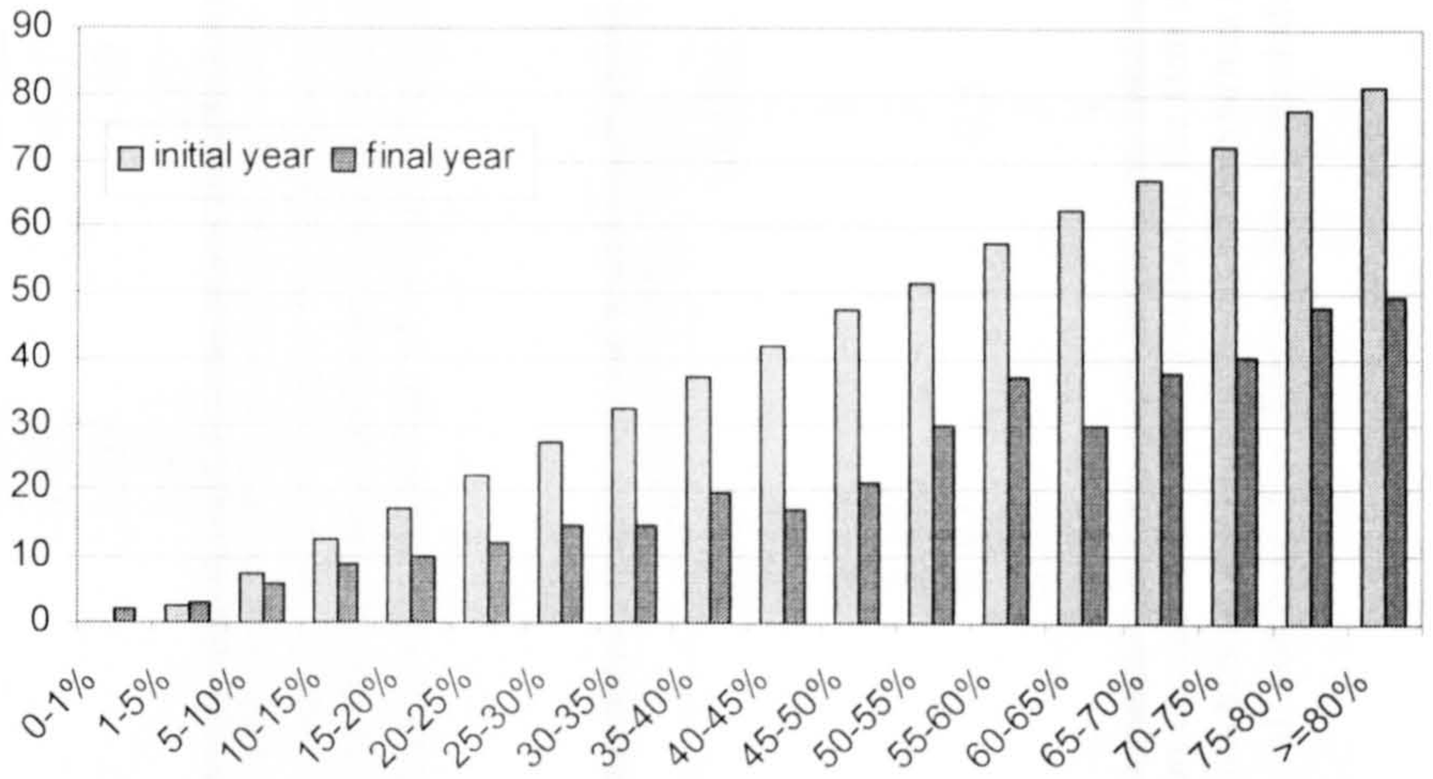


Panel C. Non-Institutional Ownership (External)

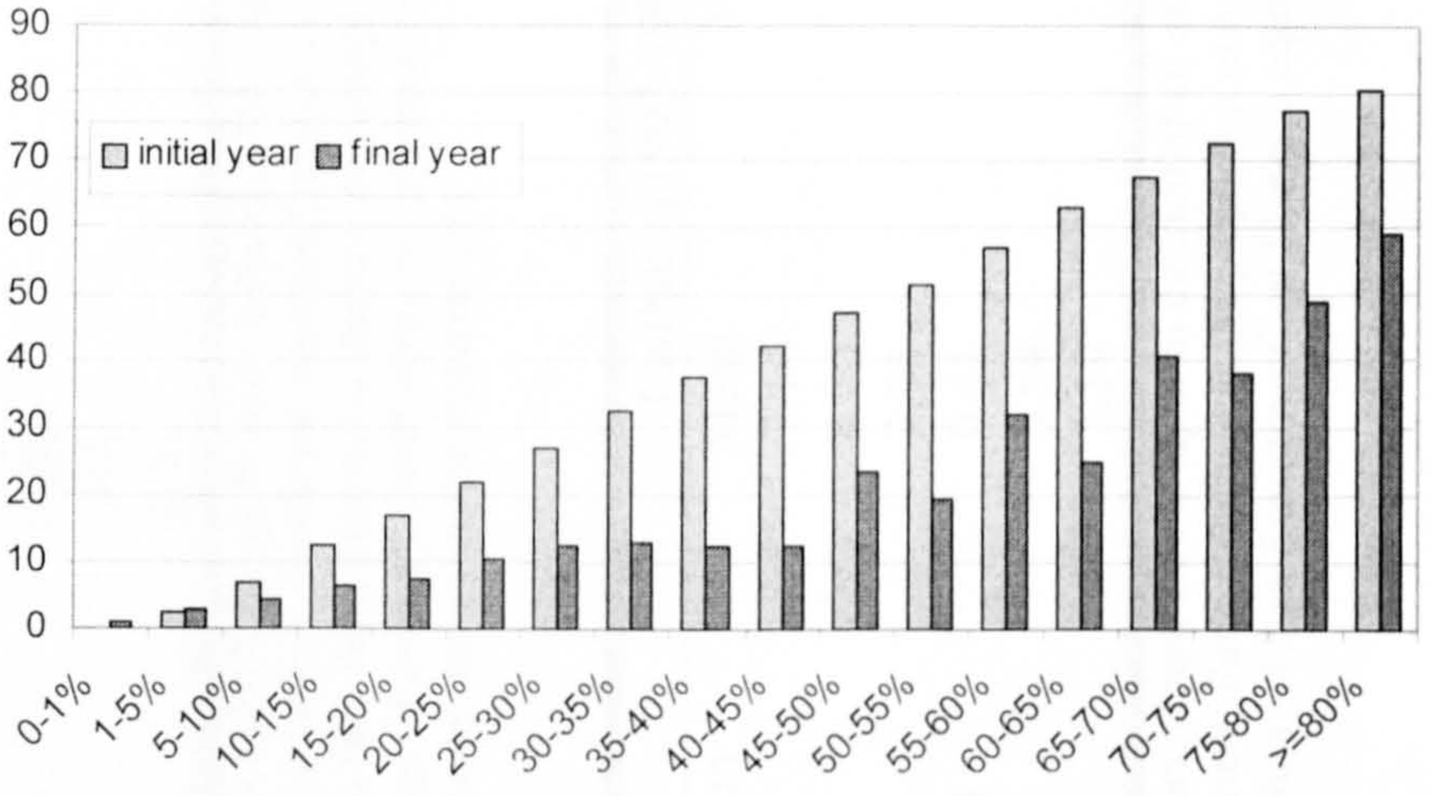


These figures show average levels of ownership variables for the first and last year that firms enter the sample. The distribution of ownership relative to the first year is on the horizontal axis. Panel A reports figures for all outside owners, Panel B for ownership by financial institutions and panel C depicts trends for non-financial investors. All definitions of variables are provided in Table 2.1.

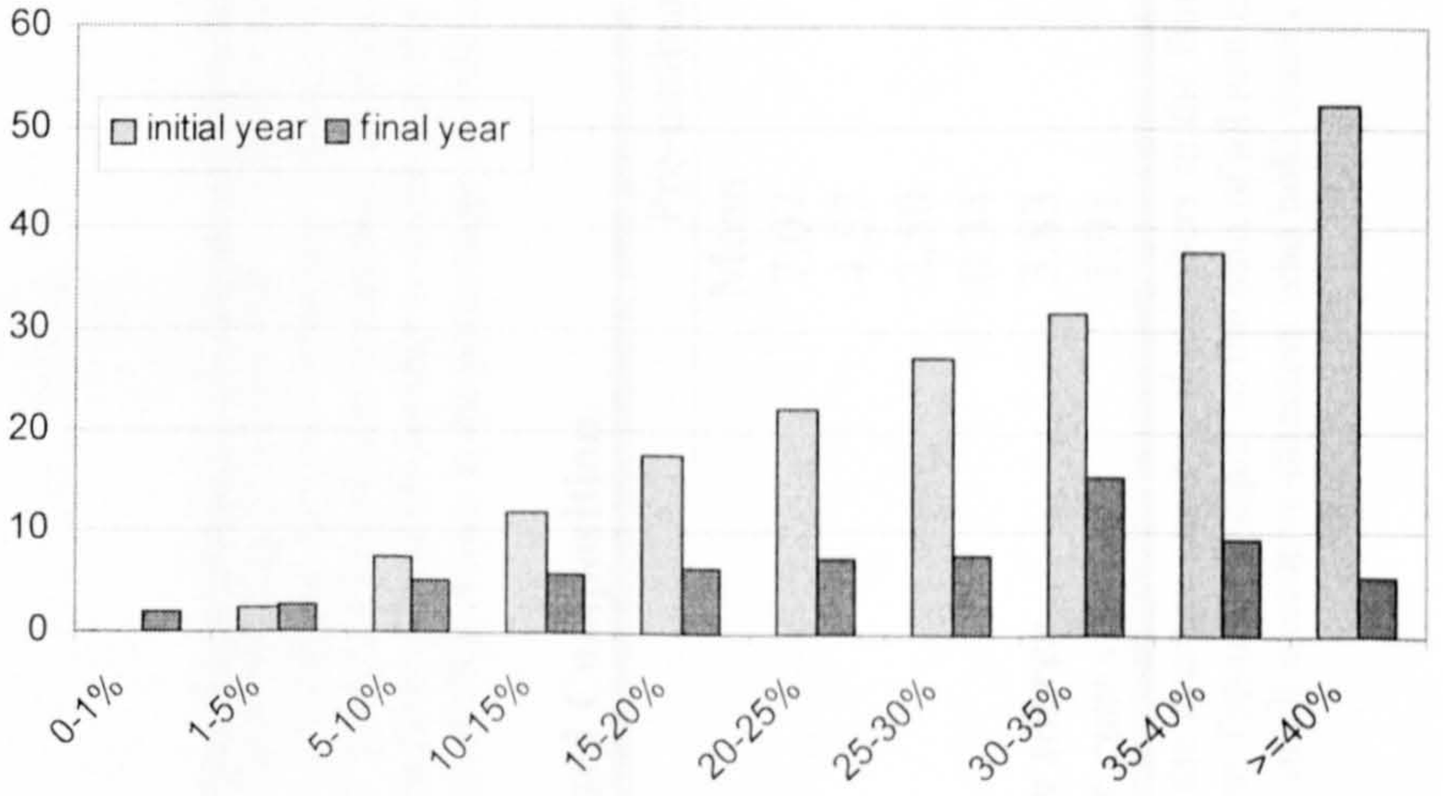
Figure 2.3. Changes in Board Ownership. *Panel A. Board Ownership*



Panel B. Executive Ownership (Exec)



Panel C. Non-Executive Ownership (Nonex)



These figures show average levels of ownership variables for the first and last year that firms enter the sample. The distribution of ownership relative to the first year is on the horizontal axis. Panel A reports figures for all directors, Panel B for executives and panel C for non-executives. All definitions of variables are provided in Table 2.1.

Table 2.7. Frequency of Annual Changes of Board and Outside Ownership Structures.

	Outside Ownership	*Instit*	*External*	*Board Ownership*	*Exec*	*Nonex*
< -10%	12.27	11.17	7.68	6.46	5.93	1.90
-10% to -5%	10.38	9.94	7.60	5.26	4.54	1.81
-5% to -1%	13.16	13.68	10.46	12.84	11.37	5.25
-1% to 1%	16.93	20.63	46.47	64.21	69.08	83.32
1% to 5%	15.28	14.63	10.86	5.97	4.92	4.17
5% to 10%	12.41	12.29	7.97	2.14	1.60	1.49
>10%	19.57	17.66	8.96	3.12	2.56	2.07

This table shows the percentage of observations of firms that experience an annual change in their ownership structures, both by outsiders and insiders, in a range of "less than 10% of ownership" to "greater than 10% of ownership". *Outside Ownership* is the sum of all external shareholding above the disclosure threshold; *Instit* is equal to the total percentage of shares held by the disclosed investment companies, insurance and banks in each firm; *External* is the total percentage of shares held by the disclosed non-financial corporations and individuals in each firm; *Board Ownership* is defined as the total percentage of ordinary shareholding by all directors (%); *Exec* represents the percentage of ordinary shareholding by executive directors (%); *Nonex* is the percentage of ordinary shareholding by non-executive directors (%)

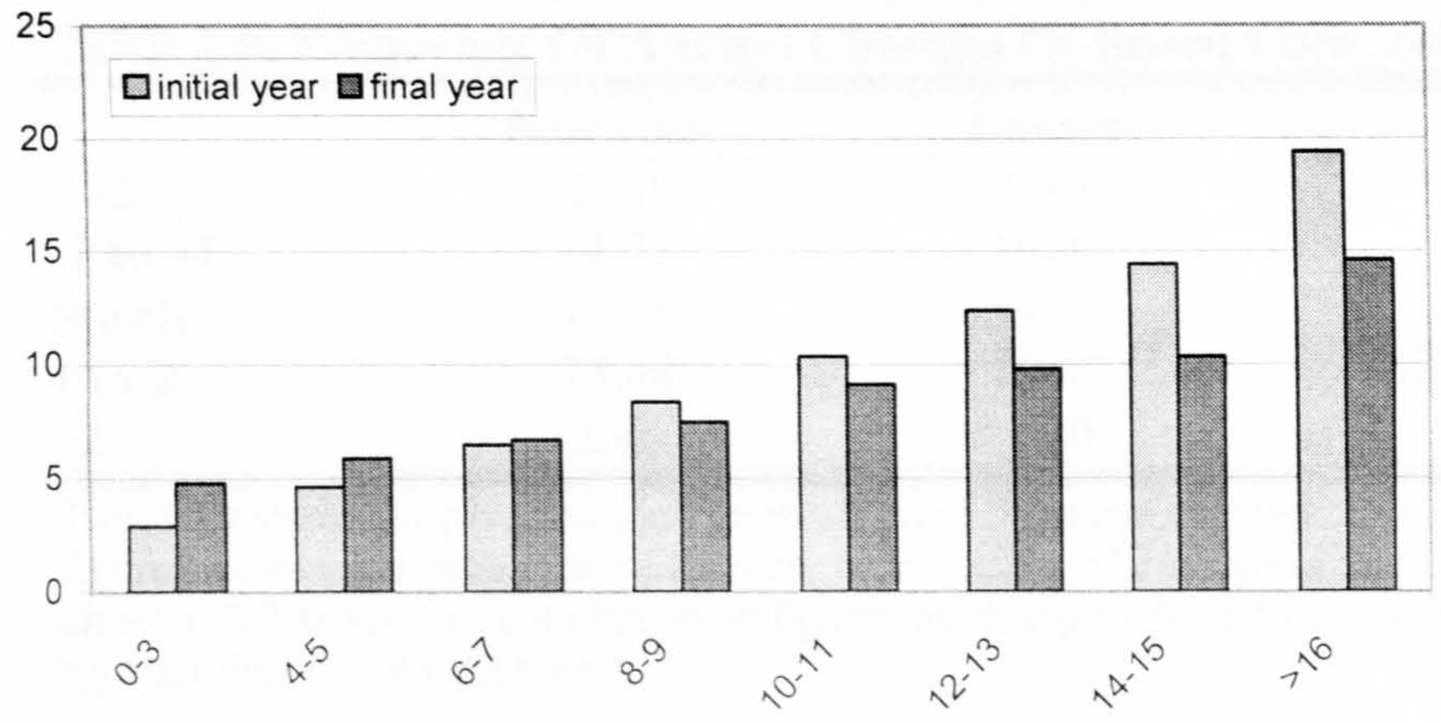
Table 2.8. Board Composition.

	Pre-cadbury (1991)		Cadbury (1992-1997)		Hampel (1998-2001)	
	Mean	Median	Mean	Median	Mean	Median
Board Size	7.07	7	7.14	7	7.26	7
Totexec	4.57	4	4.20	4	3.82	4
Totnonex	2.50	2	2.95	3	3.45	3
Ratio	0.34	0.33	0.41	0.4	0.47	0.5
Executives cum shares	3.83	4	3.54	3	3.30	3
Non-executives cum shares	1.91	2	2.19	2	2.65	3

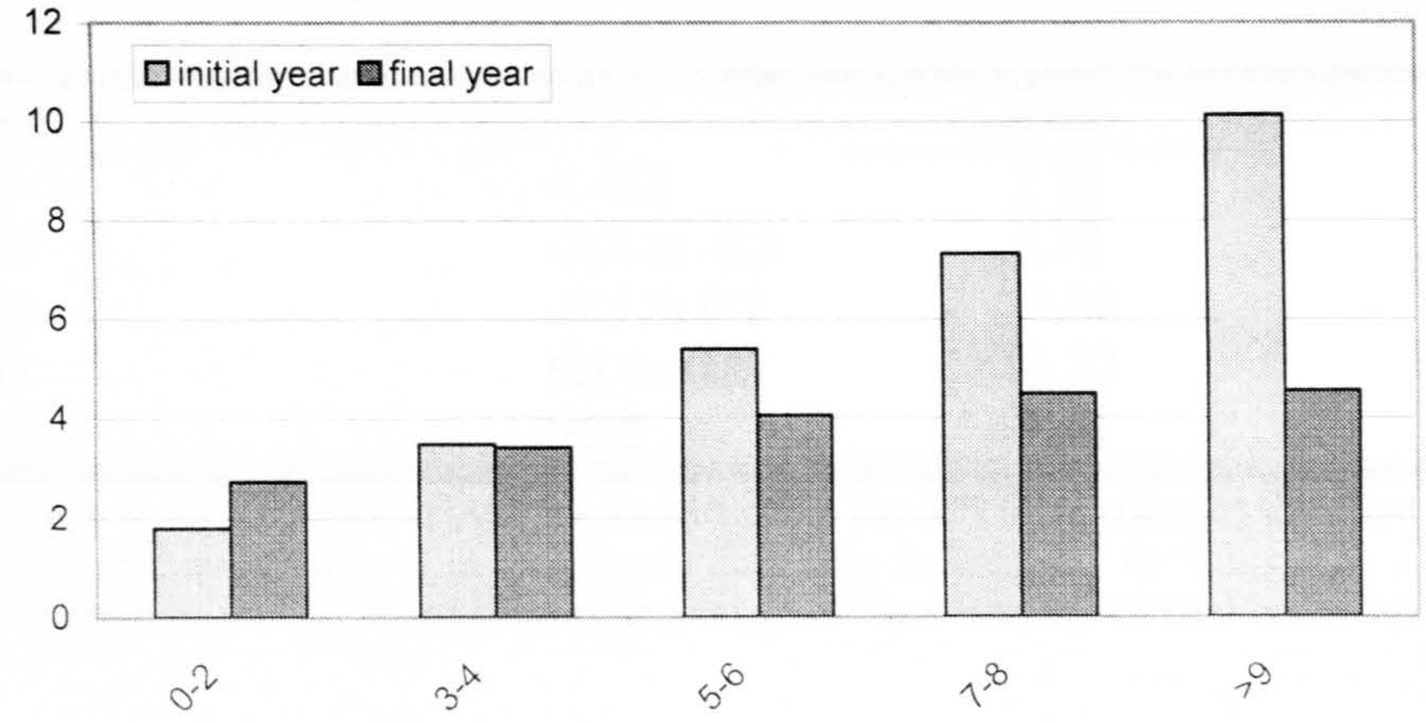
This table shows the average number of members in the Board of Directors. *Board Size* is equal to the sum of all executive and non-executive directors; *Totexec* is the sum of all executive directors; *Totnonex* is equal to the sum of all non-executive directors; *Ratio* is defined as the proportion of non-executive directors on total board; Num. of *Executives Cum Shares* is the sum of all executive directors who hold shares in the firm; Num. of *Non-Executives Cum Shares* is equal to the sum of all non-executive directors who hold shares in the firm.

Figure 2.4. Board composition.

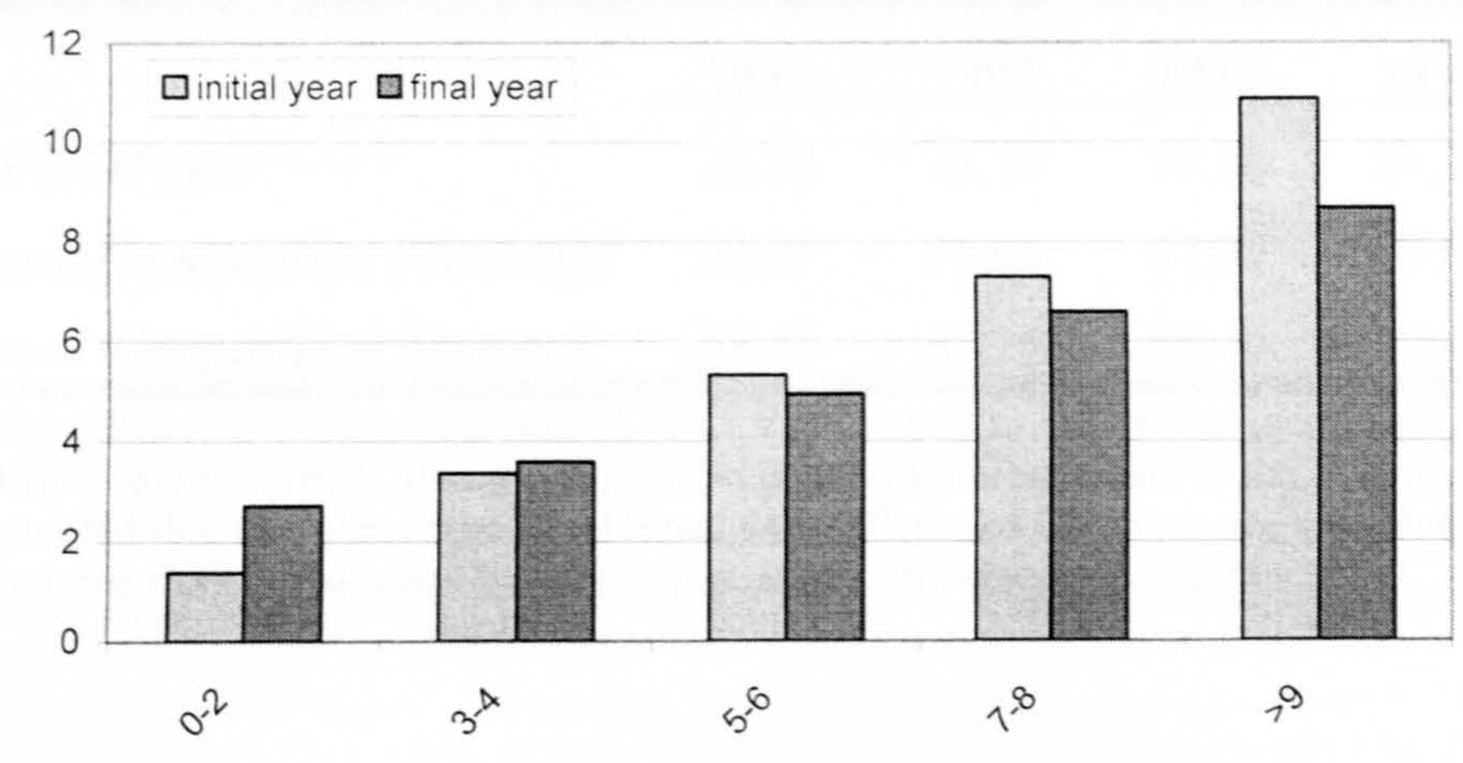
Panel A. Board Size



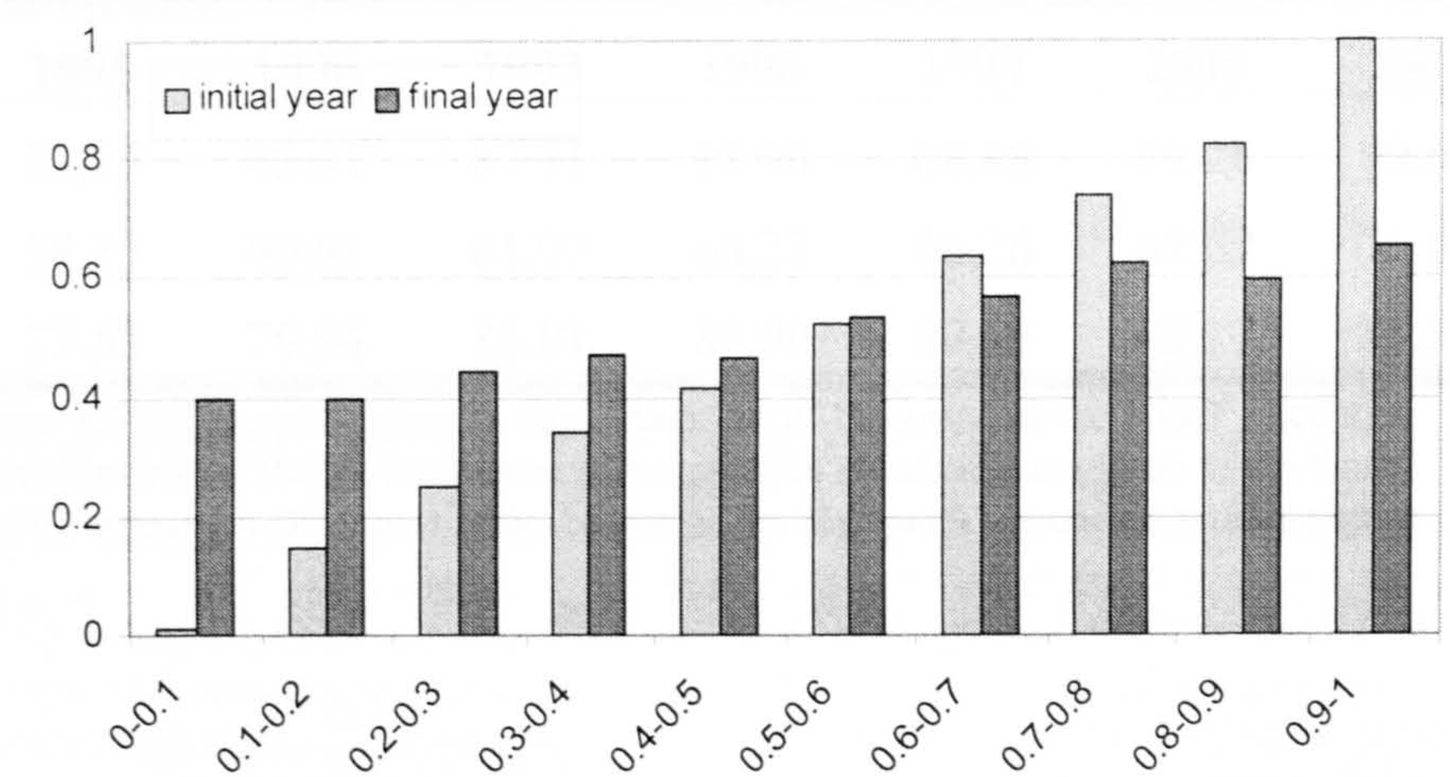
Panel B. Total Executives



Panel C. Total Non-Executives



Panel D. Ratio



These figures show average levels of ownership variables for the first and last year that firms enter the sample. The distribution of ownership relative to the first year is on the horizontal axis. Panel A reports figures for all directors, Panel B for executives, panel C for non-executives, and Panel D for the Board composition. All definitions of variables are provided in Table 2.1.

Table 2.9. Frequency Of Annual Changes Of Board Composition.

	Board Size	*Totexec*	*Totnonex*		*Ratio*
< -2	3.30	1.95	0.68	**< -0.2**	2.72
-2 to –1	24.77	25.05	17.30	**-0.2 to -0.1**	6.78
Stable	43.58	53.32	56.06	**-0.1 to 0.1**	73.80
1 to 2	25.48	18.47	24.65	**0.1 to 0.2**	11.32
>2	2.86	1.20	1.31	**>0.2**	5.38

This table shows the percentage of observations of firms that experience an annual change in their board composition. In particular, the first three columns illustrate figures on changes related to board size, total number of executives and total number of non-executives, in a range of "less than 2 directors" to "more than 2 directors". The last two columns show figures on changes related to the ratio of non-executives to total board (*Ratio*), in a range of "less than 0.2 of total board" to "greater than 0.2 of total board".

Table 2.10. Compliance to the Codes of Best Practice.

	1991	**1992**	**1993**	**1994**	**1995**	**1996**	**1997**	**1998**	**1999**	**2000**	**2001**
CH/CEO split	72.78	73.75	79.40	81.30	83.25	85.01	87.51	87.96	88.88	89.28	90.60
Board Composition (Cadbury)	37.87	37.66	47.07	48.60	58.35	60.81	61.07	65.23	66.28	69.69	71.07
Board Composition (Hampel)	58.46	61.25	69.44	70.40	77.83	79.54	83.01	84.99	87.95	88.17	88.55

This table shows the percentage of firms that comply to each recommendation each year. CH/CEO split refers to the separation of the roles of the Chief Executive Officer and Chairman. Board composition (Cadbury) refers to one of the Cadbury's recommendations that at least three non-executive directors have to be in the Board provided that the roles of the Chief Executive Officer and Chairman are separated; *Board Composition* (Hampel) refers to one of the Hampel's recommendations that at least one third of the board must be composed of non-executive directors.;

Table 2.11. Concentration of ownership.

Panel A. Ownership by large shareholders

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Largest Ownership	18.88*	18.80	18.28	17.98	18.20	17.90	18.31	18.35	18.37	17.99	17.76
Largest	17.26*	15.87	15.83	16.09	16.54	16.64	16.51	16.52	16.50	15.81	15.98
Large Instit	13.93*	12.08	12.40	12.72	13.75	13.28	13.69	13.90	13.74	13.66	13.37
Large External	23.22*	22.25	24.18	24.09	23.79	23.23	23.45	23.46	22.58	21.00	20.96
Largest Manager	21.01	21.91	22.07	22.27	22.13	22.15	23.09	23.66	23.80	23.44	23.58
Large Exec	23.82	23.52	23.65	24.23	23.75	23.64	24.19	24.56	24.77	25.13	24.49
Large Nonex	12.24	14.71	14.76	16.43	17.07	17.07	19.56	19.54	19.89	18.71	20.89

Panel B. Distribution of firms by large shareholders

Largest Outsider	56.82	69.35	70.29	72.01	72.29	72.41	72.56	73.04	74.42	75.53	76.66
Largest Financial	35.74	48.75	49.61	50.05	50.86	51.49	51.52	52.40	53.10	55.45	59.78
Largest Non-Financial	21.08	20.60	20.68	21.96	21.43	20.92	21.04	20.64	21.32	20.08	16.88
Largest Manager	43.18	30.65	29.71	27.99	27.71	27.59	27.44	26.96	25.58	24.47	23.34
Largest Executive	31.60	24.69	23.83	22.83	21.80	20.75	20.48	19.12	18.13	17.97	16.45
Largest Non-Executive	11.58	5.96	5.88	5.16	5.91	6.84	6.96	7.84	7.45	6.50	6.89

* Reported disclosure rule is 5%.

This Table shows some characteristics of the concentration of ownership in our sample firms. Panel A shows the average percentage of the largest shareholder identified by different categories of owners. The figures reflect average values when the reported typology is the largest owner. Panel B shows the distribution of firms by different categories of largest shareholders over time. *Largest Ownership* is equal to the percentage of shares by the largest shareholder in the firm; *Largest* is the percentage of shares by the first non-managerial shareholder; *Large Instit* is equal to the percentage of shares by the first non-managerial shareholder when it is an institutional investor, insurance company or bank; *Large External* is the percentage of shares by the first non-managerial shareholder when it is a non-financial company or an individual; *Largest Manager* is defined as the percentage of shares by the first shareholder when it is a manager; *Large Exec* is equal to the percentage of shares by the first managerial shareholder when it is an executive; *Large Nonex* is the percentage of shares by the first managerial shareholder when it is a non-executive.

Table 2.12. Distribution by Types of the Ultimate Controller.

Cut-offs	20%					10%					5%				
	1993	**1995**	**1997**	**1999**	**2001**	**1993**	**1995**	**1997**	**1999**	**2001**	**1993**	**1995**	**1997**	**1999**	**2001**
Widely Held	69.72	70.62	68.14	66.97	66.86	30.07	24.29	22.28	20.87	21.41	5.23	9.04	7.18	6.45	6.45
Unlisted	12.20	12.43	14.92	16.97	17.01	35.29	42.56	40.15	50.23	45.45	51.85	52.92	47.51	56.60	56.60
Widely Held	0.87	0.56	1.29	0.92	0.59	5.66	4.14	10.31	3.90	6.16	9.59	5.08	15.10	7.33	7.33
Financial Institution															
Widely Held	0.22	0.38	0.37	0.00	0.29	0.44	0.56	0.37	0.23	0.29	0.44	1.13	0.92	0.00	0.00
Corporation															
Managerial	15.25	15.07	14.73	14.45	13.78	24.40	24.86	22.65	20.18	22.29	27.67	26.74	24.13	23.75	23.75
Ownership															
Individual	1.74	0.94	0.55	0.69	1.17	4.14	3.39	4.24	4.36	4.11	5.01	4.71	2.95	5.57	5.57
Cross Holding	0.00	0.00	0.00	0.00	0.29	0.00	0.19	0.00	0.23	0.29	0.00	0.38	2.21	0.29	0.29
State	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.22	0.00	0.00	0.00	0.00
Number of Firms	459	531	543	436	341	459	531	543	436	341	459	531	543	436	341

These figures are calculated on the basis of the controlling rights for the first ultimate controller. Some definitions: *Widely Held*, company of the sample without an ultimate controller at the chosen cut-off level; *Widely Held Financial Institution*, a financial firm that is widely held at the chosen cut-off level; *Widely Held Corporation*, a non financial firm that is widely held at the chosen cut-off level; *Unlisted*, a financial or non financial firm that has an unknown ownership structure; *Managerial*, a company which has a director as ultimate controller; *Individual*, a company which has an individual (non director) as ultimate controller; *Cross holding*, a group where the voting rights remain distributed over the entire group rather than concentrated in the hands of a single company or individual; *State*, the State (Government or local Authorities) is the ultimate controller.

Table 2.13. Distribution by Identities of the First Ultimate Controller.

Cut-Offs		20%					10%					5%				
		1993	1995	1997	1999	2001	1993	1995	1997	1999	2001	1993	1995	1997	1999	2001
Unlisted Type:																
	UNL C	29.50	22.44	28.32	27.08	30.09	18.69	14.93	19.43	19.42	21.27	17.24	13.66	18.45	18.89	20.69
	II U	8.63	13.46	16.76	19.44	15.93	28.97	31.09	29.86	35.94	31.72	32.18	31.88	29.56	36.32	34.17
	INS U	0.72	1.28	1.16	2.78	3.54	0.62	3.23	1.90	5.80	1.87	2.07	5.59	2.78	8.47	2.19
	BK U	1.44	5.13	0.58	2.08	1.77	2.18	6.97	0.47	2.32	2.99	3.22	7.04	0.40	2.42	3.13
Widely Held Financial Institution_Type:																
	II	0.72	1.28	1.73	0.69	0.00	0.31	0.50	5.69	0.29	0.75	0.23	0.62	5.16	0.00	0.31
	INS	2.16	0.64	1.73	1.39	1.77	6.85	1.99	5.21	4.35	6.72	8.97	2.90	8.73	4.60	7.21
	BK	0.00	0.64	0.58	0.00	0.00	0.93	3.23	2.37	0.29	0.37	0.92	2.69	2.58	0.24	0.31
Widely Held Corporation_Type:																
	LIST C	0.72	0.64	1.16	0.69	1.77	0.62	0.75	0.47	0.58	0.75	0.46	1.04	0.99	0.24	0.31
Managerial Ownership_Type:																
	Exec	41.73	42.31	36.99	33.33	30.09	30.22	27.61	23.70	19.71	20.15	24.60	24.43	21.03	18.89	18.50
	Nonexec	6.47	6.41	6.94	7.64	8.85	4.67	5.22	5.45	5.80	8.21	4.60	4.97	4.96	5.08	7.21
Individual_Type:																
	Ind	7.92	5.77	4.04	4.86	6.19	5.92	4.48	5.45	5.51	5.22	5.29	5.18	5.55	4.84	5.95
STATE		0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.23	0.00	0.00	0.00	0.00
Number of Firms		139	156	173	144	114	321	400	422	345	311	435	483	504	413	328

These figures are calculated on the basis of the identities for the first ultimate controller. They refer only to those corporations not "*Widely Held*". Some definitions: *UNL C*, unlisted non financial company; *II U*, unlisted institutional investor (investment company, pension fund and unit trust); *INS U*, unlisted insurance company; *BK U*, unlisted bank; *LIST C*, listed non financial company; *II*, listed institutional investor; *INS*, listed insurance company; *BK*, listed bank; *Exec*, executive director; *Nonexec*, non executive director; *Ind*, individual (non director).

Table 2.14. Distribution by Complex Structures.

Panel A. Complex Structure by Ultimate Controller

Cut-Offs	20%					10%					5%				
	1993	**1995**	**1997**	**1999**	**2001**	**1993**	**1995**	**1997**	**1999**	**2001**	**1993**	**1995**	**1997**	**1999**	**2001**
Complex Ultimate Controller	2.83	4.90	3.68	3.67	1.76	11.11	16.38	12.89	11.47	6.74	14.16	21.66	15.10	14.91	8.80
Simple Ultimate Controller	27.45	24.48	28.18	29.36	31.38	58.82	59.32	64.83	67.66	71.85	80.61	69.30	77.72	78.64	84.75
Widely Held	69.72	70.62	68.14	66.97	66.86	30.07	24.29	22.28	20.87	21.41	5.23	9.04	7.18	6.45	6.45
Number of Firms	459	531	543	436	341	459	531	543	436	341	459	531	543	436	341

Panel B. Types of Complex Structures

1 Pyramid	7.69	42.11	29.41	9.09	83.33	26	67.09	45.16	27.91	60.87	64.29	65.38	43.24	27.59	27.5
1 Multiple Control Chain	92.31	31.58	29.41	45.45	0	68	22.78	41.94	55.81	30.43	27.38	25.00	44.59	58.62	65
1 Cross Holding	0	26.32	29.41	45.45	16.67	0	6.33	8.06	11.63	4.35	2.38	4.81	6.76	8.62	5
Number of Firms	13	19	15	11	6	50	79	62	43	23	84	104	74	58	40

In Panel A, the figures represent the percentage of companies by the adoption of complex structures by the ultimate controller. In Panel B, the figures represent the percentage of firms by the type of complex structures adopted by the ultimate controller. The number of firms represents companies with the first ultimate controller using a complex ultimate structure. Therefore the number of firms reported in Panel B is lower than what reported in Panel A. *Complex Ultimate Controller* is a firm having the first ultimate controller using a complex structure; *Simple Ultimate Controller* is a firm with the first ultimate controller corresponding to the direct shareholder; *Widely Held* is defined as a company in the sample without an ultimate controller at the chosen cut-off level; *1 Pyramid* is equal to a firm with the ultimate controller using a pyramid; 1 *Multiple Control Chain* is equal to a firm with the ultimate controller using a Multiple Control Chain; *1 Cross Holding* is equal to a firm with the ultimate controller using Cross Holding.

Table 2.15. Distribution by Complex Structures on the Entire Shareholding.

Panel A. Complex Structure on the Entire Shareholding

Cut-Offs	20%					10%					5%				
	1993	**1995**	**1997**	**1999**	**2001**	**1993**	**1995**	**1997**	**1999**	**2001**	**1993**	**1995**	**1997**	**1999**	**2001**
Complex Structure Firm	5.88	6.21	5.52	5.28	6.74	17.65	19.59	17.86	16.51	14.96	37.04	37.66	28.91	31.88	29.33
Simple Structure Firm	24.40	23.16	26.34	27.75	26.39	52.29	56.12	59.85	62.61	63.64	57.73	53.30	63.90	61.67	64.22
Widely Held	69.72	70.62	68.14	66.97	66.86	30.07	24.29	22.28	20.87	21.41	5.23	9.04	7.18	6.45	6.45
Number of Firms	459	531	543	436	341	459	531	543	436	341	459	531	543	436	341

Panel B. Types of Complex Structures

Pyramid	47.37	69.23	60.00	82.35	61.54	48.48	79.57	62.35	49.18	62.50	61.18	87.98	85.42	74.02	79.17
Multiple Control Chain	63.16	42.31	64.00	70.59	30.77	68.18	31.18	51.76	67.21	40.00	41.45	37.70	50.00	60.63	33.33
Cross Holding	21.05	19.23	20.00	29.41	15.38	6.06	5.38	5.88	8.20	5.00	3.29	2.73	4.86	4.72	2.083
Number of Firms	27	33	30	23	23	81	104	97	72	54	170	200	157	139	104

This Table shows the distribution of firms by different criteria. In Panel A, the figures are calculated on the basis of the presence (or not) of complex structures (pyramid, multiple control chain, cross holding, dual class shares) in the entire shareholding of the firms in the sample. In Panel B, the figures represent the percentage of firms that adopt complex structures distributed by each type of complex structure. *Complex Structure Firm* is a firm with at least one complex structure in its shareholding, that is, at least one ultimate controller has control rights higher than cash flow rights; *Simple Structure Firm* is a firm without complex structure in its shareholding, that is, the ultimate controllers correspond to the direct shareholders with cash flow rights equal to control rights; *Widely Held* is defined as a company without an ultimate controller at the chosen cut-off level.

Table 2.16. Cash Flow Rights, Control Rights, Divergence and Ratio of the First Ultimate Controller.

Panel A. Cash Flow Rights															
Cut-Offs	**20%**					**10%**					**5%**				
	1993	**1995**	**1997**	**1999**	**2001**	**1993**	**1995**	**1997**	**1999**	**2001**	**1993**	**1995**	**1997**	**1999**	**2001**
Mean	33.52	32.81	31.48	31.60	32.78	21.65	19.81	20.16	20.24	21.18	17.78	17.29	17.98	17.90	18.79
Standard Deviation	16.03	16.06	14.64	14.40	13.92	15.09	14.95	13.75	13.83	13.75	14.47	14.71	13.54	13.64	13.69
Median	28.78	28.35	26.50	27.90	28.50	17.20	15.40	16.03	15.90	16.55	13.59	13.69	14.40	14.10	14.50
Min	0.86	0.52	3.48	0.08	3.50	0.17	0.01	0.28	0.00	0.22	0.14	0.00	0.28	0.01	0.22
Max	79.80	89.90	89.90	71.20	89.90	79.80	89.90	89.90	71.20	89.90	79.80	89.90	89.90	71.20	89.90
Panel B: Control Rights															
Mean	35.20	34.94	33.07	33.21	33.47	23.49	22.10	21.98	21.97	22.11	19.29	19.52	19.62	19.48	19.68
Standard Deviation	15.05	14.50	13.21	12.80	13.53	14.29	13.80	12.75	12.71	13.26	14.10	13.76	12.84	12.81	13.31
Median	29.40	29.67	26.90	29.45	28.75	18.09	16.77	17.27	17.30	17.55	14.90	14.90	15.46	14.80	14.90
Min	20.00	20.00	20.00	20.20	20.00	10.00	10.00	10.00	10.00	10.00	5.00	5.00	5.04	5.02	5.13
Max	79.80	89.90	89.90	71.20	89.90	79.80	89.90	89.90	71.20	89.90	79.80	89.90	89.90	71.20	89.90
Panel C. Divergence															
Cut-Offs	**20%**					**10%**					**5%**				
Mean	1.68	2.13	1.58	1.61	0.70	1.84	2.29	1.82	1.73	0.93	1.51	2.23	1.64	1.57	0.89
Standard Deviation	6.33	7.10	5.04	5.56	3.36	5.19	5.65	4.75	4.84	3.30	4.58	5.30	4.43	4.43	3.11
Median	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Min	0.00	-22.7	0.00	-4.25	0.00	0.00	-22.7	0.00	-4.25	0.00	0.00	-22.7	0.00	-4.25	0.00
Max	42.18	40.38	35.52	35.58	21.58	42.18	40.38	40.18	35.58	21.58	42.18	40.38	40.18	35.58	21.58

This Table shows some descriptive statistics for cash flow rights (Panel A); control rights (Panel B); divergence (Panel C); CF/CO (Panel D). Cash Flow Rights are the product between different links along the holding chain with respect to the chosen cut-off level at each link; Control Rights are defined as the minimum holding between the links along the chain; Divergence is the difference between control rights minus cash-flow rights; CF/CO is the ratio of cash flow rights to control rights.

Appendix 2.1
How to measure cash flow rights and control rights in ultimate ownership structure. An example.

Figure 2.1 shows a case study that usefully illustrates how we calculated pyramids and multiple control chains. It describes the ultimate ownership structure of Acal Plc in 1997 with all shareholders with more than 3% reported.

Acal Plc has six direct shareholders: Curry JAH (13.93%), Mercury Asset Mgmt (11.9%), Laughton AJ (8.94%), 3i Plc (7.11%), Thompson Clive Invs (5%), Prudential Corporation (4.33%) and 3 links in the the control chains.

We can identify three different holding chains (from Mercury Asset Mgmt, 3i Plc and Thompson Clive Invs) that must be analysed back in order to find the ultimate controllers of Acal. Mr. Curry and Mr. Laughton are individuals and they can be already defined as ultimate controllers of Acal and, then, Prudential Corporation that is widely held.

First, we can trace back the ownership of Mercury Asset Mgmt as far as Munich Reinsurance, which has CF= 0.49% (4.17%*11.9%) and CO= 4.17% (min [4.17, 11.9]) in Acal.

Second, we do the same for 3i Plc, and again we find Munich Reinsurance with CF= 0.038% (7.11*13*4.17) and CO= 4.17% (min [7.11,13,4.17]) in Acal; and Prudential Corporation with CF= 0.78% (11*7.11) and CO= 7.11% (min [7.11, 11]) in Acal.

Third, we trace back the ownership of Thompson Clive Invs. It has five direct owners: two of them, Scottish Value and Scottish Inv Tr, have complex ownership structures. M&G Fund and Refuge are considered ultimate owners of Acal, with CF= 0.3% (6.05*5) and CO= 5% (min [6.05, 5]) and CF= 0.3% (6.05*5) and CO= 5% (min [6.05, 5]) respectively. There is also Equitable Life Ins with CF= 0.66% (13.2*5) and CO= 5% (min [13.2,5]). We trace back the ownership of Thompson Clive Invs through Scottish Value as far as the Bank of England Pens Fund (CF= 0.09% (9.24*20.1*5); CO= 5% (min [9.24, 20.1, 5]) in Acal) and Abbey Life (CF= 0.07% (6.99*20.1*5); CO= 5% (min [6.99, 20.1, 5]) in Acal), as ultimate controllers in Acal, and Prudential Corporation again (CF= 0.046% (4.61*20.1*5) and CO= 4.61% (min [4.61, 20.1, 5]) in Acal). Finally, the ownership of Thompson Clive Invs through Scottish Inv Tr finds as ultimate controller Sun Life (CF= 0.015% (7.74*4.07*5); CO= 4.07% (min [7.74. 4.07, 5]) in Acal) and as other shareholder again Equitable Life Ins (CF= 0.011% (5.66*4.07*5); CO= 4.07% (min [5.66, 4.07, 5]) in Acal).

At different cut-off levels the firm has different ultimate ownership structures.

1) At 20% cut-off level, Acal is defined as widely held.
2) At 10% cut-off level, we identify Prudential Corporation as the Acal ultimate controller through a multiple control chain identified from the above calculations. We sum up the CF and CO of Prudential that we found in each control chain. Therefore, Prudential Plc has CF=5.151% (4.33 + 0.04 + 0.78) and CO=16.05% (4.33 + 4.61 + 7.11) in Acal Plc.

   Curry JAH (CF=CO=13.93%) is the second ultimate controller. An Mercury Asset Mgmt is the third one (CF=CO=11.9%).
3) At 5% cut-off level, besides Prudential and Mr. Curry, we identify two other companies that are the third and fourth ultimate controllers through multiple control chains.

   Munich Reinsurance is the third ultimate controller with CF= 0.528% (0.49+ 0.038) and CO= 8.34% (4.17 + 4.17), respectively.

   Mr. Laughton (as direct shareholder) is the forth controller with CF=CO=8.94.

   With the same amount of CO=5% we define Bank of England Pens Fund and Abbey Life (as ultimate owners along the pyramidal chain of Acal-Thompson Clive Invs- Scottish Value), M&G Fund and Refuge (as ultimate owners along the pyramidal chain of Acal-Thompson Clive Invs) and Equitable Life Ins (as ultimate owner along the multiple control chain Acal- Thompson Clive Invs and Acal-Thompson Clive Invs-Scottish Inv Tr) as the remaining ultimate controllers in Acal Plc.

CHAPTER 3

FIRM PERFORMANCE: DO NON-EXECUTIVE DIRECTORS HAVE MINDS OF THEIR OWN?

EVIDENCE FROM UK PANEL DATA

3.1 Introduction

The relation between ownership structure and firm performance is the subject of an important and continuing debate in the corporate finance literature, dating back to Berle and Means' (1932) thesis, that a negative correlation should exist between dispersed shareholding and firm performance.

Jensen and Meckling (1976) formally derive a model in which the distribution of shares between the insiders and outsiders in a company can influence its value. Provided that managers' natural tendency is to allocate the firm's resources in their own best interests, then the greater the managerial ownership, the less inclined managers are to divert resources away from value maximisation, since their interests coincide more closely with those of outside shareholders. Firm performance then increases uniformly (the alignment effect).

However, the impact of managerial ownership may be non-monotonic. Shleifer and Vishny (1989) contend that, as the percentage of shares held by the manager increases, his discretion increases. He may pursue private benefits, or use this discretion to appoint a board of directors that is unlikely to monitor. This in turn would impair the capacity of outside shareholders to monitor and influence managers (the entrenchment effect).

Empirical evidence of the effect of managerial ownership on firm performance is mixed. A number of papers find a non-monotonic relation between ownership and value, but little consensus has been reached on its form. Amongst others, McConnell and Servaes (1990, 1995) observe an inverse U-shaped relationship, whereas Hermalin and Weisbach (1991), Morck et al. (1988), and Short and Keasey (1999) report a significant cubic relation between the two. In a recent study on the UK market, Davies et al. (2005) hypothesize a quintic relationship.

However, a growing body of evidence fails to detect any significant links between ownership and performance. For example, using a simultaneous equation model in which Tobin's q and insider holdings are endogenous, Loderer and Martin (1997) report no relationship between the two (whilst firm value is a negative predictor of ownership). Cho (1998) also estimates a system of equations in which insider ownership and q-ratio are determined simultaneously, and suggests that the latter affects ownership structure but not vice versa. Demsetz and Villalonga (2001) use a 2SLS approach to show that, once endogeneity is considered, the direction of causality runs only from value to ownership.

A possible explanation for this wide variety of results is that they are driven by the different empirical approaches adopted. The first set of studies typically does not allow for the endogeneity of managerial ownership, an issue that was first discussed by Demsetz (1983).[1] It is argued that a positive correlation between managerial ownership and firm performance can be interpreted as evidence that owning ordinary shares aligns the interests of managers with those of external shareholders, resulting in a positive effect in performance. However, it is also possible that managerial ownership is higher in better performing firms, simply because managers are more willing to accept ordinary shares as part of their payment scheme in those firms that perform better. Studies that fail to control for this cross causality may be capturing a spurious relationship.

Although the second set of studies discussed above adopts appropriate econometric techniques to control for this cross causality, it typically neglects another important issue. According to Himmelberg et al. (1999), estimating the impact of managerial ownership on firm value by regressing Tobin's q on variables such as the percentage of equity held by managers "is potentially mis-specified because of the presence of firm unobserved heterogeneity". To the extent that managerial ownership is strongly correlated with unobservable firm-specific characteristics (i.e., the contracting environment in the firm), studies that fail to control for this effect would obtain biased and inconsistent estimates.

Our work contributes to the literature on several grounds. First, in the present work, the relation between firm performance and managerial ownership is investigated using the GMM methodology (Arellano and Bond, 1991). This technique provides a set of results robust to the endogeneity of (all) the explanatory variables, and to the presence of unobservable heterogeneity.

Second, to carry out this study, a novel panel data set of UK firms for the period 1991-2001 was collected by hand, gathering information on ownership by the board of directors and by external shareholders, as well as information on board composition. This indicates, amongst other things, that the argument of La Porta et al. (1999), that ownership is stable in time (subsequently utilized by Zhou 2001), may not be universally valid. It is shown how ownership, and more particularly managerial ownership, varies significantly in the UK, with the result that a panel data technique can be used to retrieve results that are

---

[1] Two notable exceptions are Davies et al. (2004), who use a SEM, and Hermalin and Weisbach (1991) who use a IV approach.

robust not only to endogeneity, but also to fixed effects, as suggested by Himmelberg et al. (1999).

Third, this data and this methodology are used to test whether non-executive directors act independently from executives in determining firm performance. Previous studies in this area have typically used shareholding by the entire board as a proxy for managerial ownership.[2] Many papers, however, have noted that different board members have different incentives. Whereas the board of directors is supposed to act on behalf of the shareholders, to monitor management discretionary behaviour, non-executive directors should act as "delegated monitors", charged by the shareholders with observing the actions of executive managers (Hart, 1995). According to Morck et al. (1988), since non-executive (outside) directors must monitor the performance of the executives (officers), they should be provided with strong financial interests in the firm. Other authors correspondingly contend that non-executives do not have sufficient financial interests to be concerned about company performance (Hart, 1995), and that they may even lack the necessary expertise to participate efficiently in financial planning (Jensen, 1993). Consequently, we argue that it is important to make a distinction between the stakeholding of the two categories, when investigating the determinants of firm performance.

The UK provides an ideal case study for this matter. In the US, boards generally have a predominance of outside (non-executive) directors, but UK boards have tended until recently to be dominated by a high proportion of executives[3]. However, following corporate scandals in the early nineties and the consequent issue of the "Codes of Best Practice", corporate governance has evolved considerably. In particular, the average number of non-executives per firm has steadily increased over time, so that by the end of the decade the ratio of non-executives to executives was close to one. Furthermore, as shown below, while share ownership by executive directors has been steadily decreasing, the opposite holds for non-executives.

Given these arguments, we first test the relationship between board ownership and firm value. Then the board of directors is divided between executives and non-executives, and we test whether ownership by non-executives is also a relevant factor. We also check whether the mere presence of outside directors on the board is significantly linked to firm

---

[2] One notable exception is Lasfer (2004).

[3] For example, Dahya et al (2002) report that in 1988 just 21 of the FT500 companies has an outsider dominated board while outsiders comprised the majority of the boards for 387 Fortune 500 firms.

value. To account for the possibility that non-executives may have stronger incentives to monitor effectively when they own greater amounts of shares, we introduce an interaction term between non-executive ownership and board composition (ratio). In this way we are able to test for the presence of a *conditional effect* of non-executive ownership on board composition, besides the *main effects* (impact of non-executive ownership and impact of board composition).

We also investigate whether the presence and identity of a large shareholder have an impact on firm performance, in addition to firm capital and financial structure. A number of papers show the interdependence of these agency control mechanisms (Agrawal and Knoeber, 1996). For example, Stiglitz (1985) and Shleifer and Vishny (1997) maintain that large shareholders have greater incentives to become involved in the control process than smaller ones, because they can more easily bear the high fixed costs of collecting information on management behaviour. Some authors also emphasize that different types of shareholders have different incentives (and costs) to act as monitors of the business activities in the firm (Brickley et al., 1988; Pound, 1988).

It is also argued that an appropriate level of external debt (Jensen, 1986), or an appropriate size of dividend payments (Easterbrook, 1984), can curb managerial discretion, by restricting the amount of free resources.

Our analysis reveals that the alignment/entrenchment effect as detected on the total board is driven by the executive positions on the board. No significant relationship is found between ownership by non-executives and performance, whereas we report a positive and significant effect of the ratio of non-executives to total board. Our results also suggest that the presence of a large outside shareholder, and in particular of large institutional investors, is negatively related to firm performance, whereas investment in physical capital, cash flow and dividend payments exert a positive impact. Finally, no significant impact of company size, debt ratio or RD expenditures is detected.

The remainder of the chapter is organized as follows. Section 3.2 reviews the hypotheses tested in this work. Section 3.3 presents the data and the methodology. Section 3.4 presents the empirical results, and Section 3.5 presents the main conclusions.

3.2 Hypotheses

3.2.1 Managerial ownership and the role of non-executives

Direct equity ownership may serve as an alignment mechanism, since it provides directors with economic incentives towards firm value maximization (Jensen and Meckling, 1976). As their direct equity ownership increases, managers bear an increasing part of the cost of undertaking non-value maximizing actions. Accordingly, a positive relationship is then expected. However, starting from Fama and Jensen (1983) and Demsetz and Lehn (1985), it has been increasingly recognized that the alignment effect may not be linear in managerial ownership. This is because increasing the shareholding also delivers increasing voting power and effective control over the firm, which may enable the manager to extract company resources. At higher levels of ownership, a negative relation with firm value may therefore be anticipated. Furthermore, at very high levels of director ownership, the relationship may be expected to become positive again, since the manager is then effectively the manager-owner.

In line with these arguments, a cubic relationship is tested in this work. This choice of functional form is also corroborated by a preliminary data investigation. Figure 1 shows a plot of the average Tobin's q versus board ownership quintiles.[4] Consistent with the incentive-alignment argument, the average q-ratio first increases with the equity ownership of directors; beyond 10% to 15% of shares, the association becomes negative, providing some support for the entrenchment effect. This decrease is not monotonic either, since the relationship becomes positive again at very high levels of managerial ownership (between 30% and 40%).[5]

As discussed earlier, we initially approximate managerial ownership as the total shares held by the board of directors. However, a number of papers have highlighted the differing incentives existing amongst various board members. This distinction is particularly relevant when considering the institutional differences between the US and the UK. American boards generally have a predominance of outside directors, and the Chief Executive Officer is usually also the Chairman and strictly controls the board (Charkham, 1994). In the UK, in contrast, following the corporate scandals of the early nineties,

---

[4] Table 3.1 gives the definitions of all variables used in this work.

[5] In the Appendix we report results from univariate analysis using deciles rather than quintiles and show that results remain virtually unaltered (Figure A.1). Further tests reveal statistically significant differences in means across the three clusters. Results are reported in Appendix A.3.1.

emphasis has been placed on the importance of independent monitoring by non-executives. Until the early nineties, UK boards were characterised by a high presence of executive directors, but since the issuing of the Codes of Best Practice, the number of non-executives has steadily increased, as has their average shareholding.

As a second step in our analysis, we explicitly investigate the impact of each of the two groups of board members in determining firm performance. To the best of our knowledge, only two previous papers have addressed this issue, both on the US market, and they reach different conclusions. Bhagat and Black (2002) find a generally insignificant relation between non-executive shareholding and performance, but Morck et al. (1988) report that "outside board members, like officers, respond to financial incentives and contribute more to corporate wealth as their ownership stakes rise. In addition ... outside board members are capable of becoming entrenched".

No theoretical work indicates the shape of this relationship, so we try different functional forms. While maintaining the cubic relationship for executive directors, we allow for a cubic, a quadratic and finally a linear specification for non-executive ownership.

Further, some theoretical studies have analyzed the effect of board structure on firm value, highlighting the possibility of an effective monitoring role by non-executives, irrespective of their shareholding interests. Fama and Jensen (1983) contend that both the reputation effect in the management labour market, and expertise acquired from their career history, could give non-executives enough incentives to guarantee effective and independent monitoring within the firm. This would imply a positive correlation between firm performance and the presence of non-executives. This hypothesis may be particularly relevant in the UK market, where voting at shareholders meetings is usually done by a show of hands (Goergen and Renneboog, 1999). Unless an issue is controversial, each shareholder counts as one vote, independent of his percentage of shares. However, some authors argue that the reputation effect in the management labour market could also work in the opposite direction. For example, Hart (1995) argues that "non-executives may owe their position to management". Jensen (1993) highlights the relative lack of expertise of non-executives, and emphasizes that oversized boards are easier for the Chief Executive to control. In such cases, a null or negative relationship may be anticipated.

A growing number of empirical works have analyzed the effect of board composition on firm performance, and the results are not unambiguous. Rosenstein and

Wyatt (1990) used an event study methodology on US companies, and reported a positive (but small) impact on the stock price following the appointment of an additional outside director. In the fixed effects specification, Yermack (1996) found a positive association between the proportion of outside directors and Tobin's q. Agrawal and Knoeber (1996) studied the impact of several agency control mechanisms and, in line with Bhagat and Black (2002), observed a negative link between the percentage of board seats held by non-officers and Tobin's q. However, Hermalin and Weisbach (1991) and Mehran (1995) found no relationship between the proportion of outside directors and firm performance.

As we described earlier, the Codes of Best Practice gave a set of recommendations on the structure and responsibilities of the board of directors, making the UK a very interesting setting in which to test the hypothesis that non-executive directors play a significant role in determining firm performance. This may be significant in view of comments in the recent Higgs Report (2003, p. 39, 10.5): "A high level of informality surrounds the process of appointing non-executive directors. Almost half of the non-executive directors surveyed for the Review, were recruited to their role through personal contacts or friendships. Only four per cent had a formal interview and one per cent had obtained the job through answering an advertisement". The implication is that the independence of monitoring action by English non-executives may be blurred and, as Hart (1995) surmises, only "quiet non-executives" are appointed.

Furthermore, all codes of best practice specifically indicate that non-executives should not hold share options, as this may shift their focus from the underlying firm performance to the share price. Along the same lines, it is suggested that they should not take part in any incentive or pension schemes (see, for example, Higgs Report 12.27, pg 57). However, there is no recommendation that non-executive directors should not hold ordinary shares, because ordinary shareholding may help to align the interests of the director with the long-term interests of the shareholders (Higgs Report 12.26 pg 57).

Similar to the US findings, the empirical studies for the UK companies show mixed results. Faccio and Lasfer (1999) find little evidence for the hypothesis that firm value is affected by the combination of managerial ownership and board structure. However, Weir et al. (2002) show that UK firms with high performance have a greater proportion of independent non-executives, both on the board and in the audit committees. Young (2000) shows that there is an increased demand for non-executive directors among firms with

manager-dominated boards, and that compliance with the Cadbury recommendation concerning the minimum number of non-executives is positively related to the expected net benefits of adding further non-executives to the board. Peasnell et al. (2003) show that the potential contribution of outside directors to internal corporate control mechanisms is significant at any level of managerial ownership in the UK, and that, even in manager-owned companies, the boards are far from passive. In a recent study, Dahya and McConnell (2002) report a significant increase in management turnover following adoption of the Cadbury recommendations, and an increased sensitivity of turnover to performance, as a result of the increasing number of non-executives in the board.

To test the effectiveness of the non-executives, we use the number (*Ratio*) of non-executive directors on total board, in line with the argument that "a greater use of outside directors can lead to more effective internal monitoring" (Agrawal and Knoeber, 1996). Moreover, to investigate whether the effect of the *Ratio* on Tobin's q depends on the level of non-executive shareholding, we include an interaction term (*Non-Exec ownership*Ratio)*.

3.2.2 The role of the external shareholders: Blockholding

Several theoretical papers have investigated the effectiveness of monitoring by large shareholders. Admati et al. (1994) argue that there is a trade-off between different ownership structures. More specifically, they focus on the trade-off between achieving a high degree of monitoring, which is promoted by concentrated ownership, and realizing risk-sharing gains, which requires more diffuse ownership. In their model, shareholding is a commitment device to monitor: to extract the surplus generated by increased monitoring, the large shareholder must increase his holdings. Khan and Winton (1998) also analyze the relationship between liquidity and monitoring by large shareholders, and provide a theory in which the choice between exercising monitoring and trading is determined by the relative payoff structure of these strategies.

Maug (1998) further develops the analysis of the incentives of large shareholders to monitor. Monitoring is a costly activity that is often described as a public good, because the costs are borne by one agent, but the benefits of the monitoring actions are enjoyed by all the shareholders in the company. This generates free-riding problems among shareholders. Maug (1998) argues that a higher degree of liquidity in the market exacerbates this issue,

because it makes is easier for (large) owners to sell their stock, rather than take action against the incumbent managers. In this perspective, higher market liquidity may, ceteris paribus, reduce the effectiveness of monitoring action by large shareholders.

Additionally, Stiglitz (1985) argues that larger shareholders have greater incentives to involve themselves in the control process than smaller ones, because they can more easily bear the high fixed costs of collecting information on management behaviour. In addition, Shleifer and Vishny (1997) justify the greater monitoring role of large investors because of the resources they invest in the firm. These arguments suggest a positive relationship.

The presence of a large shareholder may, however, lead to higher agency costs inside the firm, since larger shareholders may seek the maximization of their own wealth to the detriment of other investors (Shleifer and Vishny, 1997). Additionally, Burkart et al. (1997) show that the efforts exerted by managers to boost their private benefits may be beneficial for firms. They suggest that even if tight control by shareholders is ex-post efficient, it may constitute an ex-ante expropriation threat that reduces managerial initiative. As a consequence, ownership concentration in the hands of external shareholders may be detrimental to firm performance.

The empirical literature on this issue is extensive, and generally suggests that the largest shareholders play an insignificant role. Holderness and Sheehan (1988), for instance, find no difference in the performance of various firms, whether shareholding in their corporations is concentrated or dispersed. McConnell and Servaes (1990, 1995) also report that the largest single blockholder has an insignificant effect on firm performance. Similar results arise for all the blockholders and the dummy indicating the presence of a blockholder in the firm. In line with this, Agrawal and Knoeber (1996) also conclude that no significant role is played by blockholding, whereas for the UK companies analyzed by Faccio and Lasfer (2000), there was a significant negative effect of blockholding. Davies et al. (2004) find little evidence of a significant impact by the largest stakeholder, but report a strong negative link between blockholder ownership and firm value.

We investigate these hypotheses by including two different proxies for ownership concentration: one for blockholding (*Blockholding*), defined as the sum of the ownership held by non-managerial shareholders with more than 3% of firm stakes; the other

representing the shares of the largest non-manager owner (*Largest non-managerial ownership)*.

3.2.3 Identity of the external shareholders: Institutional owners

It may be relevant to distinguish outside shareholders according to their identity, since different types of owner may have different incentives.

According to the thesis proposed by Pound (1988), institutional investors are more efficient monitors than other categories of shareholder because of their greater expertise (the efficient monitoring hypothesis). However, Pound also contends that institutional investors may find it profitable (the strategic alignment hypothesis), or even be forced (the conflict of interest hypothesis), to cooperate with managers in order to protect other business relationships they may have with the firm.

It does seem important to allow for the differences in monitoring incentives between different categories of shareholders, particularly given the peculiarities of the UK institutional setting.

First, while traditionally, private individuals have been the largest category of shareholders in the US, UK financial institutions have increased their ownership of UK equities since 1963 (Stapledon, 1996).[6] As reported in Table 3.2, institutional investors have been the largest category of shareholders over the last decade. Second, UK institutional investors face no legal restrictions on stock ownership, whereas US insurance companies are bound not to invest more than 2% of their assets in a single company. Finally, UK institutions face no legal barrier against activism.[7]

In spite of this relative institutional freedom, the lack of activism by institutional investors has been the focus of many debates (see, amongst others, Conyon and Peck, 1997). Plender (1997) reports that UK institutional investors seldom exercise their voting power, and Goergen and Renneboog (2001) provide evidence that they tend not to exercise their voting power effectively, thus increasing "the already significant power of directors".

---

[6] The recent work of Gadhoum et al. (2004) on ultimate ownership in the US shows that in 1996 about 37% of all listed firms in the US market are controlled by families, and only 16% are owned by financial institutions.

[7] In the US, for example, schedule 13D filing obliges a shareholder group with more than 5% shares to disclose the group's plans in regard to the company. However, in trying to understand the institutional governance in the UK, it is necessary to take into account the well-developed network of informal communication and coalitions among the institutional investors within the "London Square Mile" (Short and Keasey, 1997) which can contribute to reducing free riding problems for institutions.

Additionally, Faccio and Lasfer (2000) observe that UK pension funds are not effective monitors, and Cosh and Hughes (1997) also fail to detect any strong influence of institutional investors in determining either executive pay or dismissal policies. These observations are borne out in a recent paper by Dahya and McConnell (2002), who report no evidence that ownership by institutions is relevant in determining management turnover. Indeed, both the Hampel (1998) and Higgs Code of Best Practice (2003) contain specific recommendations for an increased role for institutional investors in corporate governance (Webb et al., 2003). A preliminary investigation of the present data provides some insight into these matters. Tables 3.2 and 3.3 reveal that, while the average shareholding of institutional investors as a group is around 20% in all years, this stake is held by an average of three institutions. Consequently, institutions appear individually to hold even less shares than their non-institutional counterparts.

Based on these arguments, an insignificant or negative relationship between institutional ownership and firm value may be expected.

The existing empirical evidence is mixed. Among others, Short and Keasey (1999) find that, while institutional ownership plays no role in determining firm value, ownership by non-institutional owners is statistically significant in the UK, and is positively related to performance. For US firms, Agrawal and Knoeber (1996) detect no influence of institutional ownership on firm value. In contrast, McConnell and Servaes (1990) not only report that the percentage of shares owned by institutions is positive and significant, but also that the inflection point between alignment and entrenchment increases when this proxy is included in the model. This result is interpreted as support for Pound's (1998) efficient monitoring hypothesis. In contrast, Seifert et al. (2005) find a negative correlation between ownership by institutional investors and Tobin's q. Parrino et al. (2003) find that institutional ownership changes are negatively associated with the likelihood of forced CEO turnover, and that an executive from outside the firm is appointed CEO. Moreover, Duggal and Millar (1999) find no evidence for the claim that institutional investors have superior monitoring abilities.

We investigate these hypotheses with the inclusion of four proxies. First, ownership by all the external shareholders (*Blockholding*) is divided into ownership by institutional investors (*Institutional Ownership*) comprising banks, pension funds, fund managers and similar, and ownership by non-financial institutions (*Non-Institutional Ownership*)

comprising private individual and non-financial companies. As a robustness check, we also divide ownership by the largest non-managerial investor into institutional ownership (*Largest Institutional Ownership*) and non-institutional ownership (*Largest Non-Institutional Ownership*).

3.2.4 Control variables

We include a number of control variables that the current literature argues are potentially able to influence firm performance.

Total debt is included to account for a number of factors. On the one hand, a positive effect may be expected as a result of monitoring by lenders. As Jensen (1986) argues, the raising of external debt limits managerial discretion, since managers are committed to paying out future cash flow in a durable and enforceable way. Similarly, Stiglitz (1985) maintains that effective monitoring of managerial behaviour is exercised mainly by lenders rather than shareholders. Modigliani and Miller (1963) also predict a positive correlation between leverage and performance on the basis of valuable tax shields, as does Ross (1977), on the basis that leverage increases may convey positive news concerning the firm's ability to service a larger amount of debt. On the other hand, (existing) leverage may hamper the firm's capability to raise new debt, and consequently force it to pass up valuable investment opportunities. This is related to the problem of underinvestment, analyzed by Myers (1977). Furthermore, higher leverage increases the risk of bankruptcy, which may, in turn, worsen the market perception of the firm. Under these arguments a negative relationship could be anticipated. We define leverage (*Leverage*) as the ratio of total debt to total assets.

We control for the effect of firm size, since larger firms may find it easier to generate funds internally and access external resources. Moreover, larger firms could benefit from economies of scale by creating entry barriers, with positive effects on performance (Short and Keasey, 1999). However, average managerial shareholding is larger in smaller firms, and this could create scope for greater managerial entrenchment (McConnell and Servaes, 1990; 1995). According to Jensen (1986), size may also be a proxy for agency conflicts. For example, managers have an incentive to increase firm size beyond optimal, as this implies more power, because the amount of resources under their control is larger. In our work, size (*Size*) is equal to the natural logarithm of total assets at 1991 prices.

Following Morck et al. (1988), McConnell and Servaes (1990) and Cho (1998), we include a proxy for investments, both in intangible assets using reported R&D expenses (*RD Expenditures)* and investment in fixed capital (*Capital Expenditures*). It has been argued that investment may positively affect firm performance (Jensen and Meckling, 1976). Moreover, there is evidence of a positive reaction by the US stock market to announcements of increases in planned capital expenditure (McConnell and Muscarella, 1985) and R&D expenses (Chan et al., 1990). In line with these findings, an increase in investments should have a positive impact on firm performance.

As Jensen (1986) argued, agency conflicts between managers and shareholders can become more severe when managers exercise more discretion on liquid assets. Free cash flow would then be a negative predictor of firm performance. However, a higher cash flow may also mean that firms can finance their investments through internal funds. This allows firms to reduce the risk of facing underinvestment and bankruptcy problems, so that a positive connection between performance and cash flow would be observed. Furthermore, the inclusion of a proxy for the availability of internal funds is appropriate, because this may be strongly correlated with investments (Fazzari et al., 1996). Consistent with Ozkan and Ozkan (2004) we approximate the free cash flow (*Cash Flow*) as the ratio of pre-tax profits plus depreciation to total assets.

A number of papers contend that dividend payments, like leverage, may in fact reduce free resources in the firm and mitigate potential manager-shareholder conflicts (Easterbrook, 1984; Jensen, 1986). A positive link between dividend payout and firm performance is then expected. However, it may also be argued that higher dividends are related to the presence of low growth opportunities: firms with low profitable investment opportunities may pay higher dividends, rather than undertake negative net present value projects (Smith and Warner, 1979; Milgrom and Roberts, 1992). In line with Ozkan and Ozkan (2004) dividend payouts (*Dividends*) are defined as the ratio of ordinary dividends net of Advance Corporation Tax, to total assets[8].

---

[8] Alternative definitions of dividends would suggest using, for example, earnings as a denominator. Here they are standardized on total assets, mainly for consistency with the definitions of the other economic variables. Robustness checks tend to indicate that the results are not sensitive to the specification of the denominator for dividends (especially regarding the impact of ownership and governance characteristics).

3.3 Data and methodology

3.3.1 Data collection and sampling

In the initial stage, a random sample of around 1100 listed non-financial firms was selected from *Datastream* constituent lists. Ownership data were hand-collected from the Price Waterhouse Corporate Register (Dec. issue), and economic and market data were downloaded from *Datastream*. In following companies over time from two different datasets, much effort went into tracking all name changes and defunct companies. This information was mainly collected from the London Stock Exchange Yearbook, which reports systematic information on name changes, entries removed from the companies section, companies in liquidation and companies in receivership and in administration. As a further check, the Companies House website was used to provide information on companies.

To run the empirical analysis, a number of steps were undertaken. First, the dataset was cleaned of outliers. The ownership part of the dataset was thoroughly inspected in several directions. For example, we double-checked that the sum of all the shares collected did not exceed 100%. In such cases, we tried to cross check the information with other issues of the Hemscott volumes (using the September edition of the same year or the March edition of the following year), and/or with the London Stock Exchange Yearbook, which includes some ownership information. If it proved impossible to find coherent information from the different sources of data, this observation was dropped from the sample.

We then checked for outliers in the "economic" variables, as reported in *Datastream*. There is no fixed rule for dealing with outliers, so as a general rule of thumb, data were trimmed to the 99% percentile. The trimmed data were then always benchmarked with descriptive statistics reported in other papers.

Next, firms in the broadcasting sector and public utilities were excluded, because of the peculiarities in their operational and regulatory conditions. Firms with dual class shares were also excluded, since they violate the "one share one vote" rule.[9] Also, all firm-year missing observations for any variable were dropped. Finally, only firms that have at least five consecutive years of observations were kept. This is a standard step necessary to retrieve asymptotically efficient second order serial correlation tests (Arellano and Bond, 1991). Keeping only firms with a minimum number of consecutive observations may help

[9] In line with Nenova (2003), only 26 firms in our sample have dual class shares.

in limiting survivorship bias (Yermack, 1996). There remained an unbalanced panel of 672 firms and 6340 observations.

We have gone to considerable lengths to check for consistency in the data and, in particular, for the absence of any attrition bias. Comparative descriptive statistics analysis shows that the selection process outlined above does not result in any distortion in the final sub-sample. The firms actually used for the empirical analysis are not systematically different from those excluded. The sample fully reflects market trends and does not appear to be biased in any direction.

3.3.2 Ownership structure

Data on ordinary shareholding by managers and external shareholders were collected, as well as data on board composition. Among the external owners, ordinary shares held above the 3% threshold are reported.[10] We also collected information on the category of the external owners, distinguishing between financial firms, non-financial firms, individuals and the state. In contrast to external shareholders, ownership by directors must always be disclosed, so it is possible to detect the presence of managers even when they hold no shares. Preliminary descriptive statistics are provided in Table 3.2. The figures suggest that the distribution of ownership by external shareholders shows some volatility but no clear trend. Average blockholding remains around 30%, of which 20% is institutional ownership, while ownership by non-institutions averages around 10%. Average shareholding by the largest non-managerial owner appears to be increasing over time.

However, the opposite is true for board ownership: on average, the total ordinary shares held by the board of directors decreased by approximately 5% in ten years, half of this reduction taking place between 1991 and 1993, immediately after the Cadbury Report was issued (1992). Further, Table 3.3 shows that while the average board size is relatively stable in time, the composition of the board changed significantly. In 1991, there was an average of 4.73 executives and 2.44 non-executives, but by 2001 non-executives constituted almost half of the average board. Despite the different time periods analysed, these figures are in line with Faccio and Lasfer (1999), Peasnell et al. (2003), and Dedman (2003).

---

[10] The requirement to disclose share blocks was introduced in 1967. Until 1976 it was set at 10%, then lowered to 5% until 1989 and was further reduced to 3% from 1990. However, the Corporate Register for the 1991 edition maintains the disclosure threshold at 5%.

Similar trends are found when considering the average number of executives and non-executives who actually hold shares (cum shares).

3.3.3 Economic performance

A key issue in the literature is which variable should be used to measure firm performance. Almost all the existing literature has focused attention on Tobin's q, defined as the ratio of the market and replacement values of a firm's assets, for which various approximations have been proposed. Tobin's (1969) original idea was that the replacement cost of assets would be a logical measure of their "alternative use". So, if firms cannot employ assets to create as much (market) value as their opportunity cost, then they are not being efficient. Calculating the replacement cost of assets does however pose a number of problems. As Claessens et al. (2002) noted, "the data required to calculate the replacement values are generally not available". Various studies have therefore proposed approximations to this measure, all belonging to the family of "market-to-book-ratios". We approximate Tobin'q according to the following definition: the ratio of the book value of total assets minus the book value of equity, plus the market value of equity to the book value of assets.[11] Brief descriptive statistics are reported in Table 3.4.

3.3.4 Methodology

As mentioned earlier, two factors must be accounted for in estimating the relationship between managerial ownership and firm performance: i.e., unobservable heterogeneity and endogeneity. However, one should note that all regressors are potentially endogenous. Endogeneity arises because shocks that affect corporate value are also likely to affect regressors such as its investments, leverage or dividends choices. Furthermore, this problem may also derive by cross causality. As stated previously, the level of direct equity holding by managers may influence the value of the firm; and managerial ownership may

---

[11] This definition is consistent with, among others, Guedes and Titman (1996), Johnson (2003), Ozkan and Ozkan (2004) and Datta et al. (2005). Robustness checks of the empirical results were conducted using an alternative definition of Tobin's q similar to the one used in Himmelberg et al. (1999), Demsetz and Villalonga (2001), Agrawal and Knoeber (1996) and a proxy for Market-to-Book ratio similar to Lasfer (2004). Results are virtually unaltered. For robustness purposes, we also test the relation with a proxy of Returns on asset. When we use this book-based measure, the signs are in general consistent (especially with regards to the impact of ownership and governance characteristics) but lose statistical significance. All these tests are presented in the Appendix.

itself also be determined by corporate value. A further source of endogeneity arises if there are unobservable firm-specific characteristics that are correlated with the regressors.

These problems require the use of an Instrumental Variables estimation method that also makes it possible to control for fixed effects. As a consequence, in this work we estimate the following model with the GMM technique:

$$Q_{it} = \alpha_1 Q_{it-1} + \sum_{k=1}^{k} \beta_k X_{it} + \eta_i + \eta_t + u_{it} \qquad (1)$$

where η_i represents the time-invariant unobservable heterogeneity, and η_t represents a firm-invariant time effect that is able to account for macro-economic factors (such as market-wide shocks). For the moment, we assume the idiosyncratic term u_{it} to be homoschedastic and serially uncorrelated.

The choice of a dynamic model was motivated by the results of preliminary autocorrelation tests, which hint at the misspecification of the mean function in the static form.[12] The dynamic setting seems, instead, to yield consistent estimates. This tallies with the argument by Bond (2002) that "even when coefficients on lagged dependent variables are not of direct interest, allowing for dynamics in the underlying process may be crucial for recovering consistent estimates of other parameters".[13]

The η_i parameter is a proper fixed effect that accounts for the correlation existing between firm-specific characteristics and regressors. Himmelberg et al. (1999) emphasize the importance of this factor in estimating the relationship between value and ownership. They provide the following example. Assume that firms have different capabilities in monitoring managers. Better firms will be able to minimize the diversion of resources and thus register higher valuations. They will also have less need to use the alignment instrument. Consequently, the amount of shares held by managers is negatively correlated to the firm's ability to monitor, and the ownership value relationship will be negative simply because of this omitted variable bias. OLS estimations would then be biased and inconsistent. Furthermore, as noted in Bond (2002), the dynamic specification implies that at least the lagged endogenous variable is (positively) correlated with the time-invariant component of the error term. In this case, the OLS estimation of the autoregressive parameter of Model 1 would be biased upwards.

---

[12] Results are reported in Table A.3.2

[13] Robustness checks were also conducted on a static GMM specification. Results are virtually identical to those obtained under the dynamic specification.

The usual solution to this problem is to adopt some transformation of the data in order to partial out η_i. For example, the standard procedure of the Within Group (WG) estimation is to transform all the variables in differences from their time means. Since the term η_i is time invariant, the WG transformation would eliminate it. Nonetheless, a major shortcoming of this procedure is that unless all right hand side variables are strictly exogenous, this procedure introduces a non-negligible correlation between non-exogenous variables and the time-demeaned error term. Consider the case in which managerial ownership (*Man*) is predetermined: $E(Man_{it}, u_{it-1}) \neq 0$ but $E(Man_{it}, u_{it}) = 0$. In this case, following Bond (2002), the time-demeaned regressor is $\overline{Man_{it}} = Man_{it} - \frac{1}{T-1}(Man_{i2} + Man_{i3} + ...Man_{iT})$ while the error term can be expressed as follows: $\bar{u}_{it} = u_{it} - \frac{1}{T-1}(u_{i2} + u_{i3} + ...u_{iT})$. Now, $\overline{Man_{it}}$ and $\bar{u}_{it}$ are correlated since all Man_{it} terms are correlated with all the corresponding u_{it-1} terms. Another interesting fact is that the autoregressive parameter estimated via the WG transformation is known to be biased downwards, due to the negative correlation which this methodology introduces with the time-demeaned error term[14]. The fact that the OLS and WG estimators are biased in opposite directions has been used in a number of studies to infer that a consistent estimator should lie between them (Bond, 2002).

Arellano and Bond (1991) derived a Generalized Method of Moments (GMM-DIFF) estimator. They take the first differences of the model and then use suitable lagged levels of the dependent variables as instruments. If we first difference model 1, we obtain:

$$\Delta Q_{it} = \Delta\alpha_1 Q_{it-1} + \sum_{k=1}^{k} \Delta\beta_k X_{it} + \Delta\eta_i + \Delta u_{it} \qquad (2)$$

Although the process of first differencing effectively transforms predetermined variables into endogenous ones, it does not introduce all realizations of the disturbances into the error term. We can therefore use second (and earlier) lags as instruments for any endogenous variables, under the assumption that there is no serial correlation in the error term.[15] However, if the error term in Model(1) is in fact MA(1), then the first differenced

---

[14] See Bond (2002) and Nickell (1981) for a more technical treatment.

[15] Suppose again, for example, that managerial ownership is predetermined. In Model 1 it is only influenced by past values of the error term ($E(Man_{it}, u_{it-1}) \neq 0$), but when we use Model 2 we are effectively introducing contemporaneous correlation since $E[(Man_{it} - Man_{it-1}),(u_{it-1} - u_{it-2})] \neq 0$. However, in contrast to the WG procedure, the second lagged level Man_{it-2} is now a valid instrument since it is orthogonal to the error term.

error term is MA(2). The second lag would not then be a valid instrument, but the third (and earlier) lags are.

Additionally, even if the error term is not serially correlated, the first differencing methodology introduces serial correlation of order one by construction. Because the validity of the GMM relies heavily on the absence of serial correlation of higher order, two tests of correlation in the error term of order one and two are included (m1 and m2).

The choice of an appropriate set of instruments is crucial in this type of analysis. The validity of the instrument set can be tested via the Sargan test of over-identifying restrictions, which tests the null hypothesis of the absence of correlation between the instruments and the error term. Rejection by the Sargan test would cast doubt on the validity of the instruments. A potentially serious issue in this setting relates to the power of the Sargan statistic. As Bowsher (2002) shows, the power of the Sargan statistic in detecting invalid restrictions can decline dramatically given too many moment conditions. Consequently, to reduce the possibility of severe overfitting bias (Bond, 2002), a parsimonious number of instruments (lags) is used throughout the analysis.

Another concern arises when there is a high degree of persistence in the data.[16] Under such conditions, lagged levels have a low correlation with the first differences, and the standard linear GMM-DIFF estimator has been found to suffer from a "weak instruments problem", because it displays poor finite sample properties. In particular, Blundell, Bond and Windmeijer (2000) show that in multivariate models where the individual series are highly persistent, the standard GMM difference estimator may have serious finite sample biases.

Arellano and Bover (1995) propose an estimator that considers the equation in levels, with both lagged first-differenced and lagged level terms as instruments in the first-difference equation. Blundell and Bond (1998) examined this procedure in detail, and illustrate significant asymptotic efficiency gains in this GMM-SYS estimator. They also emphasize that the finite sample bias of the GMM-DIFF is likely to be in the direction of the WG estimator when weak instruments are present.

In the light of all the issues described above, we used the GMM-SYS methodology for analysis. The Sargan Difference test is reported in order to test the restrictions imposed by GMM-SYS and its validity with respect to the GMM-DIFF. Since instruments lagged at

---

[16] A preliminary analysis of the persistency of the data revealed that most of the autoregressive coefficients were close to 0.8. Results are provided in Table A.3.3.

t-2 appear to be correlated with the error term, according to the Sargan statistic in Model 3, all GMM estimations are carried out using the lagged levels at t-3 and t-4 of all variables for the equations in first difference, and the difference lagged at t-2 for all variables in the level equation.[17]

3.4 Empirical Results

In Table 3.5, following the sequence of ideas outlined above, we compare the results of the OLS, WG, GMM-DIFF and GMM-SYS estimations. As the theoretical arguments by Bond (2002) lead us to expect, the OLS estimates of the autoregressive parameter appear positively biased, and the results obtained via the WG methodology appear biased in the opposite direction.

In line with the predictions outlined in the previous section, the GMM-DIFF estimator appears biased in the direction of the WG, while the GMM-SYS estimator seems to provide consistent and efficient estimates, because the coefficient of the autoregressive component now lies between the OLS and WG values[18]. The Wald (joint) test provides evidence that the regressors included in the model are all jointly significant, and the Wald (time) test provides support for the inclusion of time dummies. The Sargan statistic confirms the validity of the instrument set, while the Sargan Difference test provides strong evidence in support of the restrictions imposed by the GMM-SYS. As expected, we detect serial correlation of the first order, but not of order two.

3.4.1 Ownership and control characteristics: Managerial Ownership

To investigate whether the non-monotonic relation between managerial ownership and firm performance is significant, we first analyze the impact of ownership held by all directors on the board. In the GMM-SYS model shown in Table 3.5, we find support for the cubic relationship between insider ownership and firm performance. For low values of board ownership, up to around 15% (in about 67% of all sample firms) and consistent with the alignment hypothesis, we detect a positive effect on firm performance. This may alternatively imply that the market perceives insider ownership as a positive signal of reduced agency problems inside the firm. Nonetheless, a further rise in managerial

---

[17] The result in the Sargan statistic in Model 3 could be due to persistency in the data. Consider the case of an endogenous variable. If X_{it-2} is very similar (highly correlated) to X_{it-1}, this may result in correlation between X_{it-2} and the first differenced error term.

[18] See Bond (2002) for a more technical treatment.

ownership between 15% and 45% (comprising about 22% of the companies) increases the likelihood that managers will become entrenched, and this has a negative effect on firm value. Only at very high levels of ownership does the relationship turn positive again (nearly 11% of firms feature managers with more than 45% of shares), possibly because managers actually become the owners of the firm, at which point manager-shareholder conflicts fade. Our findings suggest that managers become entrenched at higher levels of ownership than their US counterparts (see, for instance, Morck et al., 1988). As Faccio and Lasfer (1999) and Short and Keasey (1999) argue, this may be a consequence of the differences between the UK and US systems regarding legal restrictions on stock ownership, and legal activism in corporate control and board composition.

In our second step, to test whether the estimated alignment/entrenchment effects apply to both categories of directors, we divided board members into executives and non-executives (Table 3.6). Since there is no clear theoretical prediction of the functional form, we specify three distinct models in which ownership by non-executives follows a cubic, quadratic and then linear relation to firm value. Further, to account for the possibility that ownership by non-executives also influences performance according to their relative presence in the board, we introduce an interaction term. All four models in Table 3.6 provide consistent figures in terms of the control variables and estimated turning points. Results indicate that executive directors follow the previously detected cubic relationship, and that the connection between ownership by all board members and performance is linked only to the executive positions in the board. The relative stability in the estimated turning points tends to corroborate this conclusion. Conversely, no model supports the hypothesis that share ownership by non-executives plays any role in determining firm performance.

These findings tally with Bhagat and Black (2002) but contrast with those of Morck et al. (1988) for US companies whose results indicate that outside board members respond to financial incentives and contribute to corporate wealth as officers do, and also that they tend to become entrenched.

The figures in our analysis may be consistent with different interpretations. On the one hand, they may indicate that outside directors are truly independent in the UK, and so are not subject to any alignment/incentive effects in terms of their shareholding. On the other hand, the results may be seen as evidence of executive directors' ability to create a

board that is unlikely to monitor. In line with Hart (1995), it may also be interpreted as evidence that non-executives in the UK still do not have sufficient financial incentives to be active monitors of executive decisions. In fact, as reported in Table 3.2, ownership by non-executives is substantially lower than ownership by executives, especially in the early nineties.

However, our results indicate that the larger the fraction of outside directors in the board, the better a firm performs. This is in line with the findings by Yermack (1996) and Baysinger et al. (1985) for the US. It is also consistent with UK findings by Dahya and McConnell (2002), who detect an increased sensitivity of turnover to performance, due to an increase in non-executives' presence in the board. Dahya and McConnell (2003) also conclude that firms that increased the number of non-executives underwent a significant improvement in performance. This evidence may corroborate the hypothesis that UK non-executive directors are effectively independent. The peculiar "one hand one vote" feature of the UK governance system might explain why non-executives positively influence firm value, irrespective of their shareholdings. Several robustness checks were next performed to test the reliability of these results.

First, all estimations were run again using the ratio of non-executives *cum-shares*, rather than all non-executives on total board, to verify whether the results are driven mainly by this peculiar UK governance feature. The figures reported in Table 3.7 (Model 10) show that the results are relatively stable. This suggests that the results obtained for the overall ratio are driven by the fact that the majority of non-executives actually hold some shares. However, the estimated coefficient for the ratio cum-shares is almost half of that for the overall ratio of all non-executives (Table 3.6 Model 9).[19] This suggests that market perception is also an important driving force. It appears that the market perceives a board with numerous non-executives as indicating good governance. In a further analysis, all estimations were run without, in turn, the ratio of non-executives (cum shares), and then their direct equity holding (Models 11 and 12). This makes it possible to verify whether, due to the one hand one vote rule, these two variables are proxies for the same thing. To the extent that the results are driven by this feature, when we exclude the ratio (cum shares) from the estimations we may expect direct equity holding to show a statistically significant

[19] Results from all the unreported results indicate this same pattern.

coefficient. Conversely, Table 3.7 confirms that the ratio of non-executives on the total board is always significant and that their shareholding never is.

These results cast doubt on the efficacy of direct equity ownership as an alignment mechanism for outside directors.

As a further robustness check, we also investigated whether results on non-executive shareholding depend on the choice of the functional form. Dummy variables corresponding to several threshold values of non-executive ownership were generated and interacted with the level of non-executive ownership. For example, *Dum.Non-Exec own>25%* is a dummy that takes value 1 when non-executive ownership is larger than or equal to 25%. This reveals whether the relation with Tobin's q is in fact linear rather than nonlinear, and enables us to verify whether the relationship becomes statistically significant only at high levels. Indeed, since non-executive ownership is usually rather low, the aim with this robustness test is to isolate those firms where non-executive ownership is high, to verify whether the lack of statistical significance is due to low financial incentives. Table 3.8 reports a selection of these robustness checks.[20] The reported figures are not in line with Hart's (1995) argument, since the relationship remains insignificant even when we isolate high non-executive ownership firms (Model 15, Table 3.8).

3.4.2 Ownership and control characteristics: Large External Shareholders

As far as ownership concentration is concerned, we find a negative relation between blockholders and Tobin's q. A possible explanation is that disclosed shareholding is too dispersed, so that no individual shareholder has the incentive to actively monitor managerial behaviour, because the coordination costs are higher than the benefits singly received by each owner. Our findings are in line with those of Faccio and Lasfer (2000), Lasfer (2004) and Davies et al. (2004), but contrast with those of Dahya and McConnell (2002), who fail to detect any significant role for blockholders in determining CEO turnover in UK companies, between 1989 and 1996. This result is also in accord with the argument of Burkart et al. (1997), who contend that too much block ownership will overly constrain management and reduce its ability to take value maximizing investment decisions.

---

[20] Several more dummies at 5% intervals were tested. All results are virtually identical to those reported in the table and are available upon request.

This interpretation is supported when we take into account only the first largest non-managerial owner. In fact, Model 16 in Table 3.9 shows, as before, the same negative relation between the largest non-managerial shareholder and q-ratio. Furthermore, results for both blockholding and individual largest shareholding contrast with the findings reported by McConnell and Servaes (1990; 1995), who fail to detect any significant impact of large external shareholders on firm performance in the US.[21]

3.4.3 Ownership and control characteristics: Identities of Large External Shareholders

The identity of owners also provides insight into the relation between external shareholders and firm performance. In Table 3.9, we sub-divide ownership by external and largest non-managerial investors (Models 17 and 18) into ownership by institutions and non-institutions. We find no evidence for the hypothesis that different owners have a different impact on firm value, whether as a group or as a largest shareholder.

Our results suggest that non-institutional owners can negatively affect firm value. This may happen, for instance, if they collude with managers in the company at the expense of the minority investors, or in cases where they are passive and unwittingly allow managers to expropriate firm resources.

This is not in line with Short and Keasey (1999), who report a positive impact of non-institutional shareholders on firm value. Also, Frank et al. (2001) report a positive relation between individuals and industrial companies with regard to executive board turnover, for the worst performing English companies. This result is cited in support of the hypothesis that this kind of shareholder engages in a certain degree of monitoring action on manager behavior.

Moreover, contrary to the "efficient monitoring hypothesis", the results for institutional shareholders support the thesis that institutional investors are either passive or they connive and collaborate with managers. As already stated, much empirical evidence shows how UK institutions are passive investors. The results presented here suggest that this "absentee landlord syndrome" results in increased managerial discretion, which is in turn detrimental to firm value. Alternatively, these results are consistent with the strategic alignment hypothesis of Pound (1988), which holds that institutional investors may find it profitable to cooperate with managers, or may even be forced to cooperate with them in

[21] With the exception of low-growth firms in the years 1986 and 1988, when all outside shareholders seem to contribute positively to firm value

order to protect other business relationships that they may have with the firm (conflict of interest hypothesis). This may happen in cases where the value of the business with the firm is larger than the value of the equity holding by the institution. For example, an institution may be a shareholder in the company and also its main insurer. In a similar situation, the institution may find it detrimental to vote against the incumbent management, since this may jeopardize business relations with the firm (Pound, 1988).

These results are in line with Seifert et al. (2005), who find a negative relation between ownership by institutional investors and Tobin's q. Similarly, Parrino et al. (2003) report that changes in ownership by institutions are negatively associated with the likelihood of forced CEO turnover, and that an executive from outside the firm is appointed CEO. Similar results are reported by Duggal and Millar (1999), who find no evidence to sustain the claim that institutional investors have superior monitoring abilities. Results reported in Jennings (2005), from Granger causation tests, also reveal how, while quality firms attract institutional investment, these institutions do not then appear to monitor properly, and firm value subsequently declines. Similar results are borne out in a paper by Faccio and Lasfer (2000) who report that occupational pension funds are not effective monitors in the UK.

Contrarily, Dahya and McConnell (2002) fail to detect any significant effect of UK institutional shareholders on management turnover from 1989 through 1996. This figure is also in line with Short and Keasey (1999), who report no significant positive impact of English institutional owners on their proxy for Tobin's q. In contrast, McConnell and Servaes (1995) provide evidence that the influence of institutional investors on q for US companies is highly significant.

3.4.4 Economic variables

We find that dividends, cash flow and capital expenditures are all highly significant in determining firm value. The positive relation between dividends and the q-ratio supports the argument of Easterbrook (1984) and Jensen (1986) that dividends are a means to mitigate manager-shareholder conflict within the firm, producing an improvement in its market valuation. This result is partly in line with findings by Farinha (2003) of an increase in dividend payments for UK firms when managers are entrenched. This is also consistent with the idea that markets positively perceive dividend increases.

On the other hand, the positive impact of cash flow on firm value suggests that the availability of internal funds may have a positive impact on the valuation of the company. One interpretation of this result is that internally generated funds allow the firm to reduce the risk of underinvestment and pursue valuable growth opportunities. In all the models we detect a positive relation between investments and firm value, although only expenditures in tangible assets are statistically significant.[22] Our results are consistent with those reported by Davies et al. (2004), while for US firms Morck et al. (1988) and McConnell and Servaes (1990; 1995) show a significant impact on R&D expenditures as well.

Finally, in none of the models estimated do we detect any significant impact of leverage or size.

3.5 Conclusions

This paper has studied the relation between firm performance and the ownership structure of firms, using an original panel data set of UK listed non-financial firms for the period 1991-2001. It has investigated whether non-executive directors play a separate role from executives in determining firm performance.

Our analysis fails to detect any significant relation between ownership by non-executive directors and Tobin's q. It emerges that the alignment/entrenchment effect, as detected on the total board, is driven by the executive positions on the board. This result is robust to a number of robustness checks. In particular, the proportion of non-executives in the board remains positive and statistically significant when we augment the model, by introducing an interaction effect with the proxy for board composition. Also, the results are unaltered when we try different proxies for board composition, and when we specify different functional forms.

These results cast doubt on the efficacy of direct equity ownership as an alignment mechanism for outside directors. One interpretation of these results may be that non-executive directors are truly independent in the UK, and, as such, not sensitive to incentive mechanisms. On the other hand, in line with Hart's (1995) argument, the results may also indicate that financial incentives for non-executives are still insufficient. This interpretation is particularly interesting when considering the recent increasing trend in non-executive

---

[22] One explanation for the insignificance of intangible assets expenses is that a large number of firms reported zero RD expenditures. As a result, the data may not have sufficient variability to show a significant relationship.

shareholding in UK firms. However, even when we isolate high non-executive ownership firms, we still fail to detect any significant link with firm value.

Nonetheless, our results suggest that the proportion of non-executives on the board exerts a positive role on corporate value. This is a very important when we consider it in the light of increasing attention that was placed on the importance of non-executive directors in the UK during the 1990s. The Cadbury (1992), Hampel (1998) and, recently, Higgs (2003) reports have all recommended an increasing presence of non-executives on boards of directors as a rule of good governance. It could be argued that market expectations of board composition may have been shaped by these codes of best practice. Moreover, in the long run, it is also possible that the market has increased the level of scrutiny of the quality of non-executives, thus creating pressures on the managerial labour market. This, in turn, may have led to an improvement in the average quality of non-executives, thus leading boards to take better decisions. For instance, this interpretation is consistent with Dahya and McConnell (2005), who indicate that UK companies that increased the proportion of non-executives, to be in compliance with the Cadbury recommendations, experienced significant improvements in operating performance. Also, Lasfer (2004) reports that the positive relationship between the ratio of non-executives and performance is stronger in the post-Cadbury period, and this may confirm that these recommendations have enhanced the quality of boards in the UK. This finding may be a crucial contribution of this study, because it has a direct bearing on policy decisions being made in many countries, as they formulate codes of best practices similar to the Cadbury Code in the UK.

In line with recent findings for the UK, we also detect a negative link between performance and blockholding. Further investigations separated the identity of external owners, and the results suggest that institutions and private investors influence corporate value in the same way. We also analyzed the role of the largest non-managerial owner and its identity. The results tend to confirm the negative role played by external shareholders on firm performance.

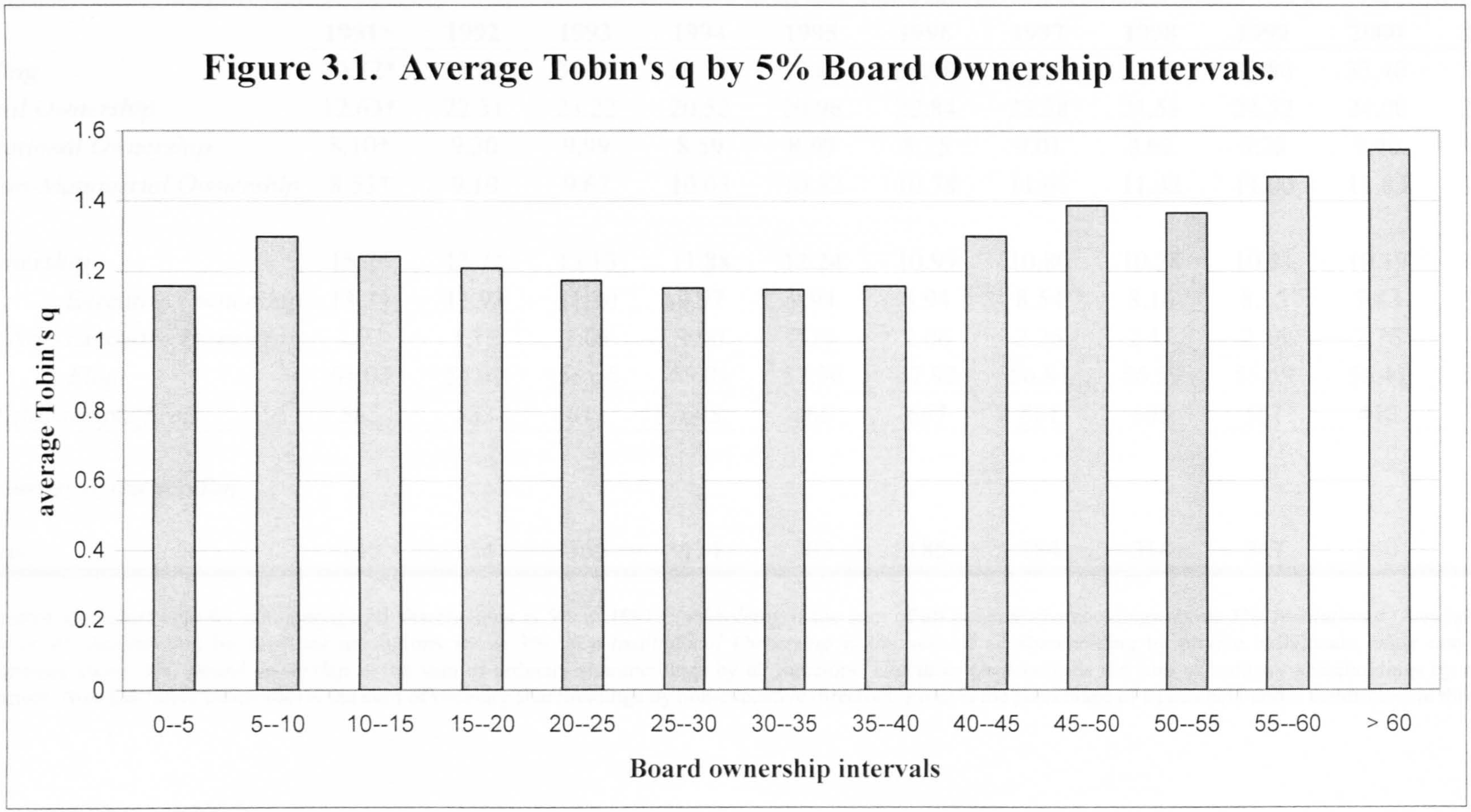
These results also indicate that investment in physical capital, cash flow and dividend payments play an important positive role in determining firm performance.

Finally, the present results are valid after allowing for the presence of individual heterogeneity, and for all dependent variables to be endogenously determined.

Table 3.1. Definitions of variables.

Variable	Definition
Tobin's q	The ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of assets
Board ownership	Sum of ordinary shareholdings by all directors (%)
Executive ownership	Sum of ordinary shareholdings by executive directors (%)
Non-Executive ownership	Sum of ordinary shareholdings by non-executive directors (%)
Dum. Non-Exec own>5%	Dummy equal to 1 if *Non-Executive ownership* is greater or equal to 5%
Dum. Non-Exec own>15%	Dummy equal to 1 if *Non-Executive ownership* is greater or equal to 15%
Dum. Non-Exec own>25%	Dummy equal to 1 if *Non-Executive ownership* is greater or equal to 25%
Blockholding	Sum of all external shareholdings above 3%
Institutional Ownership	Ownership by financial institutions (pension funds, banks, insurance companies, fund managers)
Non-Institutional Ownership	Ownership by private individuals, other non-financial companies
Largest non-managerial Ownership	Ownership by the largest non-managerial shareholder in the firm
Ratio	The proportion of non-executive directors on total board
Float	Percentage of shares held under the disclosure threshold
Board Size	Total number of directors
Executive Directors	Total number of executive directors
Non-Executive Directors	Total number of non-executive directors
Blockholders	Total number of external shareholders
Institutional Investors	Total number of financial institutions (pension funds, banks, insurance companies, fund managers)
Non-Institutional investors	Total number of private individuals, other non-financial companies
Size	Defined as the natural logarithm of total assets in 1991 prices
Dividends	The ratio of ordinary dividends net of Advance Corporation Tax, to total assets
Leverage	Defined as the ratio of total debt to total assets
RD Expenditures	Research and Development expenditures on total assets
Capital Expenditures	Defined as capital expenditures on total assets
Cash Flow	Defined as the ratio of pre-tax profit plus depreciation to total assets

Figure 3.1. Average Tobin's q by 5% Board Ownership Intervals.



This Figure reports a plot of average Tobin's q against board ownership 5% intervals. *Board ownership* is the sum of ordinary shareholdings by all directors. *Tobin's q* is the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of assets.

Table 3.2. Average percentage of ordinary shares held by outsiders and insiders.

	1991*	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Blockholding	20.72*	31.61	33.21	29.11	29.87	31.09	32.39	33.13	33.80	33.40	32.43
Institutional Ownership	12.63*	22.31	23.22	20.52	20.96	22.84	23.38	24.51	24.52	24.00	22.30
Non-Institutional Ownership	8.10*	9.30	9.99	8.59	8.90	8.25	9.01	8.62	9.28	9.40	10.13
Largest Non-Managerial Ownership	8.53*	9.10	9.67	10.03	10.32	10.78	11.01	11.42	11.00	11.83	11.45
Board Ownership	15.26	13.71	13.13	11.88	12.24	10.99	10.80	10.28	10.51	10.19	10.70
Executive Ownership	13.34	11.93	11.30	9.97	9.94	8.94	8.54	8.16	8.15	7.43	7.61
Non-Executive Ownership	1.92	1.77	1.83	1.90	2.29	2.06	2.26	2.11	2.36	2.76	3.09
Float	64.02	54.69	53.66	59.01	57.90	57.92	56.81	56.59	55.69	56.41	56.87
Total sample firms	565	583	611	645	666	667	661	606	501	440	395
Average number of outstanding shares (in millions)	145	154	165	174	203	185	184	314	247	290	288

Reported disclosure rule for non-managerial shareholding is 5% in 1991.*Blockholding* is the sum of all external shareholdings above 3%. *Institutional Ownership* is the sum of all shareholding by financial institutions above 3%. *Non-Institutional Ownership* is the sum of all shareholding by private individuals, other non-financial companies above 3%. *Board ownership* is the sum of ordinary shareholdings by all directors. *Executive Ownership* is the sum of ordinary shareholdings by executive directors. *Non-Executive ownership* is the sum of ordinary shareholdings by non-executive directors. *Float* is the percentage of shares held under the disclosure threshold.

Table 3.3. Ownership composition.

	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001
Board Size	7.17	7.13	7.18	7.17	7.33	7.32	7.28	7.33	7.38	7.39	7.35
Executive Directors	4.73	4.59	4.44	4.31	4.24	4.15	4.05	4.00	3.94	3.92	3.82
Non-Executive Directors	2.44	2.54	2.74	2.86	3.10	3.18	3.23	3.32	3.44	3.47	3.53
Ratio	0.34	0.36	0.38	0.40	0.42	0.43	0.44	0.45	0.47	0.47	0.48
Executive Directors cum shares	4.04	3.91	3.81	3.68	3.69	3.60	3.55	3.56	3.50	3.47	3.39
Non-Executive Directors cum shares	1.90	1.92	2.02	2.13	2.37	2.47	2.49	2.64	2.73	2.78	2.81
Ratio cum shares	0.32	0.33	0.35	0.37	0.39	0.41	0.41	0.43	0.44	0.44	0.45
Blockholders	2.15	4.84	4.95	4.20	4.27	4.37	4.45	4.63	4.46	4.57	4.16
Institutional Investors	1.38*	3.63	3.60	3.16	3.00	3.36	3.02	3.51	3.13	3.45	2.79
Non-Institutional Investors	0.77*	1.20	1.36	1.05	1.27	1.01	1.43	1.12	1.33	1.12	1.37

This table shows the average number of owners divided by category of owner. *Board Size* is the average number of directors. *Executive Directors* is the average number of executive directors. *Non-Executive Directors* is the average number of non-executive directors. *Ratio* is the proportion of non-executive directors on total board. Executives and Non-executives cum-shares are those who effectively own shares in the company. *Blockholders* is the average number of external shareholders. *Institutional Investors* is the average number of financial institutions. *Non-Institutional investors* is the average number of private individuals, other non-financial companies.

Table 3.4. Economic variables.

Variable	Obs	Mean	Std. Dev.	Min	Max
Tobin's q	6340	1.561	0.949	0.3628	9.732
Leverage	6340	0.172	0.132	0	0.940
Size	6340	11.2897	1.8370	5.7434	18.0256
Dividends	6340	0.028	0.033	0	1.285
RD Expenditures	6340	0.008	0.025	0	0.381
Capital Expenditures	6340	0.072	0.109	-0.1134	2.130
Cash flow	6340	0.070	0.128	-1.4431	0.713

This table shows the descriptive statistics for the economic variables used in this work. *Tobin's q* is the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of assets. *Leverage* is the ratio of total debt to total assets. *Size* is the natural logarithm of total assets in 1991 prices. *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax, to total assets. *RD Expenditures is total r*esearch and development expenditures on total assets. *Capital Expenditures* is total capital expenditures on total assets. *Cash Flow* is the ratio of pre-tax profit plus depreciation to total assets.

Table 3.5. Multivariate analysis regressions using OLS, WG, GMM-DIFF, GMM-SYS.

	Model1		Model2		Model3		Model4		Model5	
	OLS		WG		GMM DIFF		GMM DIFF		GMM SYS	
	Coeff	p-val	Coeff	p-val	Coeff	p-val	Coeff	p-val	Coeff	p-val
Tobin's q (-1)	0.6888	0.000***	0.3937	0.000***	0.4366	0.000***	0.4311	0.002***	0.5145	0.000***
Board ownership	0.0009	0.818	-0.0071	0.318	0.0018	0.943	-0.0213	0.440	0.0403	0.016**
Board ownership ^{2}	-5.39E-06	0.977	0.0004	0.208	-9.48E-05	0.920	0.0003	0.771	-0.0018	0.042**
Board ownership ^{3}	3.53E-07	0.873	-3.99E-06	0.248	1.71E-07	0.987	-2.13E-06	0.863	1.97E-05	0.079*
Blockholding	-0.0018	0.000***	-0.0016	0.039**	-0.0036	0.225	-0.0058	0.111	-0.0056	0.039**
Ratio	0.1906	0.002***	0.0476	0.590	0.0324	0.924	-0.4695	0.258	0.4580	0.108
Leverage	0.1466	0.123	0.3475	0.030**	0.1244	0.791	0.0623	0.916	0.1041	0.716
Size	-0.0240	0.001***	-0.2061	0.000***	-0.3286	0.053*	-0.8261	0.000***	-0.0355	0.409
Dividends	2.3387	0.000***	2.3015	0.001***	5.0730	0.178	1.6188	0.087*	4.0564	0.005***
RD Expenditures	2.4142	0.000***	0.7998	0.572	2.4266	0.530	4.4568	0.224	1.9185	0.191
Capital Expenditures	0.3278	0.016**	0.2994	0.073*	0.9679	0.320	0.5724	0.415	1.7385	0.029**
Cash flow	0.7936	0.000***	0.9909	0.000***	1.7074	0.010***	1.7189	0.005***	1.2894	0.025**
Constant	0.4877	0.000***	2.8764	0.000***	0.0044	0.000***	0.0482	0.000***	0.7749	0.000***
Observations	6340		6340		6340		6340		6340	
Implied Turning Points									(15.06 ; 45.43)	
Wald (joint)	2412	0.000***	431.3	0.000 ***	146.6	0.000***	90.72	0.000***	597.2	0.000***
Wald (time)	141.1	0.000***	107.6	0.000 ***	19.55	0.021**	34.92	0.000***	20.78	0.023**
Sargan					120.2	0.048**	178.4	0.165	255.7	0.511
Sargan Difference									77.3	0.919
m1 test	-1.952	0.051**	-0.6567	0.511	-6.082	0.000***	-4.391	0.000***	-6.750	0.000***
m2 test	0.5822	0.560	-3.548	0.000 ***	-0.6296	0.529	-0.6154	0.538	-0.8787	0.380

Model 1 is estimated in OLS in levels. Model 2 is estimated with the WG methodology. Models 3 and 4 contain the GMM-DIFF estimations and Model 5 reports the results from the GMM-SYS. For the equations in first differences, levels dated [t-2] of all the regressors are used as instruments in Model3 and levels dated [t-3, t-4] are used in Models 4 and 5. In the equations in levels, first differences dated [t-2] are used as instruments. Time dummies were included in all estimations. Asymptotic standard errors robust to heteroskedasticity were used in the estimations. m1 and m2 are tests for the absence of first-order and second-order correlation in the residuals. These test statistics are asymptotically distributed as N (0,1) under the null of no serial correlation. The Sargan test statistic is a test of the over-identifying restrictions, asymptotically distributed as a χ^2 under the null of valid instruments, with k degrees of freedom. The Wald (joint) test reports a test on the joint significance of all regressors. Wald (time) reports a test of joint significance of the time dummies. *Tobin's q* is the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of assets.

Board ownership is the sum of ordinary shareholdings by all directors. *Blockholding* is the sum of all external shareholdings above 3%. *Ratio* is the he proportion of non-executive directors on total board. *Leverage* is the ratio of total debt to total assets. *Size* is the natural logarithm of total assets in 1991 prices. *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax, to total assets. *RD Expenditures is total r*esearch and development expenditures on total assets. *Capital Expenditures* is total capital expenditures on total assets. *Cash Flow* is the ratio of pre-tax profit plus depreciation to total assets*significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3.6. Executives and non-executives.

	Model 6		Model 7		Model 8		Model 9	
	Coeff	p-val	Coeff	p-val	Coeff	p-val	Coeff	p-val
Tobin's q (-1)	0.5191	0.000***	0.5157	0.000***	0.5139	0.000***	0.5210	0.000***
Executive ownership	0.0479	0.011**	0.0432	0.025**	0.0437	0.027**	0.0447	0.015**
Executive ownership^2	-0.0023	0.023**	-0.0020	0.059*	-0.0021	0.051*	-0.0022	0.028**
Executive ownership^3	2.68E-05	0.035**	0.0000	0.086*	0.0000	0.068*	0.0000	0.039**
Non-Executive ownership	0.0171	0.618	-0.0262	0.179	-0.0089	0.248	0.0057	0.747
Non-Executive ownership^2	-0.0025	0.291	0.0007	0.293				
Non-Executive ownership^3	5.43E-05	0.121						
*Non-Exec ownership*Ratio*							-0.0241	0.515
Blockholding	-0.0063	0.034**	-0.0056	0.04**	-0.0056	0.028**	-0.0060	0.019**
Ratio	0.8360	0.016**	0.8426	0.005***	0.8723	0.003***	0.9635	0.002***
Leverage	-0.0784	0.838	0.0012	0.997	0.0916	0.798	0.1995	0.562
Size	-0.0496	0.195	-0.0459	0.237	-0.0554	0.177	-0.0581	0.197
Dividends	4.1290	0.011**	4.1356	0.015**	4.9145	0.029**	5.2434	0.028**
RD Expenditures	0.9200	0.492	1.5205	0.285	1.8010	0.215	1.8036	0.207
Capital Expenditures	1.8099	0.039**	1.9970	0.01***	1.6890	0.023**	1.5366	0.057*
Cash flow	1.1840	0.041**	1.3732	0.019**	1.3254	0.022**	1.2115	0.025**
Constant	0.8000	0.099*	0.5923	0.248	0.7608	0.180	0.746	0.206
Observations	6340		6340		6340		6340	
Implied Turning Points	(14.53 ; 42.46)		(14.62 ; 42.77)		(14.05 ; 42.26)		(13.56 ; 42.57)	
Wald (joint)	538.8	0.000***	574.2	0.000***	530.9	0.000***	528.7	0.000***
Wald (time)	21.52	0.018**	28.65	0.001***	28.5	0.001***	34.31	0.000***
Sargan	350.0	0.215	331.9	0.167	302.8	0.236	323.8	0.257
m1 test	-6.804	0.000***	-6.899	0.000***	-6.83	0.000***	-6.815	0.000***
m2 test	-0.7962	0.426	-0.8269	0.408	-0.9671	0.334	-0.9641	0.335

All estimations are carried out with the GMM-SYS methodology. For the equations in first differences, levels dated [t-3,t-4] of all the regressors are used as instruments. In the equations in levels, first differences dated [t-2] are used as instruments. Time dummies were included in all estimations. Asymptotic standard errors robust to heteroskedasticity were used in the estimations. m1 and m2 are tests for the absence of first and second-order correlation in the residuals, and are asymptotically distributed as N (0,1) under the null of no serial correlation. The Sargan test statistic is a test of the over-identifying restrictions, asymptotically distributed as a χ^2 under the null of valid instruments, with k

degrees of freedom. The Wald (joint) test reports a test on the joint significance of all regressors. Wald (time) reports a test of joint significance of the time dummies. *Tobin's q* is the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of assets. *Executive Ownership* is the sum of ordinary shareholdings by executive directors. *Non-Executive ownership* is the sum of ordinary shareholdings by non-executive directors. *Blockholding* is the sum of all external shareholdings above 3%. *Ratio* is the he proportion of non-executive directors on total board. *Leverage* is the ratio of total debt to total assets. *Size* is the natural logarithm of total assets in 1991 prices. *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax, to total assets. *RD Expenditures is total r*esearch and development expenditures on total assets. *Capital Expenditures* is total capital expenditures on total assets. *Cash Flow* is the ratio of pre-tax profit plus depreciation to total assets
*significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3.7. Robustness checks for the ratio of non-executives.

	Model 10		Model 11		Model 12	
	Coeff	p-val	Coeff	p-val	Coeff	p-val
Tobins'q (-1)	0.543	0.000 ***	0.543	0.000 ***	0.542	0.000 ***
Executive ownership	0.044	0.017 **	0.032	0.084 *	0.032	0.056 *
Executive ownership^2	-0.002	0.025 **	-0.002	0.079 *	-0.002	0.060 *
Executive ownership^3	2.67E-05	0.031 **	2.21E-05	0.075 *	2.16E-05	0.084 *
Non-Executive ownership	-0.017	0.417			-0.025	0.216
*Non-Exec ownership*Ratio(cum shares)*	0.034	0.526			0.061	0.229
Blockholding	-0.004	0.06 *	-0.004	0.09 *	-0.005	0.074 *
Ratio(cum shares)	0.592	0.032 **	0.497	0.04 **		
Leverage	0.076	0.807	0.036	0.92	0.118	0.725
Size	-0.042	0.292	-0.048	0.21	-0.046	0.250
Dividends	4.876	0.025 **	5.045	0.01 **	5.029	0.018 **
RD Expenditures	1.289	0.297	0.877	0.51	1.002	0.418
Capital Expenditures	1.577	0.045 **	1.428	0.07 *	1.593	0.026 **
Cash flow	0.950	0.055 *	1.075	0.04 **	0.958	0.048 **
Constant	0.7131	0.171	0.7775	0.098 *	0.910	0.060 *
Observations	6340		6340		6340	
Implied Turning Points	(12.98;42.71)		(11.97 ; 40.73)		(11.70 ; 42.82)	
Wald (joint)	512.9	0.000 ***	491.1	0.000 ***	563.8	0.000 ***
Wald (time)	37.71	0.000 ***	35.57	0.000 ***	37.48	0.000 ***
Sargan	322	0.265	269.6	0.393	292.6	0.532
m1 test	-6.791	0.000 ***	-6.773	0.000 ***	-6.801	0.000 ***
m2 test	-0.8828	0.377	-0.8045	0.421	-0.8252	0.378

In this table we report robustness checks of our results using the ratio of non-executives who do hold shares (*cum shares*) on the total board. All estimations are carried out with the GMM-SYS methodology. For the equations in first differences, levels dated [t-3,t-4] of all the regressors are used as instruments. In the equations in levels, first differences dated [t-2] are used as instruments. Time dummies were included in all estimations. Asymptotic standard errors robust to heteroskedasticity were used in the estimations. m1 and m2 are tests for the absence of first and second-order correlation in the residuals, and are asymptotically distributed as N (0,1) under the null of no serial correlation. The Sargan test statistic is a test of the over-identifying restrictions, asymptotically distributed as a χ^2 under the null of valid instruments, with k degrees of freedom. The Wald (joint) test reports a test on the joint significance of all regressors. Wald (time) reports a test of joint significance of the time dummies. *Tobin's q* is the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of assets. *Executive Ownership* is the sum of ordinary shareholdings by executive directors. *Non-Executive ownership* is the sum of ordinary shareholdings by non-executive directors. *Blockholding* is the sum of all external shareholdings above 3%. *Ratio(cum shares)* is the he proportion of non-executive directors (who own shares) on total board. *Leverage* is the ratio of total debt to total assets. *Size* is the natural logarithm of total assets in 1991 prices. *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax, to total assets. *RD Expenditures is total r*esearch and development expenditures on total assets. *Capital Expenditures* is total capital expenditures on total assets. *Cash Flow* is the ratio of pre-tax profit plus depreciation to total assets
*significant at 10%; ** significant at 5%; *** significant at 1%.

Table 3.8. Robustness checks on the functional form of non-executive shareholding.

	Model 13		Model 14		Model 15	
	Coeff	p-val	Coeff	p-val	Coeff	p-val
Tobin's q (-1)	0.533	0.000***	0.5269	0.000***	0.517	0.000***
Executive ownership	0.040	0.053*	0.0423	0.029**	0.035	0.068*
Executive ownership^2	-0.002	0.064*	-0.0022	0.040**	-0.002	0.088*
Executive ownership^3	2.49E-05	0.068*	2.70E-05	0.044**	2.1E-05	0.071*
Non-Executive ownership	0.012	0.800	0.0181	0.379	-0.018	0.388
Non-Exec own Dum. Non-Exec own>5%*	-0.020	0.666				
Non-Exec own Dum. Non-Exec own>15%*			-0.026	0.354		
Non-Exec own Dum. Non-Exec own>25%*					0.019	0.348
Blockholding	-0.005	0.073*	-0.006	0.027**	-0.007	0.020**
Ratio	0.853	0.003***	0.658	0.020**	0.792	0.007***
Leverage	0.036	0.910	-0.097	0.767	0.011	0.973
Size	-0.057	0.209	-0.047	0.243	-0.070	0.116
Dividends	4.827	0.020**	3.802	0.014**	4.199	0.014**
RD Expenditures	1.725	0.187	1.121	0.398	1.297	0.288
Capital Expenditures	1.466	0.035**	1.499	0.037**	1.504	0.037**
Cash flow	1.090	0.044**	1.168	0.037**	1.245	0.014**
Constant	0.7024	0.224	0.7340	0.142	0.8905	0.117
Observations	6340		6340		6340	
Implied Turning Points	(12.9; 41.11)		(12.7; 40.91)		(13.3; 42.23)	
Wald (joint)	624.1	0.000***	533	0.000***	584.7	0.000***
Wald (time)	31.97	0.000***	28.53	0.001***	40.96	0.000***
Sargan	319.2	0.318	323.3	0.263	317.2	0.347
m1 test	-6.704	0.000***	-6.66	0.000***	-6.600	0.000***
m2 test	-0.8848	0.376	-0.956	0.339	-0.824	0.410

All estimations are carried out with the GMM-SYS methodology. For the equations in first differences, levels dated [t-3,t-4] of all the regressors are used as instruments. In the equations in levels, first differences dated [t-2] are used as instruments. Time dummies were included in all estimations. Asymptotic standard errors robust to heteroskedasticity were used in the estimations. m1 and m2 are tests for the absence of first and second-order correlation in the residuals, and are asymptotically distributed as N (0,1) under the null of no serial correlation. The Sargan test statistic is a test of the over-identifying restrictions, asymptotically distributed as a χ^2 under the null of valid instruments, with k degrees of freedom. The Wald (joint) test reports a test on the joint significance of all regressors. Wald (time) reports a test of joint significance of the time dummies. *Tobin's q* is the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of assets. *Executive Ownership* is the sum of ordinary shareholdings by executive directors. *Non-Executive ownership* is the sum of ordinary shareholdings by non-executive directors. *Dum. Non-Exec own>5%* is a dummy equal to 1 if non-executive ownership is greater or equal to 5%. *Dum. Non-Exec own>15%* is a dummy equal to 1 if non-executive ownership is greater or equal to 15%. *Dum. Non-Exec own>25%* is a dummy equal to 1 if non-executive ownership is greater or equal to 25%. *Blockholding* is the sum of all external shareholdings above 3%. *Ratio(cum shares)* is the he proportion of non-executive directors (who own shares) on total board. *Leverage* is the ratio of total debt to total assets. *Size* is the natural logarithm of total assets in 1991 prices. *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax, to total assets. *RD Expenditures is total r*esearch and development expenditures on total assets. *Capital Expenditures* is total capital expenditures on total assets. *Cash Flow* is the ratio of pre-tax profit plus depreciation to total assets. *significant at 10%; ** significant at 5%; *** significant at 1%.

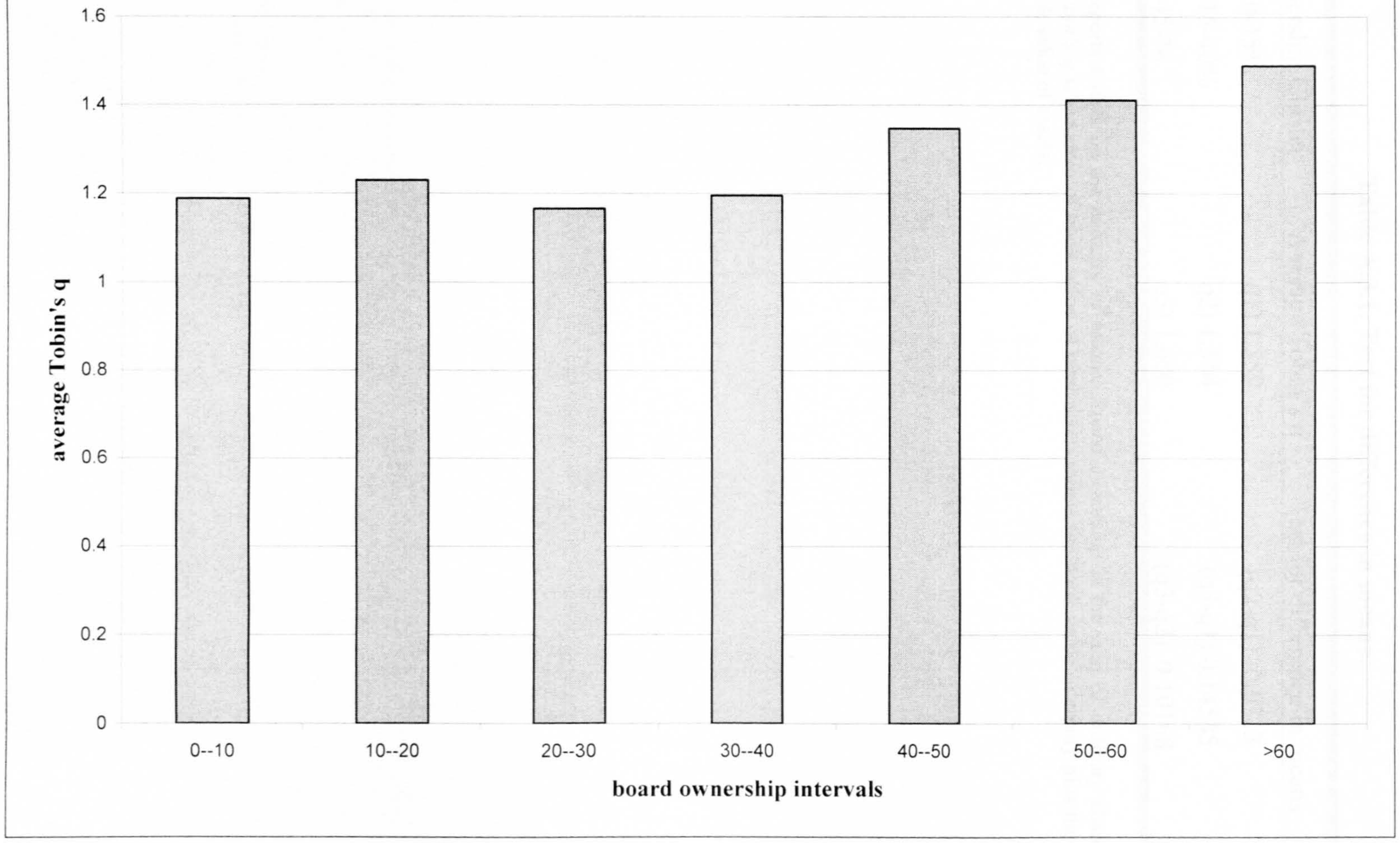
Table 3.9. Identities of the external shareholders.

	Model 16		Model 17		Model 18	
	Coeff	p-val	Coeff	p-val	Coeff	p-val
Tobin's q (-1)	0.5424	0.000***	0.5249	0.000***	0.5469	0.000***
Executive ownership	0.0402	0.045**	0.0414	0.017**	0.0439	0.044**
Executive ownership^2	-0.0020	0.059*	-0.0020	0.032**	-0.0021	0.055*
Executive ownership^3	0.0000	0.064*	0.0000	0.044**	0.0000	0.059*
Non-Executive ownership	0.0055	0.759	0.0034	0.847	0.0043	0.801
*Non-Exec ownership*Ratio*	-0.0185	0.642	-0.0167	0.644	-0.0180	0.623
Largest Non-Managerial Ownership	-0.0054	0.081*				
Institutional Ownership			-0.0061	0.023**		
Non-Institutional Ownership			-0.0077	0.025**		
Largest Institutional Ownership					-0.0057	0.133
Largest Non-Institutional Ownership					-0.0058	0.045**
Ratio	0.9059	0.001***	0.9668	0.002***	0.8998	0.002***
Leverage	0.2138	0.526	0.0549	0.854	0.1092	0.732
Size	-0.0207	0.639	-0.0597	0.168	-0.0159	0.695
Dividends	5.0954	0.016**	4.8318	0.012**	4.5649	0.011**
RD Expenditures	1.9908	0.175	1.7565	0.217	1.6356	0.26
Capital Expenditures	1.6528	0.031**	1.3644	0.082*	1.4339	0.072*
Cash flow	1.2154	0.025**	1.2114	0.017**	1.1758	0.021**
Constant	0.1583	0.746	0.8530	0.145	0.1186	0.796
Observations	6340		6340		6340	
Implied Turning Points	(13.50 ; 40.60)		(13.39 ; 42.01)		(13.96; 40.63)	
Wald (joint)	556.5	0.000***	558	0.000***	579.3	0.000***
Wald (time)	34.97	0.000***	42.56	0.000***	36.12	0.000***
Sargan	326.6	0.343	329.4	0.499	363.3	0.205
m1 test	-6.889	0.000***	-6.773	0.000***	-6.84	0.000***
m2 test	-0.8495	0.396	-0.9529	0.341	-0.8759	0.381

All estimations are carried out with the GMM-SYS methodology. For the equations in first differences, levels dated [t-3,t-4] of all the regressors are used as instruments. In the equations in levels, first differences dated [t-2] are used as instruments. Time dummies were included in all estimations. Asymptotic standard errors robust to heteroskedasticity were used in the estimations. m1 and m2 are tests for the absence of first and second-order correlation in the residuals, and are asymptotically distributed as N (0,1) under the null of no serial correlation. The Sargan test statistic is a test of the over-identifying restrictions, asymptotically distributed as a χ^2 under the null of valid instruments, with k degrees of freedom. The Wald (joint) test reports a test on the joint significance of all regressors. Wald (time) reports a test of joint significance of the time dummies. *Tobin's q* is the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of assets. *Executive Ownership* is the sum of ordinary shareholdings by executive directors. *Non-Executive ownership* is the sum of ordinary shareholdings by non-executive directors. *Largest Non-Managerial Ownership* is the *s*hareholding by the largest non-managerial shareholder in the firm. *Institutional Ownership* is the sum of all shareholding by financial institutions (pension funds, banks, insurance companies, fund managers) above 3%. *Non-Institutional Ownership* is the sum of all shareholding by private individuals, other non-financial companies. *Largest Institutional Ownership* is the *s*hareholding by the largest financial institution in the firm. *Largest Non-Institutional Ownership* is the *s*hareholding by the largest non-financial institution in the firm. *Ratio(cum shares)* is the he proportion of non-executive directors (who own shares) on total board. *Leverage* is the ratio of total debt to total assets. *Size* is the natural logarithm of total assets in 1991 prices. *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax, to total assets. *RD Expenditures is total r*esearch and development expenditures on total assets. *Capital Expenditures* is total capital expenditures on total assets. *Cash Flow* is the ratio of pre-tax profit plus depreciation to total assets *significant at 10%; ** significant at 5%; *** significant at 1%.

APPENDIX 3.1: Robustness Checks.

Figure A.3.1: Average Tobin's q by Board Ownership Intervals.



This Figure reports a plot of average Tobin's q against board ownership 10% intervals. *Board ownership* is the sum of ordinary shareholdings by all directors. *Tobin's q* is the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of assets.

Table A.3.1. Test for difference in means.

Board Ownership Cluster	Average Tobin's q	Test for difference in means	p-value
1) 0-15%	q1) 1.559	(q2-q1) -0.0713	0.0713
2) 15-40%	q2) 1.514	(q3-q1) 0.14585	0.0026
3) 45-%	q3) 1.660	(q3-q2) 0.10168	0.0085

This table reports t tests on the equality of means. *Board ownership* is the sum of ordinary shareholdings by all directors. *Tobin's q* is the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of assets.

Table A.3.2. Alternative definition of Tobin's q.

	Model5		Model6		Model7	
	Coeff	p-val	Coeff	p-val	Coeff	p-val
Tobins'q (-1)	0.524	0.000***	0.518	0.000***	0.518	0.000***
Executive ownership	0.043	0.013**	0.041	0.019**	0.044	0.015**
Executive ownership^2	-0.002	0.042**	-0.002	0.049**	-0.002	0.028**
Executive ownership^3	0.00002	0.066*	0.000	0.073*	0.00003	0.040**
Non-Executive ownership	-0.002	0.947	-0.029	0.201	-0.010	0.138
Non-Executive ownership^2	-0.001	0.556	0.001	0.189		
Non-Executive ownership^3	0.00003	0.244				
*Non-Exec ownership*Ratio*						
Blockholding	-0.006	0.032**	-0.005	0.034**	-0.005	0.027**
Ratio	0.907	0.002***	0.896	0.002***	0.888	0.001***
Leverage	0.174	0.611	0.219	0.549	0.282	0.386
Size	-0.044	0.176	-0.044	0.211	-0.057	0.123
Dividends	3.279	0.003***	3.241	0.004***	3.747	0.016**
RD Expenditures	1.412	0.326	1.762	0.222	2.065	0.162
Capital Expenditures	1.826	0.032**	1.804	0.018**	1.529	0.029**
Cash flow	1.615	0.004***	1.711	0.002***	1.654	0.002***
Constant	0.6631	0.151	0.5154	0.324	0.6549	0.243
Observations	6340		6340		6340	
Implied Turning Points	(14.49;42.73)		(14.00; 42.82)		(13.71; 42.78)	
Wald (joint)	652.1	0.000***	651.4	0.000***	613.2	0.000***
Wald (time)	32.63	0.000***	36.99	0.000***	34.99	0.000***
Sargan	339.1	0.258	316.1	0.264	292.6	0.276
m1 test	-6.757	0.000***	-6.681	0.000***	6.6698	0.000***
m2 test	0.1569	0.873	-0.208	0.835	0.03081	0.704

All estimations are carried out with the GMM-SYS methodology. For the equations in first differences levels dated [t-3,t-4] of all the regressors are used as instruments. In the equations in levels, first differences dated [t-2] are used as instruments. Time dummies were included in all estimations. Asymptotic standard errors robust to heteroskedasticity were used in the estimations. m1 and m2 are tests for the absence of first and second-order correlation in the residuals and are asymptotically distributed as N (0,1) under the null of no serial correlation. The Sargan test statistic is a test of the over-identifying restrictions, asymptotically distributed as a χ^2 under the null of valid instruments, with k degrees of freedom. The Wald (joint) test reports a test on the joint significance of all regressors. Wald (time) reports a test of joint significance of the time dummies. *Tobin's q* is the ratio of market value of equity plus the book value of total liabilities plus the book value of preferred stock to book value of total assets. *Executive Ownership* is the sum of ordinary shareholdings by executive directors. *Non-Executive ownership* is the sum of ordinary shareholdings by non-executive directors. *Ratio* is the he proportion of non-executive directors on total board. *Leverage* is the ratio of total debt to total assets. *Size* is the natural logarithm of total assets in 1991 prices. *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax, to total assets. *RD Expenditures is total r*esearch and development expenditures on total assets. *Capital Expenditures* is total capital expenditures on total assets. *Cash Flow* is the ratio of pre-tax profit plus depreciation to total assets
*significant at 10%; ** significant at 5%; *** significant at 1%.

Table A.3.3. Results using a definition of Market-to-Book Ratio.

	Model5		Model6		Model7	
	Coeff	p-val	Coeff	p-val	Coeff	p-val
Mtbv (-1)	0.546	0.000***	0.539	0.000***	0.537	0.000***
Executive ownership	0.039092	0.036**	0.040143	0.039**	0.041088	0.039**
Executive ownership^2	-0.00178	0.081*	-0.00182	0.092*	-0.00196	0.065**
Executive ownership^3	2.08E-05	0.079*	2.11E-05	0.061*	2.32E-05	0.081**
Non-Executive ownership	-0.00453	0.881	-0.02827	0.130	-0.01065	0.133
Non-Executive ownership^2	-0.0011	0.573	0.000703	0.279		
Non-Executive ownership^3	3.36E-05	0.241				
*Non-Exec ownership*Ratio*						
Blockholding	-0.00596	0.022**	-0.00512	0.043**	-0.00532	0.033**
Ratio	0.855264	0.003***	0.846055	0.002***	0.862882	0.001***
Leverage	0.133235	0.687	0.192549	0.575	0.29782	0.335
Size	-0.05275	0.124	-0.04055	0.290	-0.05183	0.215
Dividends	3.59665	0.011**	3.76972	0.016**	4.30157	0.032**
RD Expenditures	1.1599	0.389	1.5929	0.253	1.89306	0.192
Capital Expenditures	1.64799	0.046**	1.68307	0.039**	1.44483	0.056*
Cash flow	1.4022	0.008***	1.45653	0.007***	1.43351	0.006***
Constant	0.5812	0.212	0.4222	0.423	0.5279	0.356
Observations	6340		6340		6340	
Implied Turning Points	(14.84;42.21)		(14.84; 42.80)		(13.99; 42.27)	
Wald (joint)	621.7	0.000***	636.8	0.000***	620.4	0.000***
Wald (time)	32.67	0.000***	40.15	0.000***	39.03	0.000***
Sargan	344.5	0.280	318.6	0.327	301.2	0.256
m1 test	-7.028	0.000***	-6.938	0.000***	6.668	0.000***
m2 test	0.05881	0.953	0.1415	0.887	0.2990	0.765

All estimations are carried out with the GMM-SYS methodology. For the equations in first differences levels dated [t-3,t-4] of all the regressors are used as instruments. In the equations in levels, first differences dated [t-2] are used as instruments. Time dummies were included in all estimations. Asymptotic standard errors robust to heteroskedasticity were used in the estimations. m1 and m2 are tests for the absence of first and second-order correlation in the residuals and are asymptotically distributed as N (0,1) under the null of no serial correlation. The Sargan test statistic is a test of the over-identifying restrictions, asymptotically distributed as a χ^2 under the null of valid instruments, with k degrees of freedom. The Wald (joint) test reports a test on the joint significance of all regressors. Wald (time) reports a test of joint significance of the time dummies. *Mtbv* is the ratio of market value of equity plus book value of debt (long and short term) divided by the book value of assets. *Executive Ownership* is the sum of ordinary shareholdings by executive directors. *Non-Executive ownership* is the sum of ordinary shareholdings by non-executive directors. *Ratio* is the he proportion of non-executive directors on total board. *Leverage* is the ratio of total debt to total assets. *Size* is the natural logarithm of total assets in 1991 prices. *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax, to total assets. *RD Expenditures is total r*esearch and development expenditures on total assets. *Capital Expenditures* is total capital expenditures on total assets. *Cash Flow* is the ratio of pre-tax profit plus depreciation to total assets
*significant at 10%; ** significant at 5%; *** significant at 1%.

Table A.3.4. Results using a definition of Returns on Assets.

	Model5		Model6		Model7	
	Coeff	p-val	Coeff	p-val	Coeff	p-val
ROA (-1)	0.2008	0.000***	0.1946	0.000***	0.1929	0.000***
Executive ownership	0.0018	0.362	0.0018	0.389	0.0015	0.294
Executive ownership^2	-0.0001	0.504	-0.0001	0.527	0.0000	0.590
Executive ownership^3	0.0000	0.503	0.0000	0.583	0.0000	0.700
Non-Executive ownership	0.0032	0.229	-0.0002	0.914	0.0000	0.974
Non-Executive ownership^2	-0.0002	0.205	0.0000	0.965		
Non-Executive ownership^3	0.0000	0.154				
*Non-Exec ownership*Ratio*						
Blockholding	-0.0001	0.675	-0.0002	0.666	0.0000	0.906
Ratio	-0.0520	0.251	-0.0471	0.359	-0.0276	0.574
Leverage	-0.1821	0.000***	-0.1843	0.001***	-0.1961	0.000***
Size	0.0180	0.001***	0.0147	0.004***	0.0175	0.001***
Dividends	0.2323	0.112	0.1713	0.307	0.1827	0.280
RD Expenditures	-0.4848	0.017**	-0.4199	0.066*	-0.4700	0.047**
Capital Expenditures	-0.1403	0.062*	-0.1214	0.097*	-0.0934	0.235
Mtbv	0.0224	0.001***	0.0228	0.004***	0.0225	0.002***
Constant	0.0859	0.200	0.0435	0.473	0.0886	0.134
Observations	6340		6340		6340	
Implied Turning Points	(23.49;46.62)		(24.16;42.84)		(26.71;47.31)	
Wald (joint)	300.9	0.000***	131.7	0.000***	183.1	0.000***
Wald (time)	27.30	0.001***	21.32	0.011**	19.99	0.018**
Sargan	350.1	0.214	330.0	0.186	309.3	0.164
m1 test	-5.686	0.000***	-5.653	0.000***	-5.674	0.000***
m2 test	1.541	0.123	1.529	0.126	1.561	0.128

All estimations are carried out with the GMM-SYS methodology. For the equations in first differences levels dated [t-3,t-4] of all the regressors are used as instruments. In the equations in levels, first differences dated [t-2] are used as instruments. Time dummies were included in all estimations. Asymptotic standard errors robust to heteroskedasticity were used in the estimations. m1 and m2 are tests for the absence of first and second-order correlation in the residuals and are asymptotically distributed as N (0,1) under the null of no serial correlation. The Sargan test statistic is a test of the over-identifying restrictions, asymptotically distributed as a χ^2 under the null of valid instruments, with k degrees of freedom. The Wald (joint) test reports a test on the joint significance of all regressors. Wald (time) reports a test of joint significance of the time dummies. *ROA* is the ratio earnings before interest, tax depreciation and amortization to total assets. *Executive Ownership* is the sum of ordinary shareholdings by executive directors. *Non-Executive ownership* is the sum of ordinary shareholdings by non-executive directors. *Ratio* is the he proportion of non-executive directors on total board. *Leverage* is the ratio of total debt to total assets. *Size* is the natural logarithm of total assets in 1991 prices. *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax, to total assets. *RD Expenditures is total r*esearch and development expenditures on total assets. *Capital Expenditures* is total capital expenditures on total assets. *Mtbv* is the ratio of market value of equity plus book value of debt (long and short term) divided by the book value of assets.
*significant at 10%; ** significant at 5%; *** significant at 1%.

Table A.3.5. Static vs dynamic OLS models.

	Model 1		Model 2	
	Coeff	p-val	Coeff	p-val
Tobins'q (-1)			0.6888	0.000***
Board ownership	0.008309	0.279	0.0009	0.818
Board ownership ^{2}	-0.00041	0.246	-5.39E-06	0.977
Board ownership ^{3}	4.63E-06	0.273	3.53E-07	0.873
Blockholding	-0.00609	0.000***	-0.0018	0.000***
Ratio	0.443465	0.001***	0.1906	0.002***
Leverage	0.203498	0.233	0.1466	0.123
Size	-0.03661	0.024**	-0.0240	0.001***
Dividends	6.29927	0.000***	2.3387	0.000***
RD Expenditures	6.9109	0.000***	2.4142	0.000***
Capital Expenditures	1.64571	0.000***	0.3278	0.016**
Cash flow	1.92373	0.000***	0.7936	0.000***
Constant	1.028	0.000***	0.4877	0.000***
Observations	6340		6340	
Implied Turning Points	**N/A**		**N/A**	
Wald (joint)	237.5	0.000***	2412	0.000***
Wald (time)	83.88	0.000***	141.1	0.000***
m1 test	9.230	0.000***	1.952	0.051**
m2 test	8.400	0.000***	0.5822	0.560
m3 test	7.354	0.000***	1.67	0.221
m4 test	6.762	0.000***	-1.251	0.211
m5 test	5.636	0.000***	0.4372	0.662

Model1 and Model2 are estimated with OLS in levels. Time dummies are included in all estimations. Asymptotic standard errors robust to heteroskedasticity were used in the estimations. m are tests for the absence of correlation in the residuals. These test statistics are asymptotically distributed as N (0,1) under the null of no serial correlation. The Wald (joint) test reports a test on the joint significance of all regressors. Wald (time) reports a test of joint significance of the time dummies. m1 and m2 m3 m4 and m5 are tests for the absence of first, second, third, fourth and fifth order correlation in the residuals and are asymptotically distributed as N (0,1) under the null of no serial correlation. *Tobin's q* is the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of assets. *Board ownership* is the sum of ordinary shareholdings by all directors. *Ratio* is the he proportion of non-executive directors on total board. *Leverage* is the ratio of total debt to total assets. *Size* is the natural logarithm of total assets in 1991 prices. *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax, to total assets. *RD Expenditures is total r*esearch and development expenditures on total assets. *Capital Expenditures* is total capital expenditures on total assets. *Cash Flow* is the ratio of pre-tax profit plus depreciation to total assets
*significant at 10%; ** significant at 5%; *** significant at 1%.

Table A.3.6. Persistency of the individual series.

Variable	autoregressive parameter	p-value	obs	R-square
Tobins'q	0.78	0.000	5667	0.597
Board ownership	0.87	0.000	5667	0.812
Executive ownership	0.87	0.000	5667	0.814
Non-Executive ownership	0.75	0.000	5667	0.542
Blockholding	0.79	0.000	5667	0.632
Institutional Ownership	0.78	0.000	5667	0.597
Non-Institutional Ownership	0.78	0.000	5667	0.589
Largest Non-Managerial Ownership	0.80	0.000	5667	0.634
Largest Institutional Ownership	0.70	0.000	5667	0.475
Largest Non-Institutional Ownership	0.73	0.000	5667	0.517
Ratio	0.79	0.000	5667	0.665
Leverage	0.84	0.000	5667	0.667
Size	0.99	0.000	5667	0.978
Dividends	0.42	0.000	5667	0.172
RD expenditures	0.92	0.000	5667	0.722
Capital Expenditures	0.23	0.000	5667	0.062
Cash Flow	0.52	0.000	5667	0.250

This table reports the OLS estimated autoregressive parameter (as in Bond, 2002) in order to assess the persistency of the individual series. *Tobin's q* is the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of assets. *Board ownership* is the sum of ordinary shareholdings by all directors. *Executive Ownership* is the sum of ordinary shareholdings by executive directors. *Non-Executive ownership* is the sum of ordinary shareholdings by non-executive directors. *Blockholding* is the sum of all external shareholdings above 3%. *Institutional Ownership* is the sum of all shareholding by financial institutions above 3%. *Non-Institutional Ownership* is the sum of all shareholding by private individuals, other non-financial companies. *Largest Non-Managerial Ownership* is the shareholding by the largest non-managerial shareholder in the firm. *Largest Institutional Ownership* is the shareholding by the largest financial institution in the firm. *Largest Non-Institutional Ownership* is the shareholding by the largest non-financial institution in the firm. *Ratio* is the he proportion of non-executive directors on total board. *Leverage* is the ratio of total debt to total assets. *Size* is the natural logarithm of total assets in 1991 prices. *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax, to total assets. *RD Expenditures is total r*esearch and development expenditures on total assets. *Capital Expenditures* is total capital expenditures on total assets. *Cash Flow* is the ratio of pretax profit plus depreciation to total assets*significant at 10%; ** significant at 5%; *** significant at 1%.

CHAPTER 4

FINANCIAL FLEXIBILITY AND INVESTMENT DECISIONS: EVIDENCE FROM LOW-LEVERAGE FIRMS

4.1. Introduction

Since the seminal work by Fazzari et al. (1988), the investment literature has mostly been concerned with the identification of different classes of firms that are more (or less) likely to face higher costs of capital, in the attempt to document how investment cash flow sensitivities change as the cost of external finance rises (see, e.g., Devereux and Schiantarelli, 1990; and Bond and Meghir, 1994, for the UK; Hoshi et al., 1991, for Japan; Chirinko and Schaller, 1995, for Canada; Elston, 1998, for Germany). Generally, the investment models supporting these empirical studies predict that, for firms with high agency and asymmetric information problems, changes in net worth affect investment. A significantly positive value of the estimated coefficient of cash flow would correspond to the suggestion that financing constraints are present (see Hubbard, 1998). Nonetheless, since Kaplan and Zingales' (1997) paper, an ongoing debate has raised doubts about and criticism of the validity of this approach, arguing that investment-cash flow sensitivity may be higher for firms that do not face greater costs of external funds (e.g., Cleary, 1999; Kaplan and Zingales, 2000).

On the other hand, the literature on financial choices generally considers investment as exogenously determined, and it focuses on the relative cost of debt to equity, testing the hypotheses of the pecking order versus the trade off theory (e.g., Shyam-Sunder and Myers, 1999; Fama and French, 2002; Frank and Goyal, 2003; Flannery and Rangan, 2005), as well as market timing (Baker and Wurgler, 2002) and the relevance of elements such as taxes and financial distress (Hovakimian et al., 2001).

Recently, several qualitative studies, including Graham and Harvey (2001) for the US, Bancel and Mitoo (2004) and Brounen et al. (2005) for Europe, have provided evidence of the interaction between financial and investment decisions, and maintain that financial flexibility, in the form of debt conservatism, is the principal driving force of leverage choices by CFOs. For instance, 59% of Graham and Harvey's (2001) respondents say that flexibility is important (rating of 3), or very important (rating of 4), in enabling them to undertake investment in the future, when asymmetric information and contracting problems might otherwise force firms to forego profitable growth opportunities.

This survey's evidence could be interpreted in the light of the arguments by Modigliani and Miller (1963) and Myers (1984), according to whom "real-world

problems of financial strategy" (i.e., capital market imperfections) lead firms to "the need for preserving flexibility", implying "the maintenance by firms of a substantial reserve of untapped borrowing power" (Modigliani and Miller, 1963, p. 442). A further corroborating argument in the literature can be found in Myers' (1977) seminal paper. He shows how "too much" debt may induce firms to forego profitable investment opportunities, even when managers are fully aligned with shareholders' interests.

The aim of this work is to analyze more systematically the interaction between low-leverage policy and investment decisions. Taking the ideas set out above as a starting point, we investigate the hypothesis that anticipating financial constraints in the future, firms may respond by accumulating reserve borrowing power. More specifically, by pursuing a policy of low-leverage for a certain number of years, firms may accumulate financial flexibility that allows them access to the external market, and so be able to raise funds to invest more than their internal resources would permit.

The first step of our analysis consists in the identification of those companies with reserves of borrowing power (RBP). To this end, we initially identify low-leverage firms by adopting a "target" approach. This entails the estimation of a leverage equation from which the predicted level of debt is calculated: this makes it possible to calculate the deviation between actual and predicted level of debt, and to define low-leverage firms as those that are below the estimated target. We then classify a firm as RBP if it shows a low-leverage policy for three consecutive years before the analyzed investment decision.

After classifying firms, the second step of our analysis investigates whether this borrowing power, accumulated in the previous three years, has an impact on current investment policy. The prediction is that RBP firms have enough spare debt capacity to be able to raise external funds and invest more in the years following the conservative financial policy. To investigate this hypothesis, we specify an investment model in which we introduce the RBP dummy. According to our "flexibility" hypothesis, the RBP dummy should have a positive and significant impact on capital expenditure. Furthermore, because RBP firms can, after a period of low leverage, raise external funds to finance projects larger than their internal resources, we would also expect the impact on the cash flow sensitivity of investment to be negative and insignificant. It is important to underline that, in line with Modigliani and Miller (1963) and Myers (1984), RBP firms do not use only internal funds, but are also able

to go to the external markets and exploit their reserve borrowing power when internal funds are insufficient to implement a new project.

Furthermore, in an attempt to assess the dynamics of firm choices in more detail, we also undertake an intertemporal descriptive study of a number of relevant firm characteristics. Using this perspective, we expect to detect the following: first, RBP firms should show an increase in the level and value of their investments around time t; second, in line with the hypothesis of higher ability to raise external funds after having accumulated borrowing power, RBP firms should show a sharp increase in leverage levels at time t and, accordingly, they should experience an increase in net debt issue; third, RBP firms should show a decrease in available liquid resources around t, because part of these resources may be invested in new projects.

Our study contributes to the literature in several ways. First, unlike previous works, our paper is an original attempt to investigate explicitly the impact of a distinct leverage *policy* on the investment decisions of firms. To the best of our knowledge, Devereux and Schiantarelli (1990), Bond and Meghir (1994), Lang et al. (1996) and, very recently, Aivazian et al. (2005), include debt variables in their investment models. However, their analyses focus on how the current availability of external finance, such as debt, may influence investment decisions. They do not take into account any intertemporal perspective on a specific financial strategy by firms. Further, Graham (2000) and Minton and Wruck (2001) observe that conservative firms stockpile financial slack or debt capacity in order to finance future discretionary expenditures. It should be noted, however, that the focus of these studies is very different from ours. Graham (2000) estimates the magnitude of the tax benefits of debt. Minton and Wruck (2001) investigate the determinants of financial conservatism behaviour. In contrast, the aim of the present work is to analyze explicitly the impact of certain financial strategies on investment, by explicitly including the leverage policy *status* in the investment model.

Second, in defining low-leverage firms we adopt a different methodology than previous studies. Graham (2000) infers how aggressively a firm uses debt by observing where it locates on its interest benefit functions; while Minton and Wruck (2001) classify a firm as being financially conservative (i.e., having low leverage) if its annual ratio of long-term debt to total assets is in the bottom 20% of all firms for five consecutive years. In our work, in contrast, we estimate the amount of leverage as predicted by the dominant capital structure theories. We then control how firms

deviate from it, in order to identify the low-leverage firms. One advantage of our approach over previous ones is that, by estimating a leverage model, we consider a number of firm-specific characteristics that are likely to affect company demand for debt. In addition, unlike a fixed cut-off value approach, we account for possible changes in the firms' optimal leverage over time, and also the possibility of different optimal levels across firms, in line with the methodology adopted by Hovakimian and Titman (2001) for capital structure decisions and Iona et al., (2004). Furthermore, in estimating the amount of debt for each firm using the GMM-SYS methodology, we take into account the issue of the endogeneity and individual heterogeneity among variables. This may seriously bias estimations if not properly accounted for.

We conduct our analysis over a large sample of UK non-financial listed firms over the period 1991-2001. We hand-collected detailed information on ownership by directors and external shareholders, and board composition, on an annual basis for a sample of 1100 UK non-financial listed firms. Economic and market variables are from Datastream. Thanks to the availability of these data sets, we are able to estimate the influence of ownership characteristics in the optimal leverage model in a panel data framework, which represents our work's other original contribution to the literature. In addition, our study may shed more light on the relation between leverage policy and investment expenditures in the UK market, a question that has been the focus of a limited number of papers. To the best of our knowledge, Lasfer (1995), Ozkan (2001) and Bevan and Danbolt (2004) provide evidence on the determinants of capital structure for UK companies. On the other hand, Devereux and Schiantarelli (1990) and Bond and Meghir (1994) include debt variables in their investment models for the UK, but their main aim is to analyze investment-cash flow sensitivity as a proxy for financial constraints. In addition, they do not take into account the ownership effect.

Our analysis reveals that the low-leverage (LL) policy is a transitory one. Following a period of low leverage (two/three years), firms appear able to invest significantly more in capital expenditures. We investigate these results in more detail, and conduct several robustness checks in various directions. Our intertemporal analysis reveals how, consistent with our predictions, RBP firms sharply increase their capital investments after acquiring RBP status. They do so by issuing new debt and approaching their target leverage. A further interesting aspect is that we detect a significant increase of abnormal investment (spikes) by firms after acquiring RBP status. Finally, the results appear to indicate that this strategy is value enhancing: we

document an increase in average market to book ratio for this group of firms over time.

The rest of the work is organized as follows. In the next section, we develop the main hypotheses tested in the leverage and investment models, and we present the methodology adopted in our work. Section 3 is dedicated to the presentation of data. Section 4 reports the summary statistics and regressions results. Section 5 includes robustness checks. Conclusions are in Section 6.

4.2. Research Design

4.2.1 Definition of low-leverage firms

As discussed above, the first step is dedicated to the identification of the *low-leverage* firms that we use instrumentally to define RBP firms.[1] There are two main ways of proceeding.

One consists in setting a benchmark value that separates low leverage from high leverage. For example, Mikkelson and Partch (2003) consider as "high cash" those companies that hold more than 25% of their assets in cash and equivalents. Minton and Wruck (2001) use the statistical distribution across firms of the variable of interest. They classify firms as "leverage conservative" (i.e., having low leverage) when their leverage is in the bottom 20% of the distribution of all firms. We will refer to this in the text as the "percentile methodology".

The alternative specification, as we described in the introduction, starts from the idea that firms have a target capital structure that is firm-specific. In this view, low leverage is defined in terms of the deviation between the actual level of debt and the estimated target. To calculate the target and the potential deviations from it, a leverage model must be chosen. We will refer to this as the "target methodology".

This second methodology appears to be more reliable, for a number of reasons. For instance, it is reasonable to believe that the amount of debt in a firm depends on a series of firm-specific characteristics. Indeed, a preliminary inspection of the data reveals significant differences in total debt in different industries. Moreover, an increasing number of studies in the literature corroborate the idea that firms do indeed have a target capital structure. According to the figures reported in Graham and Harvey (2001), 37% of firms have a "flexible" target debt ratio, while a further 35%

---

[1] All definitions of variables are provided in Table 2.

have a stricter target. In their recent paper, Flannery and Rangan (2005) test the predictions of a static trade-off theory (TOT) model versus pecking order theory (POT), and the more recent Market Timing hypothesis. Their evidence substantiates the survey results of Graham and Harvey (2001), that firms do have a target leverage. Further, this approach seems more appropriate in assessing the evolution of the debt changes a firm realizes over time. For example, analysis of the data shows how the company "Bett Brothers" records a leverage of around 0.0137% in 1997, and 4.22% in 1998, which corresponds approximately to a 309% increase in debt ratio. These two values belong to the first and second deciles of the distribution, respectively. Therefore, despite the considerable increase in leverage, this firm is still classified as LL according to the percentile methodology. On the other hand, using the targeting approach, we find that while the 1997 observation corresponds to a negative deviation from target (i.e., LL status), in 1998 the firm is over the estimated target, and therefore loses LL status.

However, the second approach is not free from drawbacks. Possibly the most serious shortcoming lies in the fact that the choice of the leverage model affects the estimated target and deviation from it, and ultimately influences the classification of firms and the subsequent results of the investment equation. Misspecification of the leverage model may result in serious bias of the results that follow.

As a result of all these considerations, we proceed in the following way. First, to minimize the possibility that the results are affected by the choice of a specific leverage model, we test our results by using four different leverage model specifications. Second, to maintain a "neutral" approach with respect to the definition of LL firms, we will use both the target and the percentile methodology, and report all the results accordingly.

4.2.2 Definition of "reserve borrowing power" firms

In this setting, we start from the specification of a target leverage model. We use a partial adjustment model, and we include a widely accepted set of variables that have been identified in the literature as potential determinants of leverage. The estimated models, in turn, provide us with the fitted value for debt (see Opler et al., 1999 for an application to a cash model). In other words, from these estimations we work out what financial theory would predict the level of leverage of each company to be. At this point, the estimated (fitted) value is compared with the actual value and low/high

leverage firms are distinguished, in terms of the deviation between the actual and the predicted level. In other words, this entails a two-step procedure in which a predicted value is computed using the leverage model estimated at the first step, so that the model estimated at the second step then includes the prediction from the first. A peculiarity of our case is that our analysis is mostly based on the "behaviour" of the residual from the first step estimation, because we require a number of consecutive negative deviations (LL) to generate the RBP dummy that is the core of this study.

We adopt two different methods to assign LL status. The "simple" criterion assigns LL status to firms where the actual leverage is lower than the predicted one. For robustness purposes, we also utilize a more stringent definition, according to which firms are LL only if their (negative) deviation from the target is larger (in absolute terms) than at least 25% of all LL firms.

Finally, in line with our description above, we use two different criteria to identify firms with reserve borrowing power. In the first case, the dummy takes the value of 1 when we observe at least three consecutive periods in which the firm is classified as LL prior to the investment decision (*RBP3 and RBPpct3*). In the other case, we require only two consecutive periods (*RBP2 and RBPpct2*).[2]

For clarity, we now present a more detailed step-by-step description of the method followed to classify firms in Table 4.2 Panel A. For simplicity, this example describes the *RBP3* dummy. Because the leverage model is estimated in first difference, the first observation is "lost" (denoted as N/A in the table). Moreover, since to assign the RBP status we require at least three consecutive observations in which firms are LL, the first available observation to meaningfully discern RBP from NRBP firms is the 4th one (corresponding to the 1995 observation in the example). Therefore, in Table 4.2A, the observations corresponding to 1992, 1993, and 1994 are denoted as "not available". This explains how, for the investment model, we are left with 4006 observations and 613 firms available. It is worth underlining that, having defined the dummy in this way in the investment model, we will investigate the relationship between investment at time t and the dummy RBP, which defines a past behaviour.

We report the descriptive classification of firms in Table 4.2B, which shows that 277 companies are classified as never having reserve borrowing power (NRBP).

---

[2] *RBP3 and RBP2* refer to LL firms classified using the simple deviation criteria and *RBPpct3* and RBPpct2 refer to firms being classified as LL if the deviation is larger than 25% of other LL firms.

On the other hand, RBP firms account for a total of 270 companies, while 66 are always classified as RBP in all the time periods in which they are present in the dataset (ARBP). Further, an analysis of the time series properties of the RBP status reveals that firms are classified as RBP for an average (median) of 2.64 (2) consecutive periods, which confirms the idea that this is a temporary strategy.

4.2.3 Leverage model hypotheses

In this section, we describe the hypotheses that provide the theoretical underpinning for the choice of variables included in the estimated capital structure models.

4.2.3.1 Specification 1

The base specification consists in the "classical" Rajan and Zingales (1995) four variable model, consisting of size, growth opportunities, profitability and tangible assets.

According to the asymmetric information hypothesis, small firms are considered more opaque by potential investors (Petersen and Rajan, 1994) and face larger costs in raising external capital. Larger firms, on the other hand, are less exposed to asymmetric information problems, and consequently are expected to have better access to capital markets. Moreover, these companies are less exposed to the probability of bankruptcy (Titman and Wessels, 1988; Rajan and Zingales, 1995). Most empirical studies report a positive sign for the relationship between size and leverage (Rajan and Zingales, 1995; Frank and Goyal, 2003). Less conclusive results are reported by other authors (Kremp et al., 1999; Ozkan, 2001). We proxy for size using the natural logarithm of total assets.

According to Myers' (1977) underinvestment argument, firms with high growth opportunities are expected to have lower levels of leverage. To avoid having to pass up profitable investment opportunities in the future, such firms can alleviate this problem by shortening the maturity of debt (Myers, 1977; Titman and Wessels, 1988), or by using convertible bonds (Jensen and Meckling, 1976; Smith and Warner, 1979). Titman and Wessels (1988) also point out that firms in growing industries incur higher agency costs, since they have more flexibility in making future investments. It is also suggested that, although growth opportunities are capital assets that add value to a firm, they cannot be collateralized and do not generate current

income. They are intangible in nature, and valuable only as long as the firm is alive. Their value will fall significantly if the firm faces bankruptcy, which suggests that the expected bankruptcy costs for firms with greater growth opportunities will be higher (Myers, 1984; Williamson, 1988; Harris and Raviv, 1990). Larger expected bankruptcy costs would in turn imply lower financial leverage. Rajan and Zingales (1995) find a negative relationship between growth opportunities and leverage, and suggest that this may occur as a result of firms issuing equity when stock prices are high. As mentioned by Hovakimian et al. (2001), large stock price increases are usually associated with improved growth opportunities, and lead to a lower debt ratio. Similar to other studies (e.g., Smith and Watts, 1992; Whited, 1992; Barclay and Smith, 1995; and Rajan and Zingales, 1995), this proxy is defined as the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of total assets.

To the extent that firms first finance their investments by extinguishing their internal funds, as predicted by the pecking order theory, a larger profitability/cash flow will be negatively related to leverage. In contrast, according to the trade-off theory, a positive relationship would be expected, as a consequence of decreasing bankruptcy risks and increasing free-cash flow problems. Following Titman and Wessels (1988) and Whited (1992), we measure profitability as the ratio of the earnings before interest, tax and depreciation (EBITD) to total assets.

Tangible assets are likely to have an impact on the borrowing decisions of a firm, because they are less subject to informational asymmetries, and they usually have a greater value than intangible assets in the event of bankruptcy. Additionally, moral hazard risks are reduced when the firm offers tangible assets as collateral, because this constitutes a positive signal to creditors, who can request the selling of these assets in the case of default. As such, tangible assets constitute a good collateral for loans and are expected to be positively related to leverage. Moreover, as underlined above, it must be taken into account that a large presence of tangible assets may also be a proxy for relative low growth options. Most empirical studies conclude that there is a positive relation between collaterals and the level of debt (Rajan and Zingales, 1995; Kremp et al., 1999; Frank and Goyal, 2002). Inconclusive results are reached by Titman and Wessels (1988). Following Rajan and Zingales (1995) and Booth et al. (2001), we define collateral as the ratio of total fixed assets to total assets.

4.2.3.2 Specification 2

In the second specification, the standard Rajan and Zingales (1995) regression is augmented with ownership control variables, under the hypothesis that agency conflicts between managers and shareholders may be important determinants of leverage choices. We include executive ownership, blockholding and the ratio of non-executives on total board.

Following Jensen and Meckling (1976), the influence of managerial incentives and discretion on capital structure choices has attracted considerable attention, and different and contrasting views have been proposed. On the one hand, some authors have proposed theories under which managers prefer to keep debt ratios low, to reduce risk and protect their undiversified human capital (Fama, 1980), or to alleviate the pressure that comes with interest payment commitments (e.g., Jensen, 1986). On the other hand, according to Harris and Raviv (1988) and Stulz (1988)), managers may actually prefer higher leverage, in order to inflate their voting power and reduce the possibility of a takeover. Furthermore, according to Leland and Pyle's (1977) signalling hypothesis, managers may actually choose higher leverage, to convince investors of their ability to generate sufficient earnings to repay their debt. Research on this issue provides some evidence that entrenched managers, i.e., managers who are able to act in their own self-interest, prefer lower leverage ratios. Friend and Lang (1988) and Mehran (1992) find that managers with discretion tend to choose lower leverage. Consistent with this, Berger et al. (1997) show that leverage levels are lower when managers do not face pressure from disciplining mechanisms. However, given the contrasting theoretical views on the relation between the extent of manager shareholder agency conflicts and the choice of capital structure, it is difficult to predict a priori the direction of the relationship.[3]

Increasing emphasis has recently been placed on the role of board composition, as a possible corporate governance tool that could help to regulate managerial discretion. It is a general view that the board of directors is more independent as the number of non-executives increases. Non-executive directors should be independent "advisors" and act as "delegated monitors" by the shareholders of the actions of executive managers. To the extent that non-executive directors

---

[3] In line with other studies (Kim and Sorensen, 1986; Crutchley et al., 1999), and to account for the possibility that the relationship may be a non-linear one, in an unreported test we also specify a quadratic relationship. Results in the estimated target and deviations and following investment models are virtually unaltered.

perform a monitoring and disciplining function over executives, we may expect to detect an impact on leverage decisions. It is difficult, however, to predict exactly the direction of causality. As Hermalin and Weisbach (2003) argue in their paper, the board of directors could be endogenously determined in response to the agency conflicts inside the firm. It could be argued that firms with more outside-dominated boards may have lower manager-shareholder conflicts. This, in turn, may counterbalance the managers' preference for lower debt, and result in higher levels of leverage. However, if non-executive owners are exercising an effective degree of monitoring of executives, we may also expect a negative relationship under the hypothesis that, as we also discuss below, managers use leverage as a signal to the market. To the extent that the market perceives an outsider-dominated board as a signal of reduced agency conflicts, then managers do not need to use (high) leverage as a signal of their commitment to the market. We approximate board composition by the fraction of non-executive directors on total board.

As Stiglitz (1985) and Shleifer and Vishny (1997) argue, large shareholders may have greater incentives to be involved in the control process than smaller ones, because they can more easily bear the high fixed costs of collecting information on management behaviour, given the large proportion of resources invested in the firm. In general, when control rights are concentrated in the hands of few investors with extensive cash flow rights, a concerted action is easier than when control rights are dispersed. Similar conclusions are reached by Zeckhauser and Pound (1990), who argue that the mere presence of a large shareholder often acts as a signal to the market that managers are less able to expropriate the firm's resources, thus avoiding the need for managers to increase debt level as a signal. For example, Sudarsanam (1996) provides evidence that large block acquisitions in the UK market are value-enhancing events, consistent with the hypothesis of the market's expectations of reduced agency costs. In line with these arguments, we would expect higher ownership by non-managerial shareholders to result in a lower proportion of debt in the capital structure of firms. However, other studies such as Holderness (2003) reports little evidence that blockholders affect leverage. In our work, we use the sum of all large external shareholders that hold more than 3% of the shares in each company as a proxy for blockholding.

4.2.3.3 Specification 3

As indicated above, in a third specification we also include other potential control variables, to take into account the "financial status" of firms. We include dividend payments, debt maturity, cash holding and non-debt tax shield. These variables have been linked to capital structure decisions in different works.

According to Easterbrook (1984), dividend policy is also an instrument that firms can use to reduce managerial discretion. It is argued that dividend payouts play a role in mitigating equity agency costs, by facilitating capital market monitoring of the firm's activities and performance. Higher dividend payouts increase the likelihood that the firm will have to sell common stock in primary capital markets. This, in turn, will induce scrutiny of management by investment banks, securities exchanges and capital suppliers. Also, dividends commit the firm's management to pay out cash to shareholders, and cutting dividends may, in turn, provide a negative signal to the market. A negative sign could then be predicted, to the extent that different control mechanisms are alternated to reduce manager shareholder conflicts (Agrawal and Knoeber, 1996).

A number of studies have also underlined the interdependence of the leverage and maturity mechanisms, and have reached opposite conclusions on the direction of this relationship. On the one hand, Barclay et al. (2003) argue that, as short debt maturity can reduce the cost of underinvestment problems, it may allow firms to increase optimal leverage. On the other hand, Johnson (2003) argues that shortening the maturity of debt can also increase liquidity risk, and may therefore constitute an incentive for firms to reduce optimal leverage. It is then difficult ex ante to predict the sign of this relationship. In our study, maturity is defined as the ratio of total loans repayable after one year to total debt.

In the literature on cash holding policy, it is argued that one motive for holding cash arises because raising funds from the external market can be very costly for firms that need prompt liquidity. As a consequence, cash may be used as a buffer against the possibility of having inadequate funds to implement valuable projects. In this sense, leverage can be seen as a substitute to cash (Opler et al., 1999), and therefore a negative link could be predicted. We define cash as the ratio of total cash and equivalents to total assets.

Finally, DeAngelo and Masulis (1980) show that if non-debt tax shields exist, then firms are likely not to use fully debt tax shields. In other words, firms with large

non-debt tax shields have a lower incentive to use debt from a tax shield point of view, and thus may use less debt. Nonetheless, a large non-debt tax shield may indicate a relatively large presence of fixed assets. This variable may also be a proxy for low growth options, and this may imply a positive relationship. Following Titman and Wessels (1988), we use the ratio of annual depreciation expense to total assets as a proxy for non-debt tax shields.

4.2.4 Estimation methodology: Leverage

All leverage models are estimated using the GMM-SYS methodology, which allows us to control for a number of econometric issues simultaneously. First, it allows us to control for the potential endogeneity of regressors. Endogeneity arises because shocks that affect corporate gearing are also likely to affect regressors such as cash holding, maturity or dividend choices. Moreover, endogeneity may arise from cross causality. For example, it may be argued that it is leverage decisions that affect the company's cash holding or dividend policy, rather than the other way around.

A further reason for endogeneity arises from the possibility that firm-specific characteristics may be correlated with the explanatory variables.[4]

As a consequence, in this work we estimate the following model:

$$LEV_{it} = \alpha_1 LEV_{it-1} + \sum_{k=1}^{k} \beta_k X_{it} + \eta_i + \eta_t + u_{it} \quad (1)$$

where η_i is a proper fixed effect that accounts for the correlation existing between firm-specific characteristics and regressors, and η_t represents a firm-invariant time effect which is able to account for macro-economic factors (such as market shocks). For the moment, we assume the idiosyncratic term u_{it} to be homoschedastic and serially uncorrelated.

Following the seminal work of Arellano and Bond (1991), we take the first differences of the model and then use suitable lagged levels of the dependent variables as instruments. If we first difference model 1, we obtain

$$\Delta LEV_{it} = \Delta\alpha_1 LEV_{it-1} + \sum_{k=1}^{k} \Delta\beta_k X_{it} + \Delta\eta_t + \Delta u_{it} \quad (2)$$

Because the validity of the GMM relies heavily on the absence of serial correlation of higher order, two tests of correlation in the error term of order one and two are included in the results (m1 and m2).

---

[4] Preliminary diagnostic checks confirm that firm fixed effects appear to be important in explaining leverage ratios.

The choice of an appropriate set of instruments is tested via the Sargan test of over-identifying restrictions, which tests the null hypothesis of the absence of correlation between the instruments and the error term. Rejection by the Sargan test would cast doubt on the validity of the instruments.

Another concern arises when there is a high degree of persistence in the data.[5] Under such conditions, Arellano and Bover (1995) propose an estimator that considers the equation in levels, with both lagged first-differenced and lagged level terms as instruments in the first-difference equation. This procedure is examined in detail by Blundell and Bond (1998), who illustrate significant asymptotic efficiency gains in this GMM-SYS estimator. They also emphasize that, when weak instruments are present, the finite sample bias of the GMM-DIFF is likely to be in the direction of the WG estimator.

In the light of all the issues described above, we used the GMM-SYS methodology for this analysis. Unreported tests confirm how, in line with this econometric theory, the autoregressive parameter's coefficient for the GMM-SYS lies between the OLS and Within Group ones, while the GMM-DIFF one seems affected by the weak instrument problem, as the coefficient is close to the WG one.

4.2.5 Investment model hypotheses

In their seminal paper, Modigliani and Miller (1963) noted that, despite the existence of some tax advantages for debt financing, firms tend not "to use the maximum possible amount of debt in their capital structure" because of limitations from lenders, which lead to "the need for preserving flexibility". Graham (2000) reports corroborating evidence that firms do not fully exploit the potential tax benefits of leverage. In 1984, Myers proposed a modified version of the pecking order theory, in which he maintains that firms, even if they cover part of normal investment with new borrowing, have two main reasons to restrain themselves from issuing debt: to avoid the costs of financial distress and to maintain financial slack.

Taking these ideas as a starting point for our analysis, we test empirically the hypothesis that, in imperfect capital markets, firms may anticipate potential financial constraints from creditors in the future by accumulating reserve borrowing power at present. As in Myers (1984), reserve borrowing power means that they are able to

---

[5] A preliminary analysis of the data confirms the presence of persistency.

issue debt if they need more funds than the accumulated internal ones to implement positive growth opportunities.

To evaluate whether a low leverage is the result of a corporate policy rather than a temporary shock, we require firms to be classified as RBP on the basis of the definitions provided above. Therefore, through a *policy* of LL for a certain number of years, firms may accumulate financial flexibility that allows them to have access to the external markets, and to raise the necessary funds to invest in valuable projects in the future. As a consequence, we predict that the RBP dummy should have a positive and significant impact on the capital expenditure of firms.

Furthermore, in the earlier investment literature, the sensitivity of investments to cash flow was used to assess the degree of capital market imperfections (Fazzari et al., 1988; Hoshi et al., 1991; Devereux and Schiantarelli, 1990; amongst many others). However, there is an ongoing debate about the interpretation of this sensitivity parameter. As we argued earlier, the underpinning idea is that imperfections introduce a wedge between the costs of external and internal funds. Firms facing higher informational imperfections experience a wider wedge, and therefore they are more financially constrained. On the one hand, Fazzari et al., (1988) argue that, for more financially constrained firms, investment is more sensitive to cash flow. Kaplan and Zingales (1997) provide an opposing perspective. They screen a set of annual reports for a sub-sample of low-dividend payout firms, and conclude that investment-cash flow sensitivity can be higher for unconstrained firms. Moreover, Gilchrist and Himmelberg (1995), Cleary (1999), Erickson and Whited (2000), and Alti (2003) present evidence indicating that measurement problems associated with Tobin's q may affect the sensitivity of investments to the availability of internal funds.

To the extent that investment-cash flow sensitivity indeed contains information about financial imperfections and, thus, the accessibility of firms to external markets, then this sensitivity should be insignificant for RBP firms. This is because these companies can raise external funds at time t to finance projects larger than their internal resources, thanks to the borrowing power accumulated in the previous years.

In addition, to corroborate our predictions, we may expect to find evidence of the following characteristics in an intertemporal perspective. First, RBP firms are expected to show an increase in the level and value of their investments around time t.

Second, in line with the hypothesis of higher ability to raise external funds after having accumulated borrowing power, RBP firms should show a sharp increase in leverage levels at time t and, accordingly, they should experience an increase in net debt issue. Third, RBP firms should show a decrease in available liquid resources around t, because part of these resources may be invested in new projects.

4.2.6 Estimation methodology: investment model

Four broad classes of investment model can be identified in the literature: the neoclassical model, the sales accelerator model, the Tobin's q model and the Euler-equation model. Each of these approaches is subject to criticism. However, most testing has been conducted in the context of q-models, in which average Tobin's q is used to control for the investment opportunities available to firms.

For the purposes of comparison with previous work, we decided to adopt the investment model used in Devereux and Schiantarelli (1990), augmented by leverage *status* variables. Therefore, capital expenditures are regressed on Tobin's q and cash flow. Moreover, instead of partitioning the sample into different groups of firms, and running separate regressions for each of them, we include the leverage *status* dummy, both as a regressor on its own and interacted with cash flow, in the attempt to investigate whether RBP firms have indeed different investment expenditures.

We are aware that estimating q-models is not without problems. A potentially serious issue is that Tobin's q will only include future expectations if the conditions indicated by Hayashi (1982) to approximate marginal q with average q hold: firms are price takers in perfectly competitive industries, there are constant returns to scale, and the stock market value correctly measures the fundamental expected present value of the firm's future net cash flows. In practice, these conditions may not be fulfilled. For instance, in the presence of a stock market bubble, Tobin's q would not capture all relevant information about the expected future profitability of current investment. Therefore, cash flow would be positive because of the expectations that are not captured by Tobin's q.

As above, we employ the GMM-DIFF technique in a dynamic framework, similar to that proposed by Devereux and Schiantarelli (1990) and Bond et al. (2004) to control for endogeneity and individual heterogeneity. The estimated model is as follows:

$$IK_{it} = \delta IK_{it-1} + \gamma_1 CFK_{it-1} + \gamma_2 Q_{it} + \gamma_3 RBP_{it} + \gamma_4 CFK_{it-1} \times RBP_{it} + \eta_i + \eta_t + \nu_{it} \qquad (3)$$

η_i is an unobserved firm-specific time-invariant effect, η_t is a time-specific firm-invariant effect and, finally, v_{it} is a disturbance term which is assumed to be serially uncorrelated with mean equal to zero.

In line with the vast majority of works on this issue, all variables in the investment model are standardized on capital stock, which is measured on a replacement cost basis. For the first observation, replacement cost is assumed equal to the historic cost of total net fixed assets, adjusted for inflation. For the following observations, a standard perpetual inventory method process is adopted as follows: $K_{it} = K_{it-1}(1-\delta) + I_{it}$, where δ is the rate of depreciation, assumed to be 0.08.[6]

A further reason for standardizing on capital stock, rather than total assets, as the proxy for Q, is to attempt to mitigate the potential endogeneity between the leverage and investment models that may occur as a consequence of the leverage *status* variable having been obtained by regressing leverage on *mtbv*.

4.3 Data

The sample used in this analysis is constructed as follows. In the initial stage, a random sample of around 1100 listed non-financial firms was selected from Datastream constituent lists. Ownership data were hand-collected from the Price Waterhouse Corporate Register (December issue) for the period 1991-2001 (Marchica and Mura, 2005). Economic and market data were downloaded from Datastream. However, in order to compute the capital stock on a replacement cost basis, we needed to collect information even before 1991. This is because we employed a standard perpetual inventory method that requires the first available information in each time series of total net fixed assets as a proxy for the starting replacement value of capital stock.

To be able to follow companies over time from two different datasets, a considerable effort went into tracking all the name changes (and also defunct companies) in the period. This information was collected mainly from the London Stock Exchange Yearbook, which reports systematic information on name changes, entries removed from the companies section, companies in liquidation, and companies in receivership and in administration. Moreover, as a further check, the Companies

[6] For this purpose data from Datastream from 1968 were employed.

House website was used. This is an online facility that provides various types of information on companies (including name changes).

To run the empirical analysis, we undertook a number of steps. First, the dataset was cleaned of outliers. The ownership part of the dataset was thoroughly inspected in several directions. For example, we double-checked that the sum of all the shares collected did not sum to more than 100. In cases where they did, we tried to crosscheck the information with other issues of the Hemscott volumes (using either the September edition of the same year or the March edition of the following year), and/or with the London Stock Exchange Yearbook, which also contains some ownership information. When it proved impossible to find coherent information from the different sources of data, this observation was dropped from the sample. After running these tests for the ownership side of the dataset, we also checked for outliers in the "economic" variables, as reported in Datastream. As there is no fixed rule for dealing with outliers, data were trimmed to the 99% percentile, as a general rule of thumb. The trimmed data were then always benchmarked with descriptive statistics reported in other established papers.[7]

When the issue of outliers had been addressed, firms in the broadcasting sector and public utilities were excluded because of the peculiarities in their operational and regulatory conditions. Firms with dual class shares were also excluded, because they violate the "one share one vote" rule. Furthermore, missing firm-year observations for economic variables were dropped. Finally, in line with the indications specified by Arellano and Bond (1991), only firms with at least five consecutive years of observations were kept. This left us with an unbalanced panel of 677 firms and 5660 observations for the leverage model. Descriptive statistics are reported in Table 4.3.

4.4. Empirical Results

4.4.1 Leverage model

We start our analysis by estimating the leverage models, in order to identify the LL firms through the target methodology. As we discussed above, for robustness purposes, we analyze three alternative models, using a set of variables that have been identified in the literature as potential determinants of leverage. Table 4.4 shows the results for each model. The adopted methodology is the GMM-SYS. Results for OLS,

[7] Particular care was placed in benchmarking the variables in the investment model. As Table 3 shows, our figures are in line with Bond et al. (2004) and Benito and Young (2002).

WG and GMM-DIFF, unreported for brevity reasons, show that the estimates of the lagged dependent variable are upward biased, downward biased and close to the fixed effect regression, respectively, for each model.[8] In line with Bond's (2002) and Arellano and Bover's (1995) arguments, the GMM-SYS is the preferred methodology. The estimation period is between 1991 and 2001. We report three test statistics: (1) Sargan test of overidentifying restrictions, which is asymptotically distributed as chi-square under the null of instrument validity; (2) First order autocorrelation of residuals, which is asymptotically distributed as standard normal N(0,1) under the null of no serial correlation; and (3) Second order autocorrelation of residuals, which is distributed as standard normal N(0,1) under the null of no serial correlation. GMM estimation reveals that the coefficient of the lagged cash holding in all the specifications is positive and significantly different from zero. The reported adjustment coefficient λ (i.e., $(1-\delta)$) is about 0.317, which seems to provide evidence that the dynamic nature of our model is not rejected. Moreover, it indicates that companies take, on average, about three years to close the gap with their target. This would corroborate our choice of examining the leverage behaviour of firms in our sample for three consecutive years before analyzing their investment decisions. This result is similar to that reported recently by Flannery and Rangan 2005) for US firms, and is lower than that reported by Ozkan (2001) for the UK, possibly due to the difference in the methodology.[9]

As far as the interpretation of the other coefficients is concerned, most of the results in all models seem in line with the predictions. We detect a positive and significant impact of size. Larger firms are less exposed to asymmetric information and expected bankruptcy problems and, consequently, they seem to have better access to external capital markets. This is in line with the majority of findings in the capital structure literature (Rajan and Zingales, 1995; Frank and Goyal, 2003; Flannery and Rangan, 2005). In the same way, firms with larger collateral may be able to afford to have a larger amount of debt, as reported in Rajan and Zingales (1995), Kremp et al. (1999), Frank and Goyal (2003) and Flannery and Rangan (2005). Furthermore, profitable firms seem to borrow significantly less, consistent with the POT hypothesis, which predicts that firms prefer to use their internal funds first, and then

---

[8] Values for the lagged dependent variable are 0.766 for OLS, 0.470 for WG and 0.521 for GMM-DIFF. All estimations were carried out using STATA 9.

[9] Indeed the results of this paper are similar to what we obtain when we use the GMM-DIFF estimator.

raise external finance to implement their investment. Similar results are shown by Ozkan (2001), for UK companies, and Shyam-Sunder and Myers (1999), Frank and Goyal (2003) and Flannery and Rangan (2005).

As far as the financial variables added to the basic Rajan and Zingales model are concerned, the negative and significant coefficient of cash seems to support the transaction costs motive for holding cash. It could be also explained in the light of the POT hypothesis, interpreting cash as an alternative proxy for internal funds.

On the other hand, the positive and significant relation between maturity and leverage is consistent with the results documented by Johnson (2003): that is, long-term debt is associated with lower liquidity risk, which positively affects leverage.

In addition, dividends and non-debt tax shield show the predicted sign, although they are not significant, while growth opportunities do not seem to play a significant role in determining the level of leverage.

Finally, among the ownership variables, blockholding and board composition seem to be relevant in leverage decisions.

The result for blockholding is consistent with various interpretations. On the one hand, it may be evidence that leverage and outside shareholding are alternative agency control mechanisms. Therefore, a larger percentage of stakeholding in the hands of a non-managerial owner reduces the need for aligning incentives, such as direct equity holding by managers. Alternatively, this result could be interpreted in terms of the strategic alignment hypothesis, where blockholders are aligned with managers' interests and, consequently, prefer less than optimal leverage.[10]

The results reported tend to support the view that firms with outside-dominated boards are likely to experience an increase in the monitoring of executives, and therefore a reduction in the agency costs of external finance.

4.4.2 Investment model

We now turn to the investment model estimations, to verify whether firms, having accumulated reserve borrowing power (RBP), are able to raise external funds to implement some valuable growth opportunities.

Table 4.5 shows the results of the investment model, and analyzes the behaviour of the different set of dummies that describe RBP firms. It reports the

[10] This result appears to be in line with what we showed in Chapter 2.

results that follow the calculation of the RBP dummies, using the "target methodology" with the most complete leverage model (i.e., Specification 3 above). Column A reports the results of the investment model for the entire sample of firms. We observe a positive and significant relationship between investments and Q, which is consistent with the prediction of the investment theory: that growth opportunities play a relevant role in investment decisions. The coefficient for cash flow is positive and significant, which may suggest the presence of capital market imperfections that may result in firms depending, at least partially, on available internal funds to invest. This is in line with the results reported in Devereux and Schiantarelli (1990), Blundell et al. (1992) and Vogt (1994).

The dummy indicating RBP status is always positive and statistically significant, indicating that these companies seem to invest significantly more than the others after an accumulation period of two (Specifications B through E) or three years (Specifications F through I). In fact, every alternative proxy of RBP has a positive and significant impact on capital expenditure.

Furthermore, we find that investment cash flow sensitivity, as represented by the interaction terms, is always negative, possibly confirming what we found above: investments for firms that accumulate reserve borrowing power are less sensitive to the availability of internal funds. This is further corroborated by the fact that, in two cases out of four (Specifications E and G), this interaction term is also statistically significant. To the extent that significant and positive cash flow sensitivity represents the company's financial constraints, this would imply that these firms' ability to invest is not jeopardized by asymmetric and agency costs problems with investors.

To provide a more complete picture of the behaviour of RBP companies, we further investigate the intertemporal characteristics of these firms, immediately before and after the time where their investment decisions are analyzed. To this end, we compute descriptive statistics for the three sub-samples of firms. In more detail, we plot the average values for the most important variables (such as investments, investment spikes, leverage, deviation from target, net debt issued and so on) at t-2...t-1...t...t+1...t+2.

4.4.3 Firm behaviour in time

Figure 4.1 presents the set of graphs describing the firms' choices and actions in time. We start by defining t = 0 as the time when RBP firms are assigned a value of

1. We analyze both their behaviour, in terms of investment and financial decisions, and their characteristics, in terms of growth opportunities, dividend policy and size before and after this defining moment (from t-2 to t+2).

Furthermore, we differentiate the trends of RBP firms from those of two other types of firm. The first, as discussed above, refers to ARBP companies that never change their LL strategy. The second is our "control group", constituted by firms that are never classified as RBP throughout the entire period (NRBP).

The first graph (Graph 1a) shows the trend for capital expenditures. Prior to t, RBP firms appear to invest less then the other two groups. Nonetheless, between t-1 and t, they appear to experience an important and sudden increase in their investments, which seem to decrease slowly again after t. Both ARBP and NRBP, on the contrary, show a steady and a decreasing level of investment, respectively. This may support the hypothesis that RBP firms have used their accumulated borrowing capacity to make more investments.

To corroborate further our argument, Graph 1b analyzes the value of the "non-routine investments", in line with Mayer and Sussman (2004). "Non-routine investments", or "spikes", are those capital expenditures that are larger in value than what appears to be the norm in the firm's life. To identify these spikes, we proceed as follows. First, we identify investments over a period of three years of data. We calculate the average value of investments only in the extreme years, excluding the central one (i.e., $(I_{t-1} + I_{t+1})/2$). This would represent the "norm" investment. Then, we define a spike if the investment value in the central year t is at least twice the average of these two extremes.[11] Once these spikes have been identified, we plot their average value for the three groups of firms. Graph 1b indicates how, between t-1 and t+1, RBP firms experience "non-routine investments" in a larger magnitude than other companies. This further supports the initial idea that RBP firms make "big" capital expenditure after having reinforced their capacity to raise external finance, in order to avoid having to pass up valuable growth opportunities.

The subsequent graphs shed more light on how firms finance these extraordinary investments. Figure 4.1c contains a plot of capital structure patterns. It is evident that, after a limited reduction of leverage between t-2 and t-1, firms suddenly and sharply increase their total borrowing between t-1 and t+2. We can also

---

[11] The same exercise was performed using a period of five rather than three years and delivers similar conclusions.

see, from the next graph, that this sudden increase corresponds to a decline in the gap between actual and predicted leverage. From time t, firms are much closer to their target, as the values for the deviations are closer to zero. In addition, Graph 1e confirms this trend, as RBP firms appear to suddenly and markedly issue new (net) debt between t-1 and t. In t+1 and t+2, their net debt issue decreases slightly, but remains positive and significantly larger than for the other two groups. This further corroborates our initial hypothesis that, after a period of borrowing restraint, RBP firms are more able to exploit the external markets, thanks to their maintained financial slack. Figure 4.1f provides additional interesting insight: it reveals a slight increase also in the net equity issues of RBP companies around t, although, overall, net equity issues are decreasing, as for the other two groups of firms.

Figure 4.1g shows that RBP firms decrease their stock of cash. The decrease in cash holding is more marked (though slight) between t and t+2, which may indicate an increased use of liquid assets to finance new projects.

Interestingly, Figure 4.1h shows an increasing trend of the market-to-book ratio for RBP firms, which may represent the positive expectations of investors in the market. Some caution is necessary, but this evidence may suggest that accumulating borrowing power seems to be value-enhancing behaviour, because it enables firms to implement their projects generally, both in intangible and capital expenditures. This deduction seems particularly sound when we compare the market-to-book ratio trend for RBP companies with the trend of the other two groups of firms that also show lower levels of investments.

However, it must also be underlined that expenditures in R&D grow only until time t (Graph 1i), and there subsequently appears to be a sharp drop in such types of investment.

Finally, Graphs 1l and 1m show how firms appear to keep their dividend payments relatively stable over time, and also maintain relatively constant size.

Overall, the results in this section seem to support the hypothesis that an accumulating borrowing power strategy increases the ability of firms to have better access to the external markets, and to raise the necessary funds to increase their investments, especially capital expenditures.

4.5. Robustness Checks

As we argued earlier in the text, we took several steps to test the soundness of the results, and to investigate whether they are a consequence of the leverage models chosen. The results of all these checks are presented and discussed below.

First, we run all the investment estimations and the intertemporal descriptive analysis as above, using both a) more parsimonious leverage models (Specification 1 and 2 above); and b) a more complete model that also includes taxes, R&D and capital expenditures.

Second, we re-run the complete set of regressions and tests using a longer time series, to investigate whether results are driven by some "shock" specific to the period under analysis that is not controlled for by year dummies.

Moreover, as we discussed in the introduction, to test in full the degree of dependence of our results on the choice of leverage model, we re-run all the analysis using the "percentile" methodology, because it does not entail the estimation of a capital structure equation.

Finally, we discuss the possibility of alternative interpretations of our set of results.

4.5.1 Investment results using different leverage models

Table 4.6 reports the results from all the alternative leverage models outlined above. For brevity, we include only one definition of RBP (*RBP3*) and its relative interaction with cash flow (*interRBP3*). The results of the different definitions of RBP status are similar to those presented here, and are omitted for brevity.

The findings in Table 4.6 seem virtually unaltered, irrespective of the leverage model. Even if we control for the effect of R&D and capital expenditures, as in Graham (2000), and taxes, as in the capital structure study by Lasfer (1995), the trends identified before remain unchanged. The dummy indicating the RBP *status* is always statistically significant and positive, while the interaction with cash flow remains statistically insignificant, corroborating the fact that at time t, RBP firms invest more than the others; and that, at least at this time, they do not appear to be particularly affected by the presence of financial constraints, probably due to their previously accumulated ability to access the external market.

All the alternative leverage specifications reported in Table 4.7 deliver very similar results. In Figure 4.2, therefore, we report the analysis of firm behaviour in

time according to Model 4 in Table 4.6. The added value of showing this particular set of results is that we have allowed for a longer time series in the leverage model (1985-2001). This, in turn, implies a longer time series available to analyze the investment decisions as well. Therefore, in this set of graphs we study the evolution of firm choices between t-6 and t+6.

Some minor differences are apparent from the previous set of figures presented in Figure 4.1. For instance, leverage for RBP firms is never lower than for ARBP ones; and deviation from target of RBPs becomes even larger than for ARBPs at t-2. Despite these variations however, the main picture remains robust and consistent.

It is interesting to note how, in Graph d, RBP firms tend to be very close to their target leverage for the entire period, with the exception of the years corresponding to a large investment (around time t): at this stage, they appear to reduce their leverage, possibly to accumulate reserve borrowing power (Figure 4.2a), and they then increase their total borrowing again. Figure 4.2b also confirms that, following a period of LL *status*, firms are now able to finance more "abnormal" investments ("spikes") than before. Further, Graph 2e provides another interesting insight: it indicates that firms undergo a period of debt repurchase before starting new net debt issues between t-2 and t. These findings seem in line with the argument and the results in Mayer and Sussman's (2004) study, which shows how, in the longer term, financing patterns are more consistent with the trade-off theory. In their work, Mayer and Sussman provide clear evidence of capital structures reverting back to previous levels of leverage after an abnormal investment. Moreover, and consistent with previous results, average market to book ratio appears to increase in time.

One interesting difference with respect to Figure 4.1 is that, according to this specification, RBP firms appear to be more cash rich than NRBP ones (Figure 4.2g). This is probably because cash holding policy is not explicitly accounted for in this "Rajan and Zingales" model, and it is therefore part of the estimated residual (i.e., the predicted deviation from target).

4.5.2 Investment results using the percentile methodology

In an attempt to fully verify the extent to which the above mentioned results may result from any sort of misspecification of the leverage model, we also replicate all the above analysis adopting the "percentile methodology": this does not entail

estimating any leverage model, but, rather, as discussed earlier, consists in assigning LL status by using the distribution of leverage across firms each year. Firms are classified as LL when (in each year) they belong to the bottom three deciles of the leverage distribution. As we stated in our earlier discussion, to assign the RBP status, we require firms to be in the bottom three deciles for at least three consecutive years prior to the investment decision. If firm A is classified as low-leverage for 1991, 1992 and 1993, it is assigned a value of 1 in 1994 to capture its "flexible" status in the previous three years (RBPpct3). For robustness purposes, we also compute a parallel set of results, using another dummy that takes the value of 1 if the company belongs to the bottom three deciles for two rather than three consecutive years (RBPpct2).

As Table 4.2B shows, when we follow this methodology, we obtain a lower number of companies that are classified as RBP (176), while there are 385 NRBP firms. Fifty-two firms are always classified as low-leverage (ARBP). Despite these differences in classification, it appears that firms adopt this strategy only temporarily, since companies are classified as RBP for an average (median) of 3.02 (3) consecutive periods. This figure is larger than that obtained using the target method. As we discussed above, this may be because the former is more stringent in assessing the evolution of firm's leverage in time, which makes it more difficult for firms to change status.

Similarly to what we described above, the results in Table 4.7 confirm what we would expect from the extant literature. We observe a positive and significant relationship between investments and Q across all specifications, which is consistent with the hypothesis that growth opportunities play a relevant role in investment decisions. The cash flow sensitivity parameter is positive and statistically significant, which may indicate the presence of capital market imperfections that affect companies' investment policy.

However, both dummies indicating firms with reserves of borrowing power (*RBP2* and *RBP3*) are significant and positive, indicating an increased ability to invest. The interaction with cash flow is statistically insignificant though still negative, which may confirm that asymmetric and agency costs do not particularly affect firms' ability to invest.

Figure 4.3 describes firm behaviour in time around the (hypothesized) investment decision. As before, t refers to the first year when firms are assigned RBP status. Some differences from previous results can be noted. First, according to this

specification, RBP firms seem always able to invest more than the other companies, whereas, with the targeting method, we reported RBP firms below the others before t, then investing above NRBP and ARBP from t onwards. Also, the increase in net equity issues appears more pronounced with the percentile methodology than with the target methodology. Further, the estimated impact on firm value appears to differ. In this case (Graph 3g), RBP firms appear to persistently outperform the other two groups, whereas in Figure 4.1 Graph g we detect a clear increasing trend in mtbv over the entire period under analysis.

Nonetheless, the results generally confirm previous findings, in that firms experience an increase in investments around t (Graph 3a) and an increase in their investment spikes (Graph 3b). This appears to be linked to a leverage policy that suddenly and sharply increases between t-1 and t+2, mostly as a result of new net debt issues (Graph 3d). Cash holding appears decreasing, especially starting from t-1, as before, and, similarly to what was previously detected, R&D expenses appear to increase around t but then suddenly decrease (Graph3h.). It must be underlined that, unlike what we previously detected, the proxy for market to book value does not increase in time; and, moreover, firms that are classified as RBP in this way appear to always display a higher average than the other two sub-groups.

4.5.3 Alternative interpretation of results

In this section, we discuss some other potential interpretations of our results. In particular, a low-leverage policy may be interpreted as the expression of the difficulty firms have in raising external capital. Alternatively, a low level of leverage may be driven by managerial entrenchment.

4.5.3.1. Financial flexibility or financial constraint?

It could be argued that firms may be characterized by low leverage not as a result of a policy, but rather as a consequence of the difficulty of raising more external debt. In other words, it could be argued that leverage may be viewed as a proxy of accessibility to external capital (John, 1993). Under this perspective, it is possible to interpret low-leverage firms as financially constrained rather than financially flexible, because they are incapable of raising more capital on the external market.

An argument, based on the analysis of the coefficients of cash flow between sub-samples can be produced against this view. We split firms between RBP and

NRBP ones, and analyze whether investment cash flow sensitivities differ between the two groups.

A typical approach in the investment literature consists in identifying firm characteristics that are a priori considered signals of financial constraints. For example, firm size is so used, based on the idea that small firms are more opaque and therefore face more asymmetric information. Dividends were also so used, following Fazzari et al.'s (1988) intuition that low dividend payments can be viewed as an expression of a firm's financial constraints (also see Devereux and Schiantarelli, 1990; Hoshi et al., 1991; amongst many others). Accordingly, to provide more insight on this issue, we split the sample between RBP and NRBP firms. We would expect that, if LL is an expression of financial constraints rather than flexibility, the coefficient for cash flow should be larger in magnitude, positive and statistically significant for RBP firms. In contrast, if RBP is an expression of flexibility, we would expect a lower, and possibly insignificant, coefficient for cash flow, suggesting a lower degree of dependence on the availability of internal funds to invest. Table 4.8 Column A reports results for the whole sample, while Column B shows the estimated coefficients for NRBP firms (i.e., those that are never classified as LL for at least three consecutive years).[12] Finally, Column C reports results for RBP firms. It can be noted that firms that are classified as having reserve borrowing power show an estimated cash flow coefficient that is insignificant and lower than NRBP firms. Following the interpretation of cash flow sensitivities as proxies for financial constraints, the results for RBP firms seem to suggest that those companies are less (or no more) exposed to capital market imperfections than those firms that never show a low-leverage policy for at least three consecutive years. This may imply that a (persistent) low-leverage policy does not necessarily imply that firms systematically experience difficulties in raising funds from the external markets.

Further, some of the findings from the intertemporal analysis discussed above may corroborate this view. For instance, to the extent that dividends or size are meaningful proxies of financial constraints (e.g., Fazzari et al., 1988), we would expect to find that RBP firms belong to the bottom deciles of dividend distribution more systematically than NRBP firms, if leverage is interpreted as a proxy of

---

[12] Results for firms that are always classified as RBP (*ARBP*) are not reported, since no explanatory variable is significant. This may be due to the very low number of observations available in total for this sub-sample of firms.

financial constraints. However, Figures 4.1.j and 1.k show that RBP firms pay, on average, more dividends than NRBP ones. Our own calculations reveal that, of 969 observations belonging to the bottom three deciles of dividends, about 54% of them pertain to NRBP firms while 46% belong to RBP. Similar arguments could be made regarding firm size. These arguments may corroborate the view that RBP firms are not necessarily more exposed to market imperfections than others.

Moreover, some authors have argued that financially constrained firms are expected to have higher incentives to hold large cash reserves (Fazzari et al., 1996; Kim et al., 1998; Hovakimian and Titman, 2003). In other words, firms anticipating future financial constraints in the external capital market may, as a reaction, tend to accumulate substantial cash holdings. This does not appear to be our case either. From Figure 4.1.g we can see that RBP firms do not appear to be cash rich when compared to the other sub-samples. This would be inconsistent with the previous argument, and would make it unlikely that these firms are following a conservative leverage policy because of the difficulty of raising money in the external market.

4.5.3.1. Financial flexibility or managerial entrenchment?

The relationship between leverage and the likelihood of expropriation by managers depends on whether debt constrains or facilitates this expropriation. On the one hand, some authors have proposed theories under which managers prefer to keep debt ratios low, to reduce risk and protect their undiversified human capital (Fama, 1980), or to alleviate the pressure that comes with interest payment commitments (e.g., Jensen, 1986). On the other hand, according to Harris and Raviv (1988) and Stulz (1988), managers may prefer higher leverage in order to inflate their voting power and reduce the possibility of a takeover. Furthermore, according to Leland and Pyle's (1977) signalling hypothesis, managers may choose higher leverage to convince investors of their ability to generate sufficient earnings to repay their debt.

Therefore, it is not necessarily unambiguous to conclude that a low-leverage policy may be driven by the presence of managerial entrenchment issues inside the firm. Nonetheless, to the extent that entrenched managers prefer a suboptimal level of leverage, we would expect an adjustment in those variables that represent conflicts between managers and shareholders that correspond to the dramatic change detected in the amount of debt held by RBP firms. We would expect, therefore, a structural break in executive ownership, blockholding and/or board composition. We may also

expect a sharp variation in the dividend payout, as an alternative control mechanism to leverage.

In Figure 4.4, we plot trends in executive ownership, blockholding and ratio of non-executives on total board, for RBP, NRBP and ARBP firms (4.4a, 4.4b and 4.4c). No significant "break" is documented in these variables. Figures 4.1.j, 4.2.j and 4.3.i show how dividends also remain relatively constant in time. In other words, no significant change is detected in any of these variables.

Further, a sound and consistent result from the ownership and performance literature is that we would expect a significantly lower firm valuation in the presence of managerial entrenchment (i.e., during low-leverage periods). An examination of the average market to book ratios for RBP firms in Figures 4.1.g, 4.2.g and 4.3.g, however, provides no evidence of sharp increase in market to book when there is a change in the leverage policy. On the contrary, depending on the specification, a steadily increasing average firm value (Figures 4.1.g and 4.2.g) or, a relatively stable but larger than other groups average firm value (Figure 4.3.g), is detected for these companies.

Overall, this evidence does not appear to be consistent with the view that low-leverage may be driven by managerial entrenchment issues.

4.6. Conclusions

The focus of this work was to systematically investigate the interactions between a specific capital structure characteristic, that is, low-leverage policy, and the capital expenditures of firms. Our argument, based on the ideas of Modigliani and Miller (1963) and Myers (1984), maintains that those firms that anticipate financial constraints in the future respond to these potential constraints by accumulating reserve borrowing power. In fact, through a policy of low leverage for a certain number of years (t-n … t-1), companies may accumulate financial flexibility that allows them to have access to the external market at time t (RBP firms), and to be able to raise funds to invest more than their internal funds would allow them to do.

To investigate whether this hypothesis is supported by the actual behaviour of a large sample of UK non-financial listed firms between 1991 and 2001, we conducted two types of analyses. First, we estimated an investment model augmented by those variables that represent the leverage policy *status*, that is, RBP dummies and their interaction with the cash flow sensitivity. Second, we described the

intertemporal behaviour of RBP firms, in terms of their investment and financial decisions, and their characteristics, in terms of growth opportunities, dividend policy and size before and after the analyzed investment decision.

Our findings contrast with Graham (2000), in that low-leverage (LL) policy appears to be transitory. On average, firms maintain this status for an average of 2.6 consecutive years. Further, RBP firms are able, after a period of LL, to invest significantly more in capital expenditures.

Our intertemporal analysis tends to corroborate our predictions, revealing that, after a period of two/three years of being LL, RBP firms sharply increase their amount of capital expenditures with respect to the previous years, and they are able to invest "better". Indeed, we identify an increase in investment "spikes" after firms acquire RBP status, and an increase in average market to book ratio. In addition, we provide evidence that, after being LL, firms close the deviation from their target leverage via new net debt issues.

Thanks to a robustness check over a longer time series, we are able to show that, in fact, these firms have a long-term financing pattern that is more consistent with the trade-off theory. In other words, it seems that their capital structures revert back, after an abnormal investment, to those levels of leverage that preceded the accumulation period of borrowing power.

Furthermore, they appear to experience a reduction in internal funds (cash), and seem to be able to steadily increase their average value through this policy.

Finally, we provide several robustness checks of alternative leverage model specifications, and also different methodologies to define LL. The results are similar in all cases, and support the soundness of our initial predictions.

Table 4.1. Variables definitions.

Panel A. Economic variables	
Lev	Ratio of total debt to total assets
Mtbv	Ratio of book value of total assets minus book value of equity plus market value of equity to book value of assets
Size	Natural logarithm of total assets
Collateral	Ratio of fixed assets to total assets
Profitability	Ratio of the earnings before interest, tax and depreciation (EBITD) to total assets
Cash	Ratio of total cash and equivalents to total assets
Maturity	Ratio of loans repayable after one year to total debt
Div	Ratio of total payment dividend to total assets
Ndts	Ratio of annual depreciation expense to total assets
Spike Value	It is defined over a pattern of three years of investment data. The average value of investments is calculated in the extreme years. The spike exists in this pattern only if the investment value in the central year is at least twice the average of the extremes.
Debt Issue	Ratio of net debt issued in each year to total assets
Equity Issue	Ratio of net equity issued in each year to total assets
R&D	Research and Development expenditures on total assets
Capital Expenditures	Capital Expenditures on total assets
Tax	Total tax charge divided by pre-tax profits
I	Due to changes in company accounts definitions in 1991, until 1991 it is equal to the total new fixed assets; from 1991 it is equal to the sum of payments for fixed assets and the net of fixed assets of subsidiaries.
K	Capital stock is measured on a replacement cost basis. For the first observation, the replacement cost is assumed equal to the historic cost of total net fixed assets, adjusted for inflation. For the following observations, a standard perpetual inventory method process is adopted as follows: $K_{it} = K_{it-1}(1-\delta) + I_{it}$, where δ is the rate of depreciation assumed to be 0.08.
CF	Cash flow equal to the operating profits before tax, interest and preference dividends plus depreciation of fixed assets
IK	Investment to capital stock
CFK	Cash flow to capital stock
Q	Book value of total assets minus the book value of equity plus the market value of equity to capital stock
RBP2	Dummy equal to 1 if a company is identified as low-leverage for the two consecutive years before the analyzed investment decision, and 0 otherwise
interRBP2	Interaction term between RBP2 and CFK
RBPpct2	Dummy equal to 1 if a company has a negative deviation from its target larger than at least 25% of all undershooting firms for the two consecutive years before the analyzed investment decisions, and 0 otherwise
interRBPpct2	Interaction term between RBPpct2 and CFK
RBP3	Dummy equal to 1 if a company is identified as low-leverage for the three consecutive years before the analyzed investment decision, and 0 otherwise
interRBP3	Interaction term between RBP3 and CFK
RBPpct3	Dummy equal to 1 if a company has a negative deviation from its target larger than at least 25% of all undershooting firms for the three consecutive years before the analyzed investment decisions, and 0 otherwise
interRBPpct3	Interaction term between RBPpct3 and CFK
Panel B. Ownership variables	
Man	Sum of ordinary shareholdings by all directors (%)
Blockholding	Sum of all external shareholdings above 3%
Ratio	The proportion of non-executive directors on total board

Table 4.2. Classification of firms. Panel A.

Firm id	year	deviation	LL-status	RBP
AAA	1991	N/A	N/A	N/A
AAA	1992	<	1	N/A
AAA	1993	<	1	N/A
AAA	1994	<	1	N/A
AAA	1995	>	0	1
AAA	1996	>	0	0
AAA	1997	<	1	0
AAA	1998	<	1	0
AAA	1999	<	1	0
AAA	2000	<	1	1
AAA	2001	<	1	1

This table provides a brief example, showing how the RBP dummy was generated. Deviation represents the difference between the predicted target leverage and the actual value. LL stands for low-leverage.

Table 4.2. Classification of firms. Panel B.

	NRBP	RBP	ARBP	TOTAL
Target method	277	270	66	613
Percentile method	385	176	52	613

This table reports the classification of firms between never having been classified as having *reserve borrowing power* (NRBP), having been classified as having attained *reserve borrowing power* (RBP) and those which are always classified as *reserve borrowing power* (ARBP).

Table 4.3. Descriptive statistics.

	Mean	St.dev.	25th perc	Median	75th perc
Lev	0.17	0.13	0.07	0.16	0.25
Mtbv	1.50	0.80	0.99	1.29	1.75
Size	11.27	1.80	9.98	11.05	12.40
Collateral	0.34	0.21	0.19	0.31	0.46
Profitability	0.13	0.10	0.09	0.13	0.18
Cash	0.10	0.12	0.02	0.06	0.14
Maturity	0.47	0.34	0.11	0.50	0.76
Dividends	0.03	0.02	0.01	0.02	0.04
Ndts	0.04	0.03	0.02	0.04	0.05
Man	10.05	15.79	0.18	2.12	13.28
Blockholding	31.63	18.75	16.77	30.20	45.17
Ratio	0.41	0.16	0.33	0.42	0.50
IK	0.12	0.14	0.06	0.11	0.18
CFK	0.32	0.22	0.19	0.29	0.42
Q	2.78	2.64	1.18	1.89	3.39

This table reports the descriptive statistics of the main variables included in both leverage and investment models. LEV is defined as the ratio of total debt to total assets; *Mtbv* is equal to the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of total assets; *Size* represents the natural logarithm of total assets in 1991 prices; *Collateral* is defined as the ratio of Fixed Assets to total assets; *Profitability* is the ratio of the earnings before interest, tax and depreciation (EBITD) to total assets; *Man* is equal to the sum of ordinary shareholdings held by executive directors (%); *Blockholding* is the sum of the external (non-managerial) shareholdings above 3%; *Ratio* is equal to the proportion of non-executives to total number of directors; *Cash* is defined as the ratio of total cash and equivalents to total assets; *Maturity* represents the ratio of loans repayable after one year to total debt; *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax to total assets; *Ndts* (Non-Debt Tax Shield) is defined as the ratio of annual depreciation expense to total assets. *IK* is defined as the ratio of investment to capital stock; *CFK* is equal to the ratio of cash flow to capital stock; *Q* represents the ratio of market value of assets to capital stock.

Table 4.4. Leverage models.

	Spec.1	Spec.2	Spec.3
lev_{t-1}	0.700***	0.717***	0.682***
	[0.000]	[0.000]	[0.000]
mtbv	0.012	0.013	0.002
	[0.119]	[0.229]	[0.305]
size	0.017***	0.016***	0.012***
	[0.000]	[0.000]	[0.000]
collateral	0.071**	0.093***	0.058**
	[0.036]	[0.002]	[0.033]
profitability	-0.114*	-0.099*	-0.131***
	[0.073]	[0.097]	[0.003]
man		0.001*	0.00
		[0.097]	[0.218]
blockholding		-.000062	-0.003**
		[0.236]	[0.043]
ratio		0.053	0.039*
		[0.130]	[0.082]
cash			-0.073**
			[0.045]
maturity			0.045***
			[0.000]
dividends			-0.16
			[0.527]
ndts			-0.25
			[0.140]
Observations	5660	5660	5660
Number of firms	677	677	677
Implied adj. Factor	0.300	0.283	0.317
Sargan test	334.27	382.58	478.98
	[0.354]	[0.205]	[0.221]
m1 test	-12.79***	-12.78***	-12.46***
	[0.000]	[0.000]	[0.000]
m2 test	-0.68	-0.65	-0.72
	[0.495]	[0.515]	[0.471]

This table presents GMM-SYS regressions predicting leverage choices. The estimation period is 1991-2001. In GMM estimations all the regressors are dated at time [t], except for the lagged dependent variable at [t-1]. The models are a linear system of the first differenced and levels equations. The instruments are the levels dated [t-2...t-5] of all regressors for the first differenced equations and the first differences dated [t-2] for the level equations. In GMM model time dummies are included. Asymptotic standard errors robust to heteroskedasticity are used in all the estimations. P-values are reported in parentheses. Sargan test is a test of overidentifying restrictions, distributed as chi-square under the null of instrument validity; m1 and m2 are test statistics for first and second order autocorrelations in residuals, respectively, distributed as standard normal N(0,1) under the null of no serial correlation; the adjustment factor is calculated from the estimated coefficient of the lagged dependent variable. *Lev* is defined as the ratio of total debt to total assets; *mtbv* is equal to the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of total assets; *size* represents the natural logarithm of total assets in 1991 prices; *collateral* is defined as the ratio of Fixed Assets to total assets; *profitability* is the ratio of the earnings before interest, tax and depreciation (EBITD) to total assets; *man*

is equal to the sum of ordinary shareholdings held by executive directors (%); *blockholding* is the sum of the external (non-managerial) shareholdings above 3%; *ratio* is equal to the proportion of non-executives to total number of directors; *cash* is defined as the ratio of total cash and equivalents to total assets; *maturity* represents the ratio of loans repayable after one year to total debt; *dividends* is the ratio of ordinary dividends net of Advance Corporation Tax to total assets; *ndts* (Non-Debt Tax Shield) is defined as the ratio of annual depreciation expense to total assets.
* significant at 10%; ** significant at 5%; *** significant at 1%.

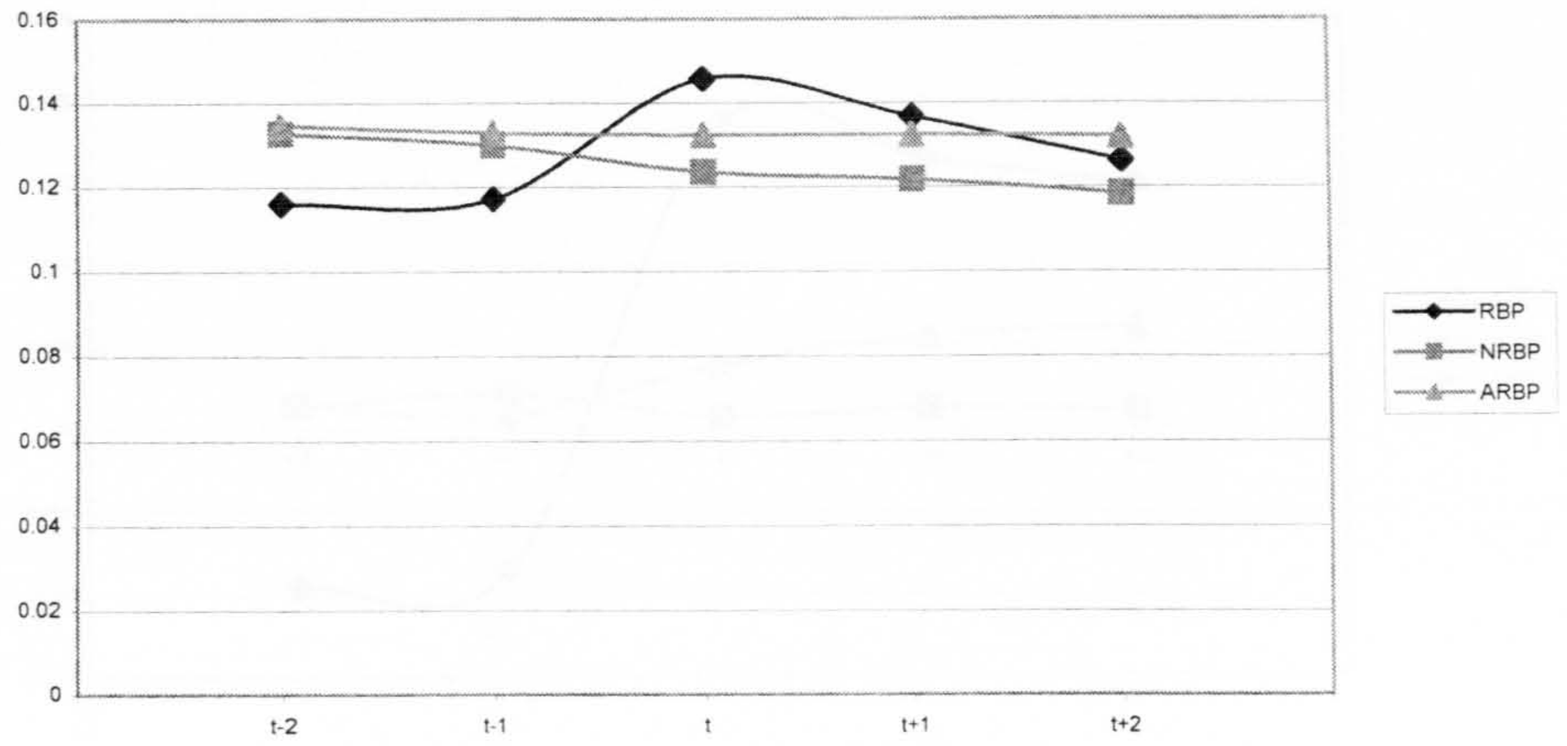
Table 4.5. Investment models.

	A	B	C	D	E	F	G	H	I
IK_{t-1}	0.108***	0.100***	0.097***	0.098***	0.103***	0.094***	0.099***	0.101***	0.111***
	[0.001]	[0.002]	[0.008]	[0.002]	[0.002]	[0.003]	[0.002]	[0.002]	[0.000]
lCFK	0.150*	0.121	0.167**	0.144*	0.162**	0.123	0.204**	0.134*	0.150**
	[0.057]	[0.138]	[0.044]	[0.084]	[0.044]	[0.124]	[0.018]	[0.097]	[0.046]
Q	0.021***	0.021***	0.020***	0.019***	0.021***	0.021***	0.023***	0.020***	0.021***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
RBP2		0.064***	0.113***						
		[0.000]	[0.009]						
interRBP2			-0.158						
			[0.159]						
RBPpct2				0.062***	0.137***				
				[0.000]	[0.010]				
interRBPpct2					-0.221*				
					[0.092]				
RBP3						0.082***	0.202***		
						[0.000]	[0.001]		
interRBP3							-0.375***		
							[0.009]		
RBPpct3								0.036*	0.104
								[0.065]	[0.125]
interRBPpct3									-0.206
									[0.207]
Observations	4006	4006	4006	4006	4006	4006	4006	4006	4006
Number of firms	613	613	613	613	613	613	613	613	613
Sargan test	58.55	62.90	95.78	63.23	83.81	62.71	92.31	59.20	70.14
	[0.529]	[0.374]	[0.210]	[0.363]	[0.393]	[0.380]	[0.304]	[0.505]	[0.777]
m1 test	-7.84	-7.60	-7.13	-7.79	-7.60	-7.65	-7.48	-7.80	-8.07
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
m2 test	-1.00	-0.81	-0.86	-1.10	-1.13	-1.12	-0.99	-1.03	-0.94
	[0.318]	[0.419]	[0.389]	[0.271]	[0.260]	[0.261]	[0.322]	[0.303]	[0.349]

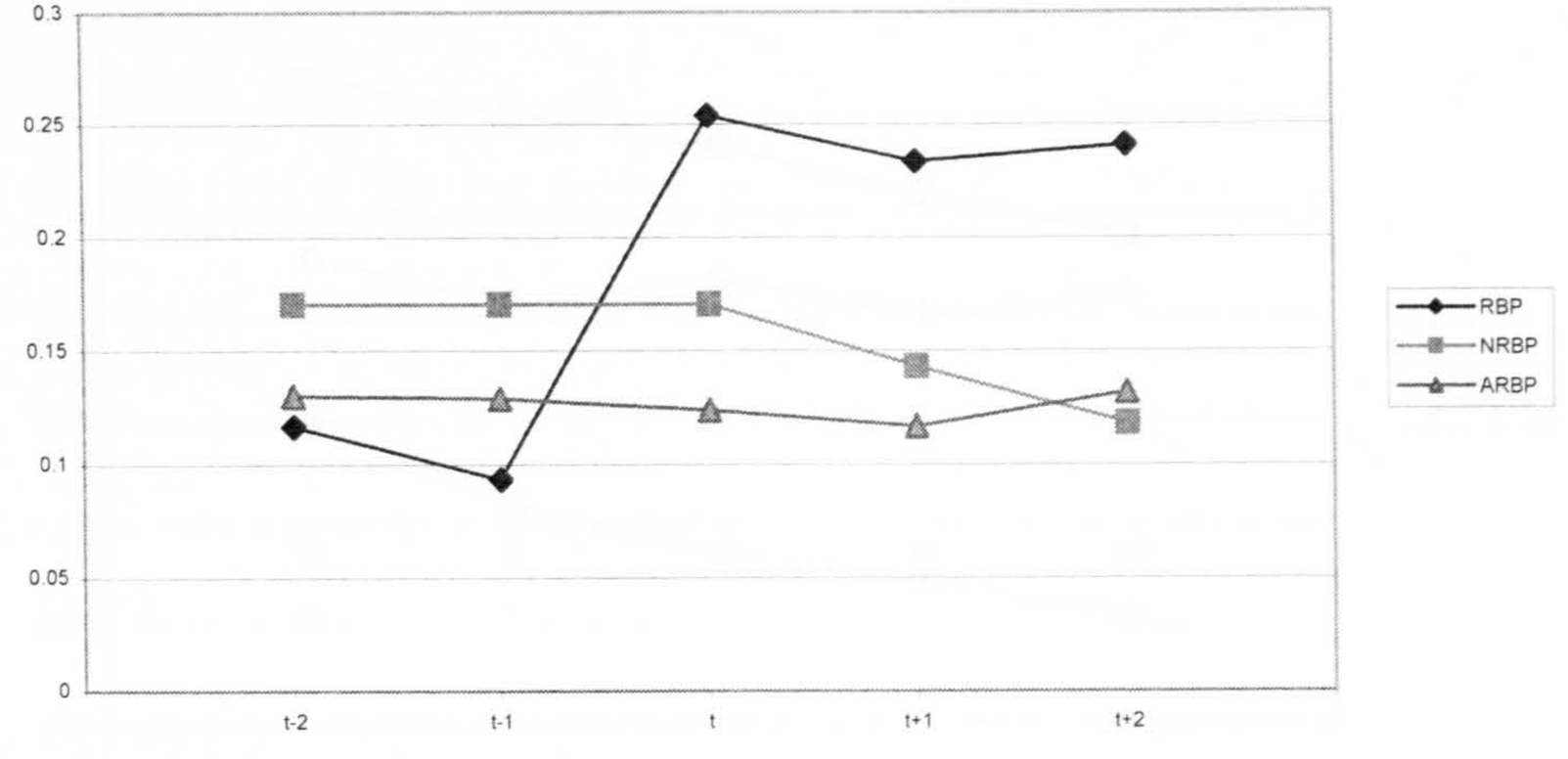
This table shows the GMM results for the investment model with the leverage *status* dummies computed from the estimation of the "complete" leverage model (that is, R&Z augmented by the ownership and other financial characteristics). The estimation period for GMM is 1994-2001, depending on the availability of leverage *status* dummies. GMM is the model in the first differences with levels dated [t-2, t-5] of all regressors as instruments. In GMM model time dummies are included. Asymptotic standard errors robust to heteroskedasticity are used in all the estimations. P-values are reported in parentheses. Sargan test is a test of overidentifying restrictions, distributed as chi-square under the null of instrument validity; m1 and m2 are test statistics for first and second order autocorrelations in residuals, respectively, distributed as standard normal N(0,1) under the null of no serial correlation. *IK* is defined as the ratio of investment to capital stock; *CFK* is equal to the ratio of cash flow to capital stock; *Q* represents the ratio of market value of assets to capital stock; *RBP2* is a dummy equal to 1 if a company is identified as low-leverage for the two consecutive years before the analyzed investment decision and 0 otherwise; *RBP3* is a dummy equal to 1 if a company is identified as low-leverage for the three consecutive years before the analyzed investment decision and 0 otherwise; *RBPpct2* is a dummy equal to 1 if a company has a negative deviation from its target larger than at least 25% of all undershooting firms for the two consecutive years before the analyzed investment decisions and 0 otherwise; *RBPpct3* is a dummy equal to 1 if a company has a negative deviation from its target larger than at least 25% of all undershooting firms for the three consecutive years before the analyzed investment decisions and 0 otherwise; *interRBP2* is the interaction term between *RBP2* and *CFK*; *interRBP3* is the interaction term between *RBP3* and *CFK*; *interRBPpct2* is the interaction term between *RBPpct2* and *CFK*; *interRBPpct3* is the interaction term between *RBPpct3* and *CFK*. * significant at 10%; ** significant at 5%; *** significant at 1%.

Figure 4.1. Firm behaviour in time.

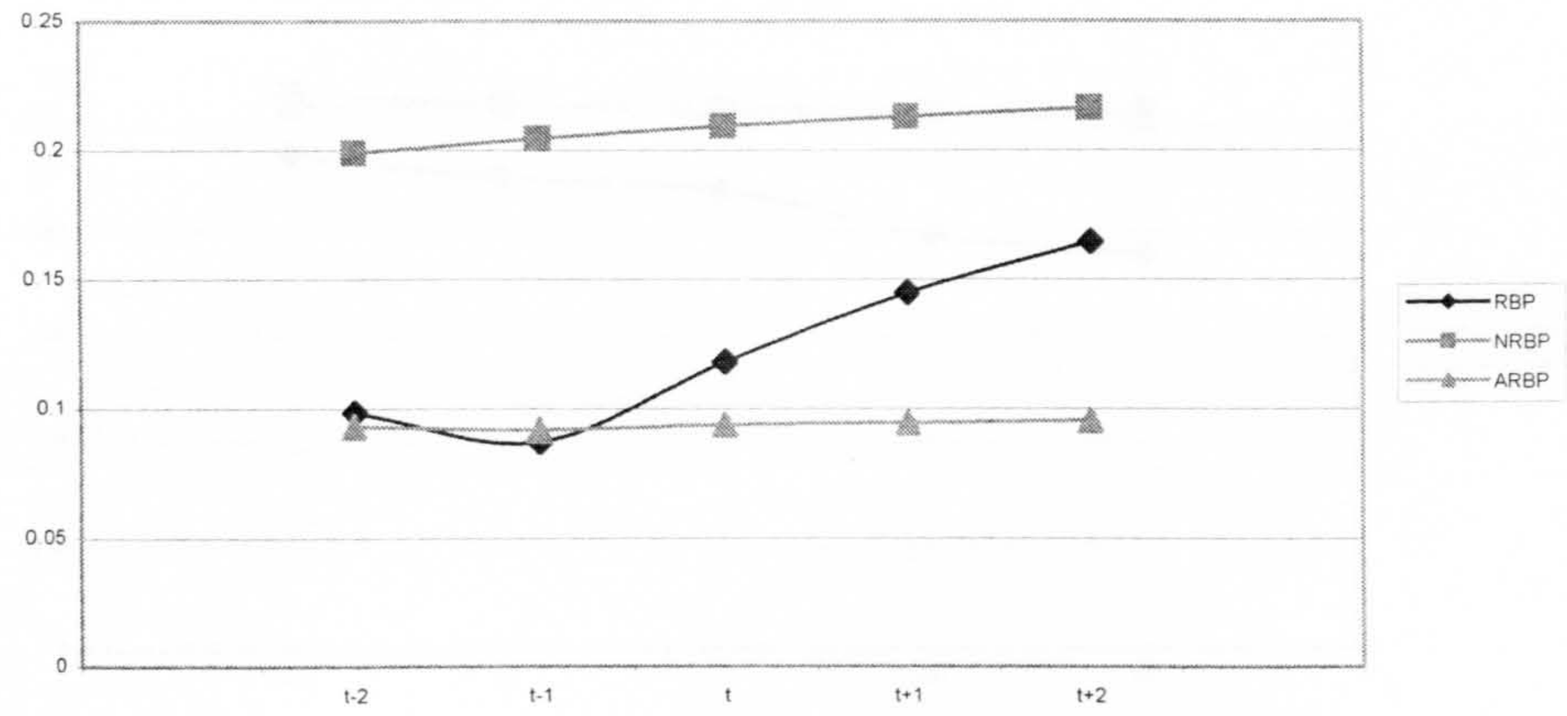
a. *IK*



b. *Spike Value*



c. *Leverage*



d. *Deviation*

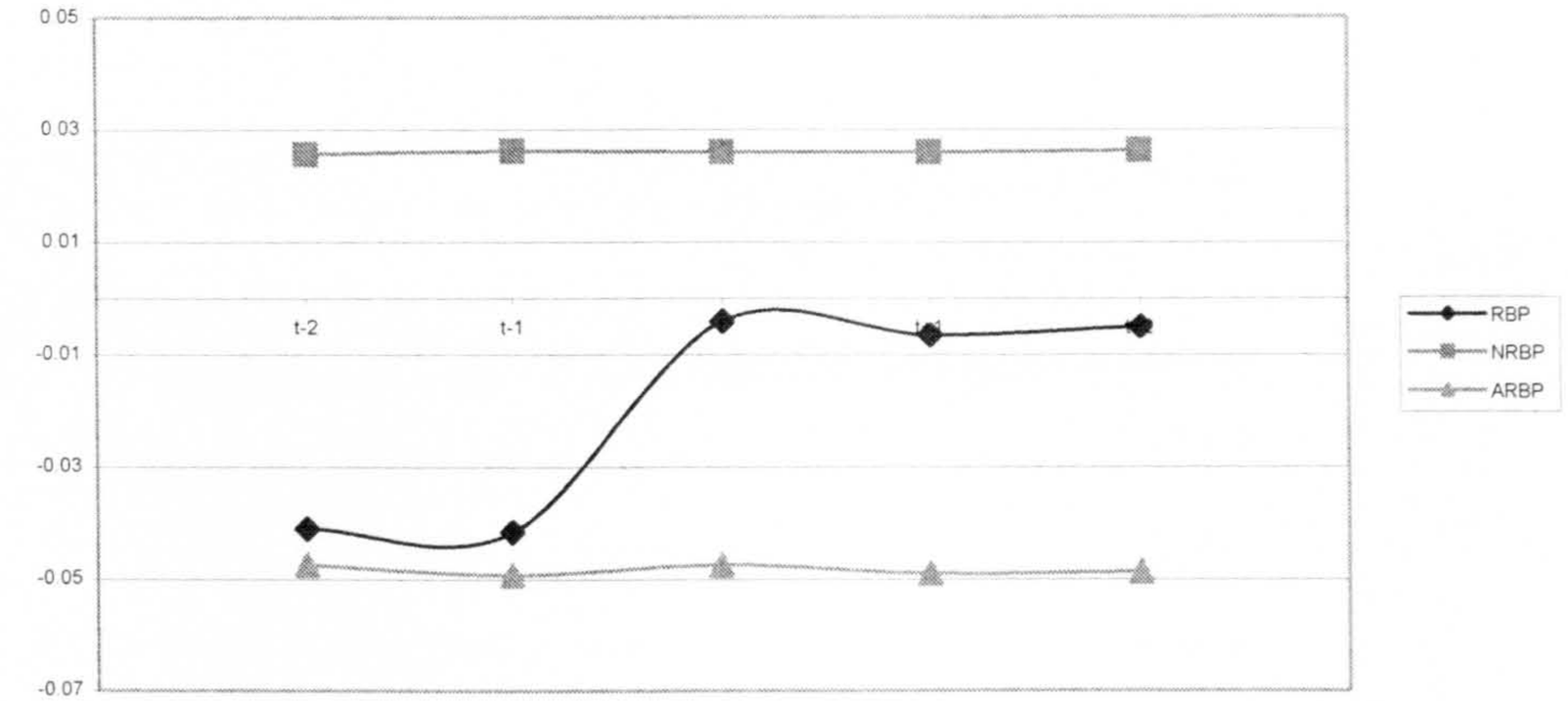
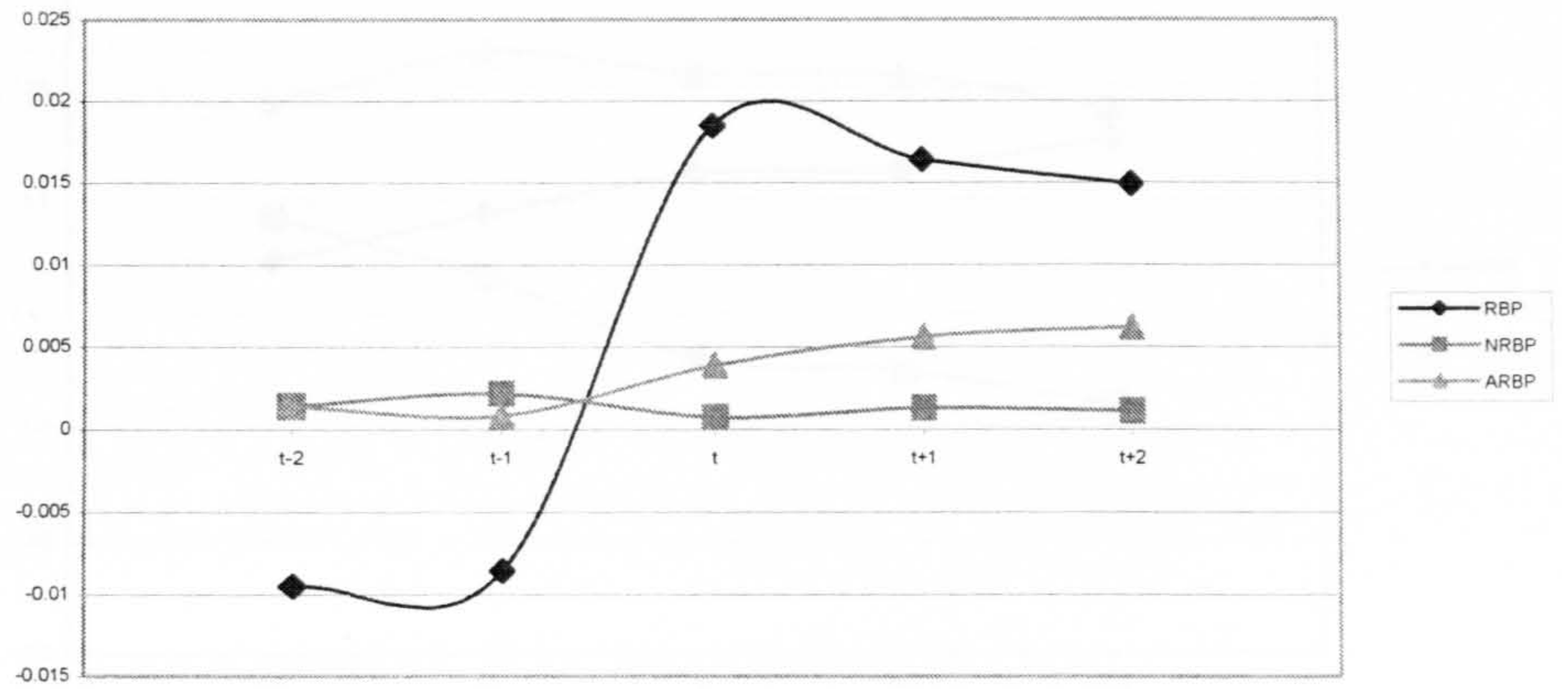
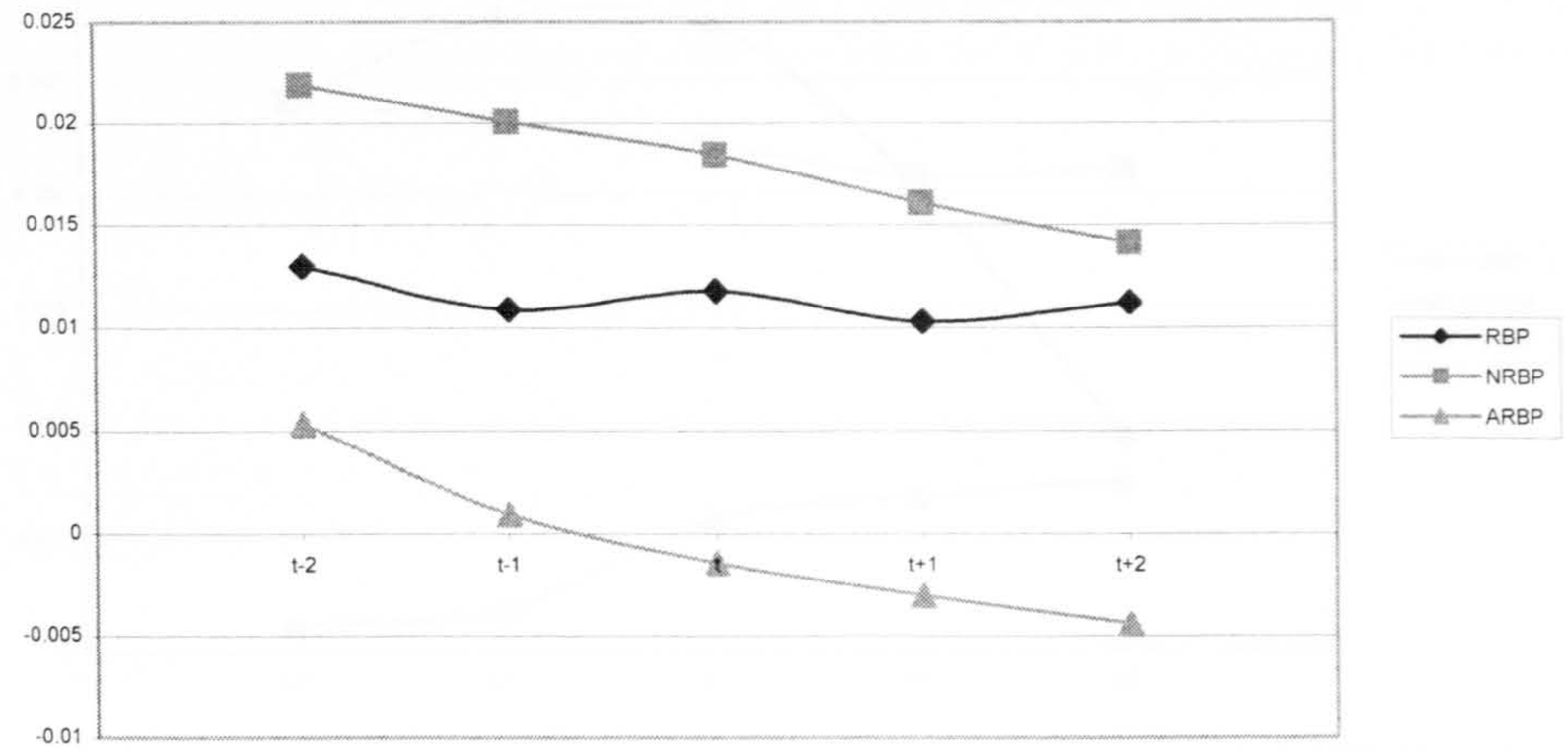


Figure 4.1. Firm behaviour in time (continued).

e. *Net Debt Issued*



f. *Net Equity Issued*



g. *Cash*

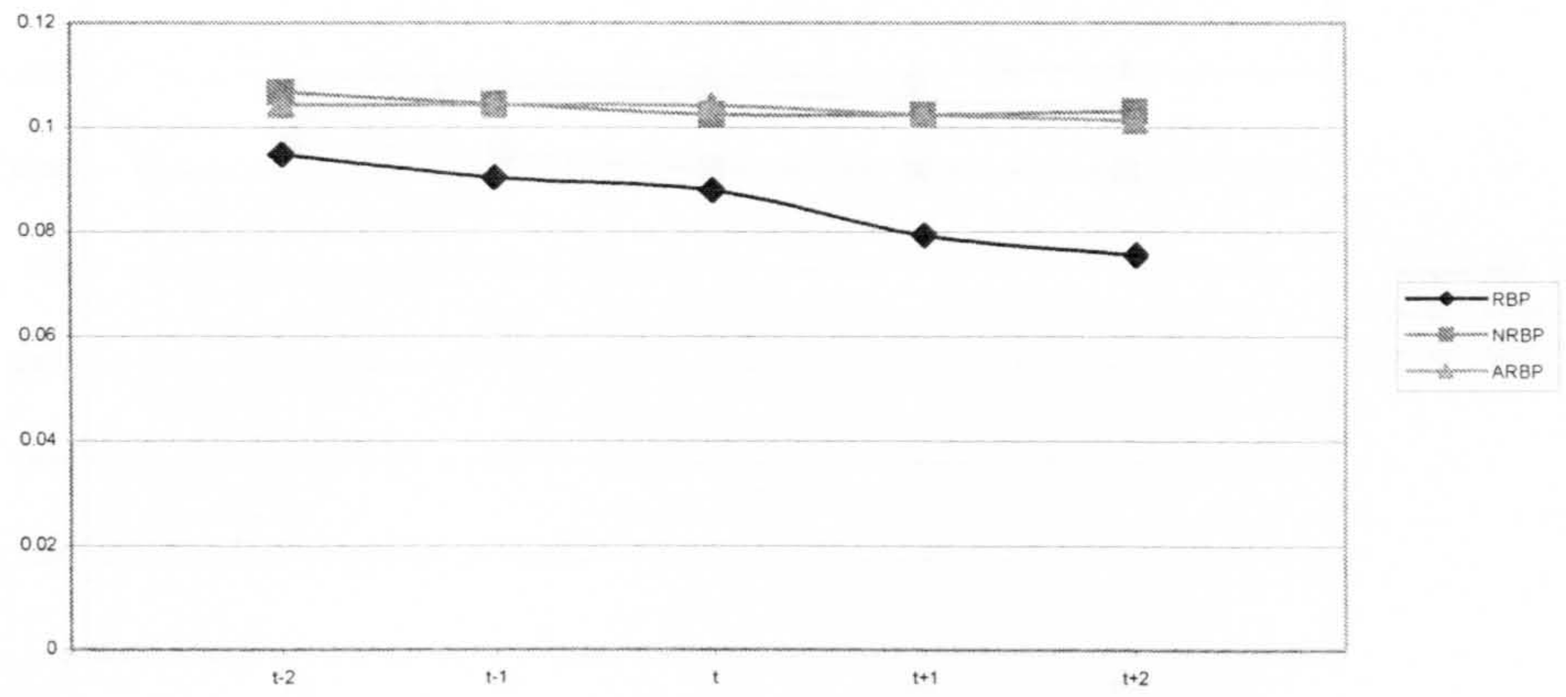
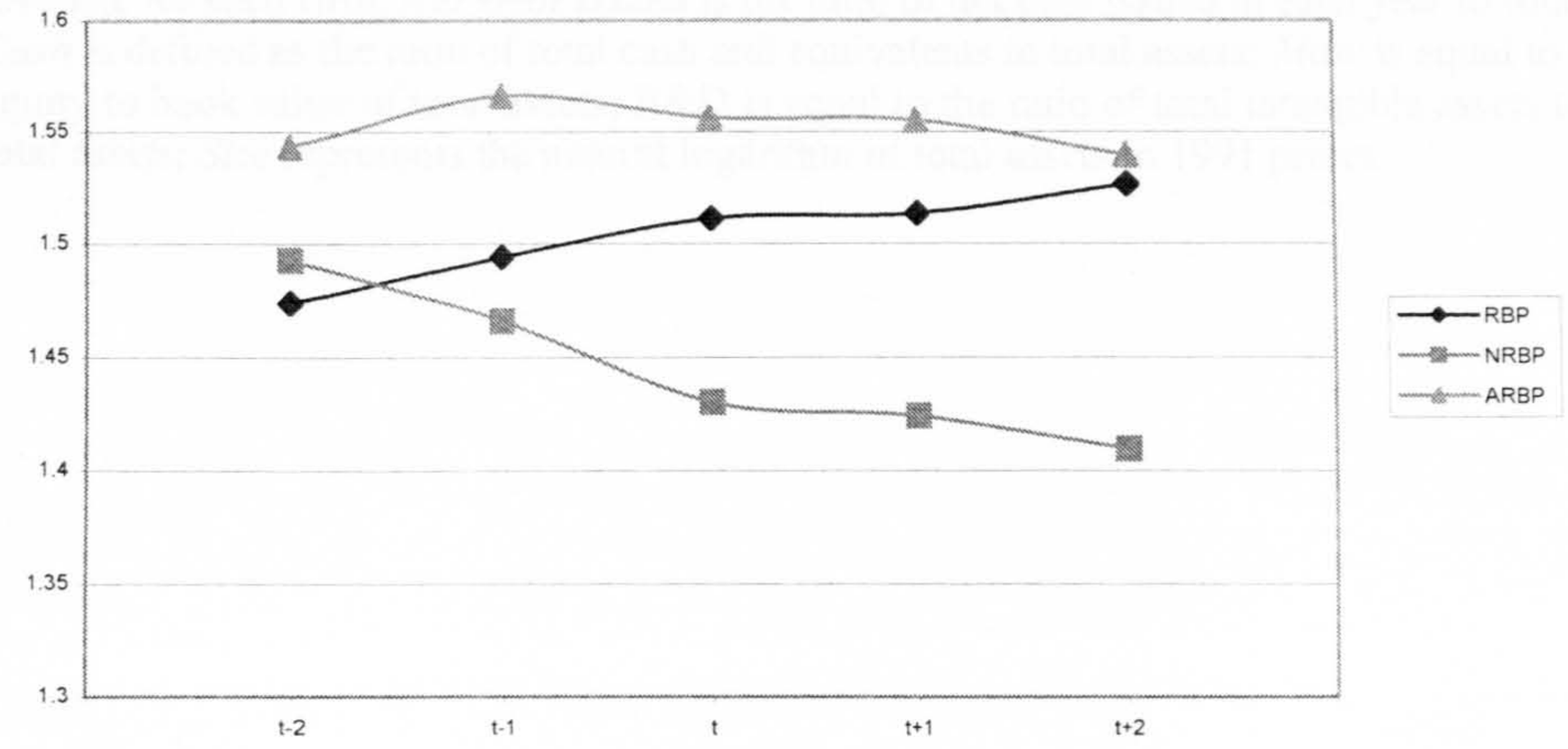
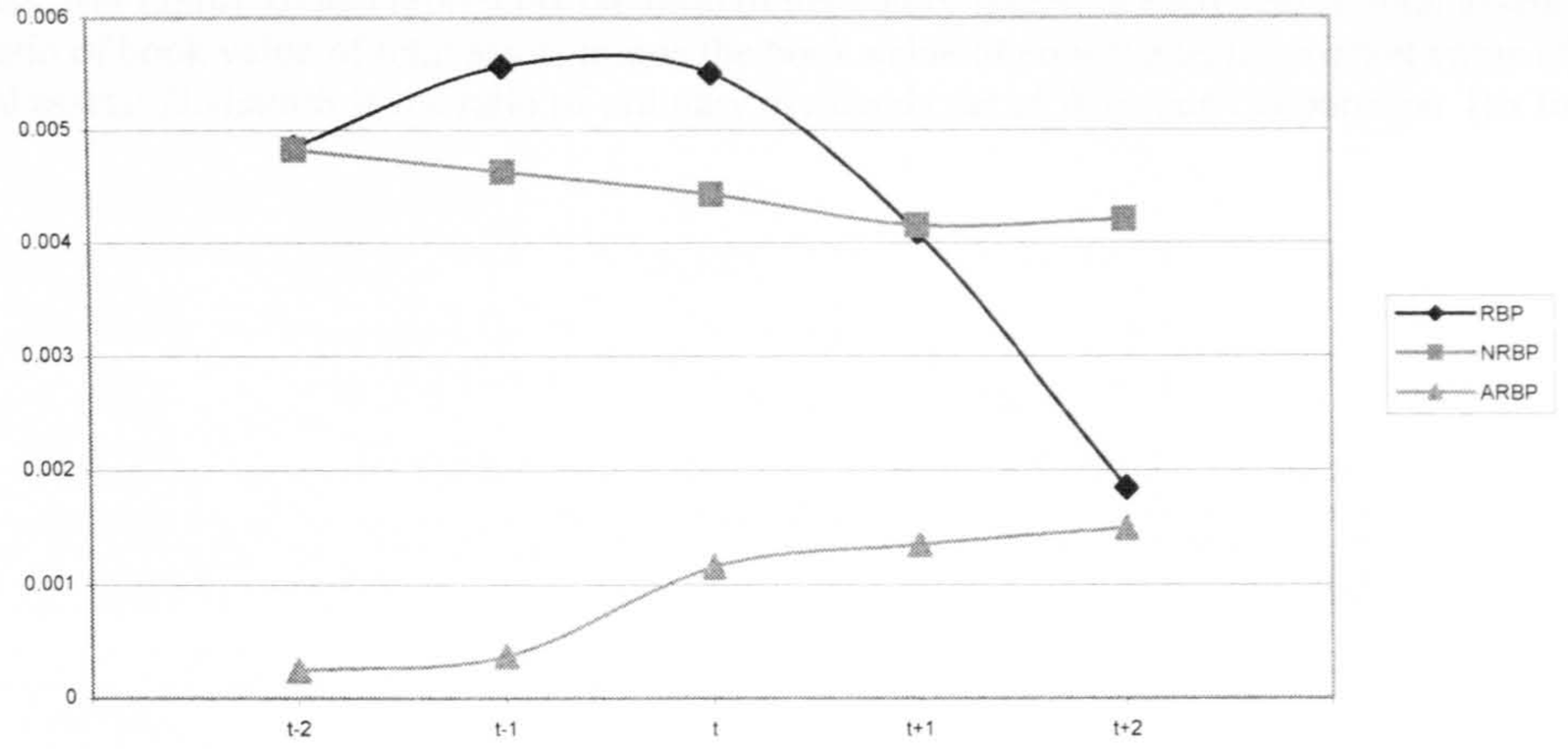


Figure 4.1. Firm behaviour in time (continued).

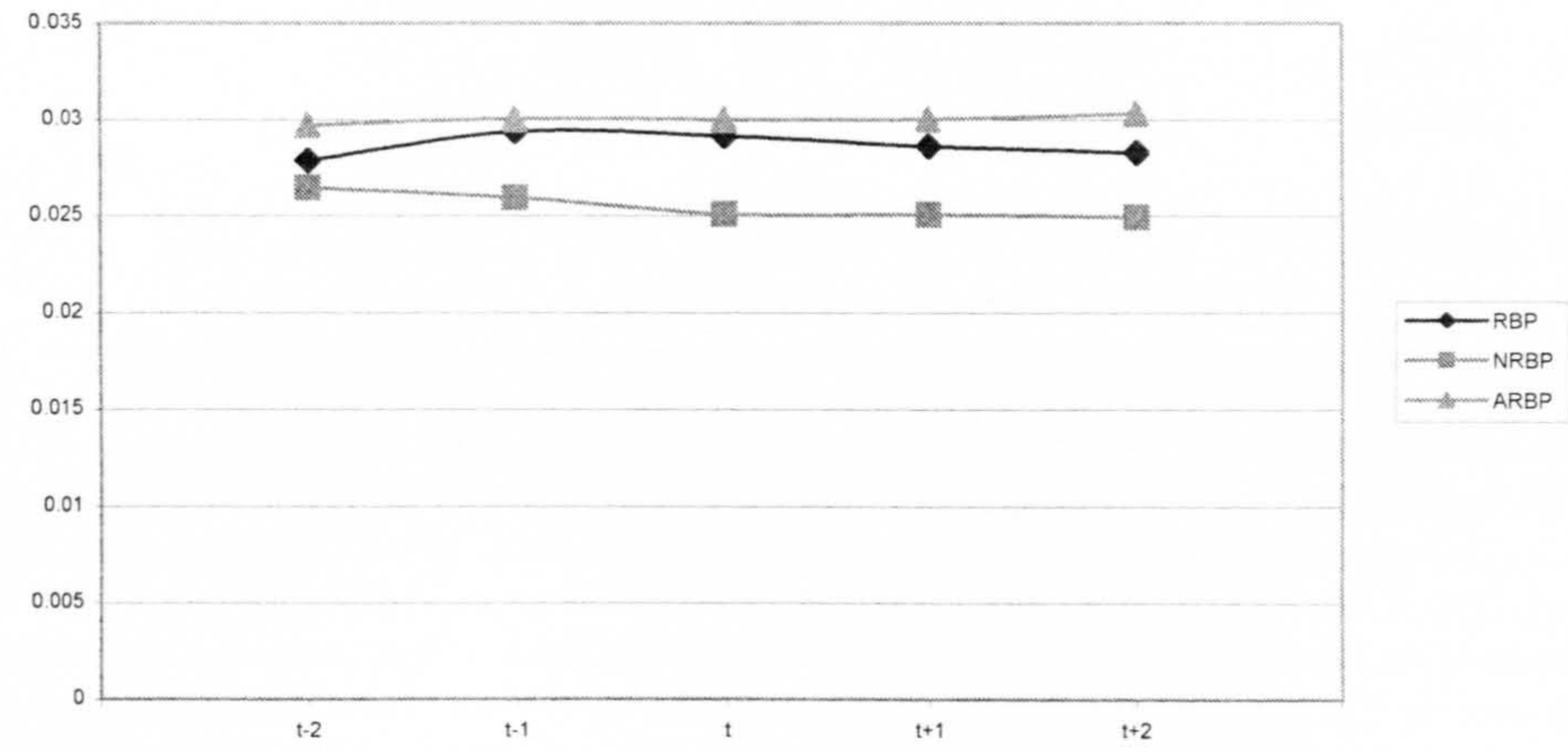
h. *Mtbv*



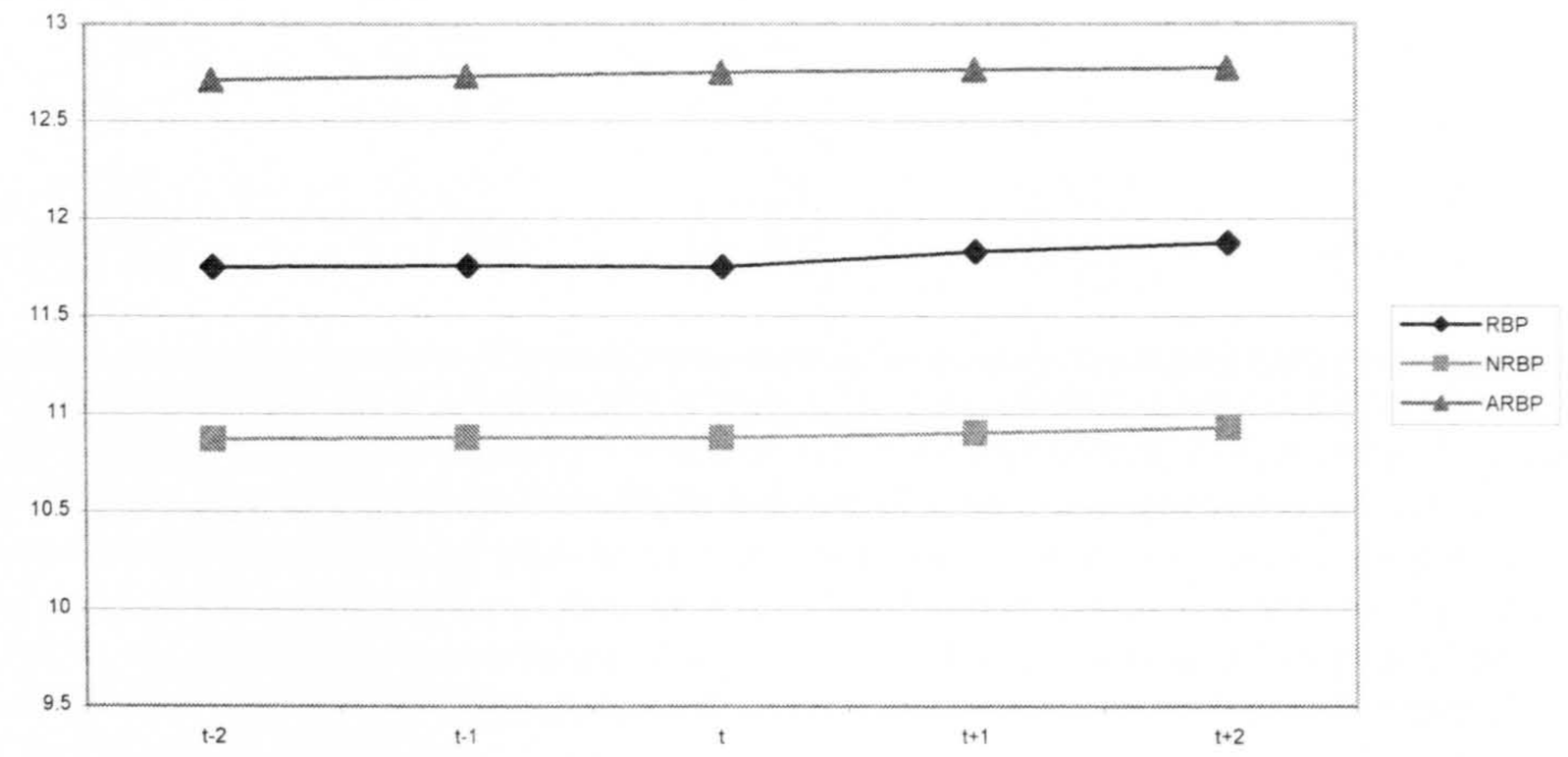
i. *R&D*



j. *Dividends*



k. *Size*



These figures are constructed with the leverage *status* dummies derived from the complete leverage model (specification 3). Firms are divided in three categories here: RBP are firms that at some point in time are identified with RBP=1 and they are separated from those firms that are always "low-leverage" for the entire period which are clarified as ARBP. NRBP are those that are never identified as RBP. At time t the capital expenditures of RBP firms are examined after a period of low-leverage policy. The analysis of the trends for each firm

characteristic is conducted before and after this defining moment (from t-2 to t+2). *IK* is defined as the ratio of investment to capital stock; *Spike Value* is defined over a pattern of 3 years of investment data. The average value of investments is calculated in the extreme years. Thus, there is a spike in this pattern only if the investment value in the central year is at least twice the average of the extremes; *Leverage* is defined as the ratio of total debt to total assets; *Deviation* represents the difference between the actual and predicted level of leverage for each firm; *Net Debt Issued* is the ratio of net debt issued in each year to total assets; *Net Equity Issued* represents the ratio of net equity issued in each year to total assets; *Cash* is defined as the ratio of total cash and equivalents to total assets; *Mtbv* is equal to the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of total assets; R&D is equal to the ratio of total intangible assets to total assets; *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax to total assets; *Size* represents the natural logarithm of total assets in 1991 prices.

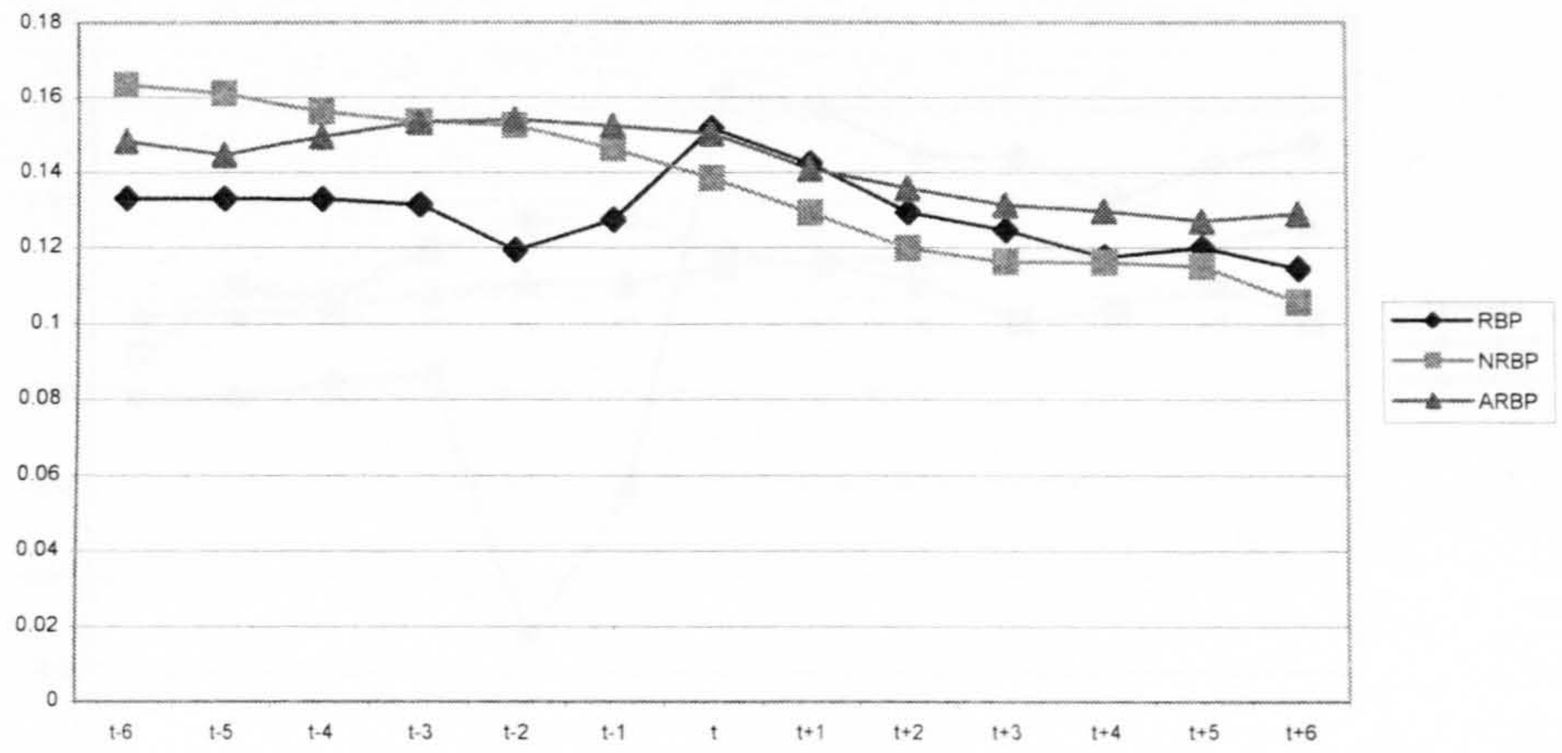
Table 4.6. Investment models derived from alternative leverage models.

	1	1	2	2	3	3	4	4
IK_{t-1}	0.112***	0.097***	0.109***	0.100***	0.107***	0.095***	0.095***	0.095***
	[0.001]	[0.004]	[0.002]	[0.006]	[0.002]	[0.005]	[0.000]	[0.000]
lCFK	0.059*	0.060*	0.063**	0.062*	0.058*	0.059**	0.058***	0.045**
	[0.058]	[0.055]	[0.044]	[0.065]	[0.068]	[0.041]	[0.003]	[0.024]
Q	0.012***	0.012***	0.012***	0.012***	0.013***	0.011***	0.013***	0.013***
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
RBP3	0.074***	0.064***	0.085***	0.056	0.071***	0.032	0.069***	0.058***
	[0.000]	[0.006]	[0.000]	[0.180]	[0.000]	[0.312]	[0.000]	[0.000]
interRBP3		0.006		0.043		0.069		0.005
		[0.865]		[0.692]		[0.289]		[0.782]
Observations	4006	4006	4006	4006	4006	4006	8128	8128
Number of firms	613	613	613	613	613	613	873	873
Sargan test	62.74	80.29	60.25	83.98	63.65	82.84	250.07	320.61
	[0.380]	[0.470]	[0.467]	[0.359]	[0.349]	[0.392]	[0.195]	[0.156]
m1 test	-8.04	-8.07	-7.97	-7.60	-8.02	-8.08	-11.37	-11.38
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
m2 test	-1.18	-1.30	-1.10	-1.15	-1.21	-1.34	-0.57	-0.53
	[0.240]	[0.195]	[0.270]	[0.250]	[0.225]	[0.182]	[0.566]	[0.594]

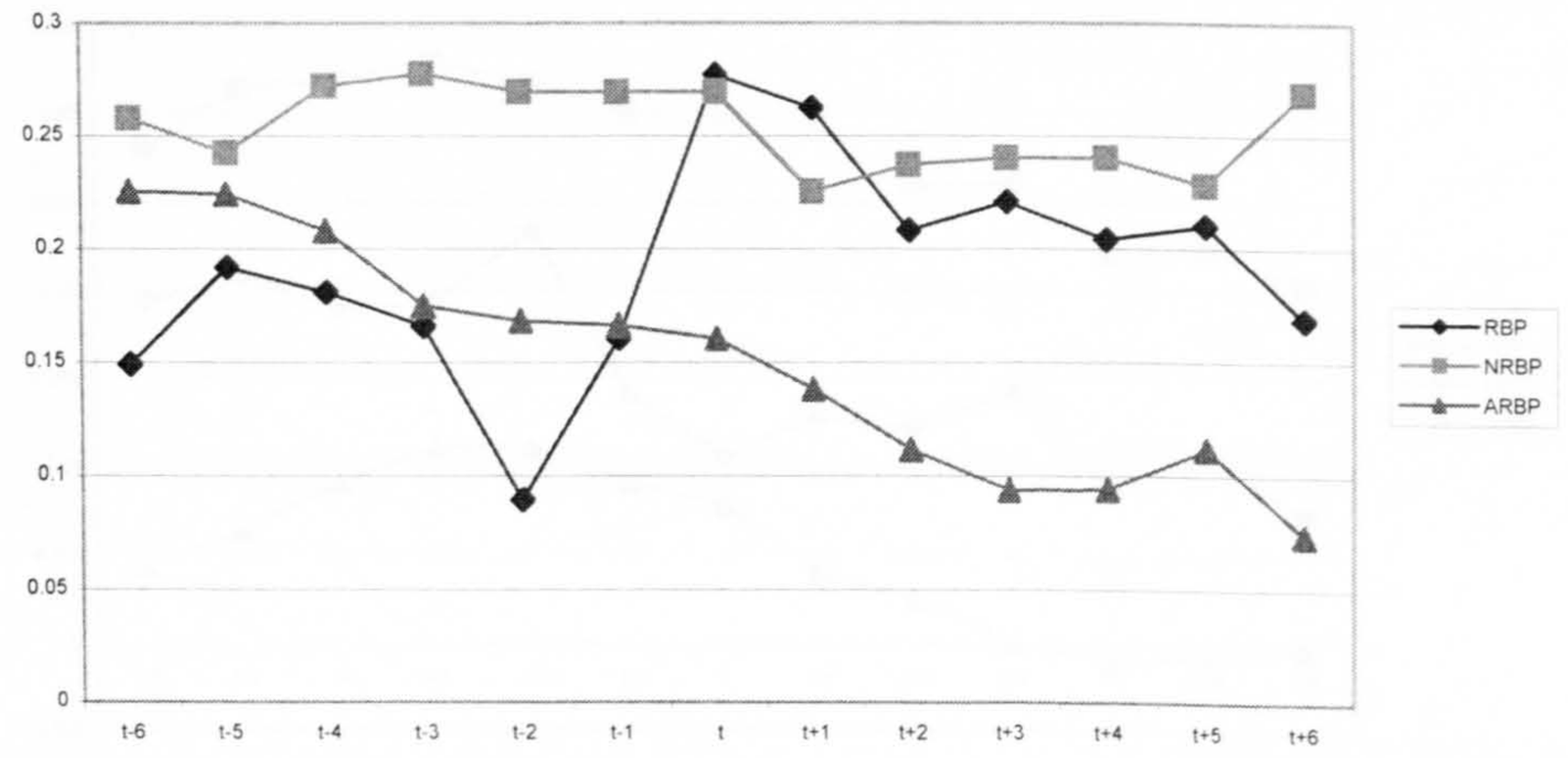
This table shows the GMM results for the investment model with the leverage *status* dummies computed from the estimation of alternative leverage models. That is, specifications 1 derive from the RZ leverage model; specifications 2 from the RZ augmented by the ownership characteristics; specifications 3 from the complete leverage model augmented by the capital and R&D expenditures and taxes variables; specifications 4 from the RZ model estimated on a longer time series from 1985 to 2001. The estimation period for GMM in the first three specifications is 1994-2001, depending on the availability of leverage *status* dummies. For brevity reasons, we present here only the results for the leverage status dummies of RBP3 and interRBP3. GMM is the model in the first differences with levels dated [t-2, t-5] of all regressors as instruments. In GMM model time dummies are included. Asymptotic standard errors robust to heteroskedasticity are used in all the estimations. P-values are reported in parentheses. Sargan test is a test of overidentifying restrictions, distributed as chi-square under the null of instrument validity; m1 and m2 are test statistics for first and second order autocorrelations in residuals, respectively, distributed as standard normal N(0,1) under the null of no serial correlation. *IK* is defined as the ratio of investment to capital stock; *CFK* is equal to the ratio of cash flow to capital stock; *Q* represents the ratio of market value of assets to capital stock; *RBP3* is a dummy equal to 1 if a company is identified as low-leverage for the three consecutive years before the analyzed investment decision and 0 otherwise; *interRBP3* is the interaction term between *RBP3* and *CFK*. significant at 10%; ** significant at 5%; *** significant at 1%.

Figure 4.2. Firm behaviour in time over a longer time series.

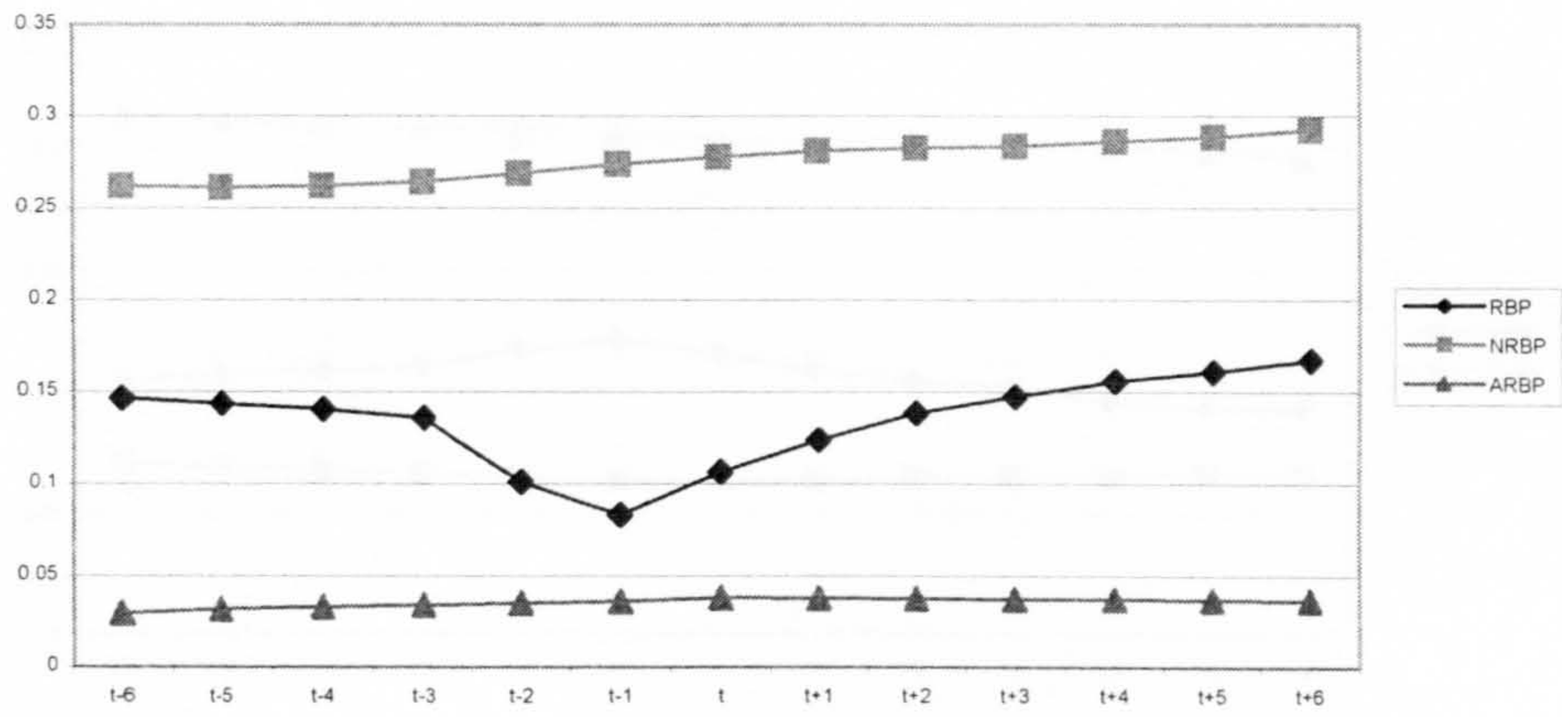
a. *IK*



b. *Spike Value*



c. *Leverage*



d. *Deviation*

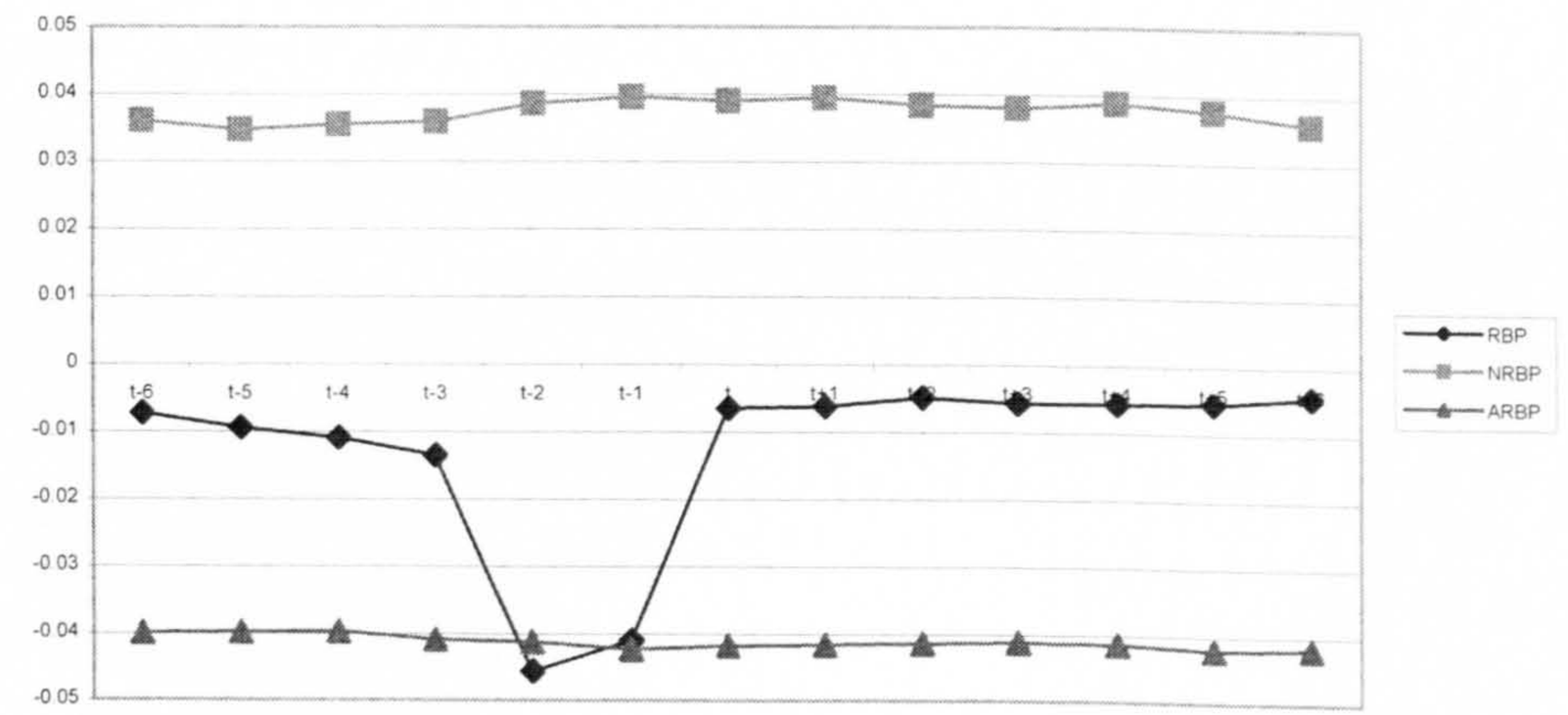
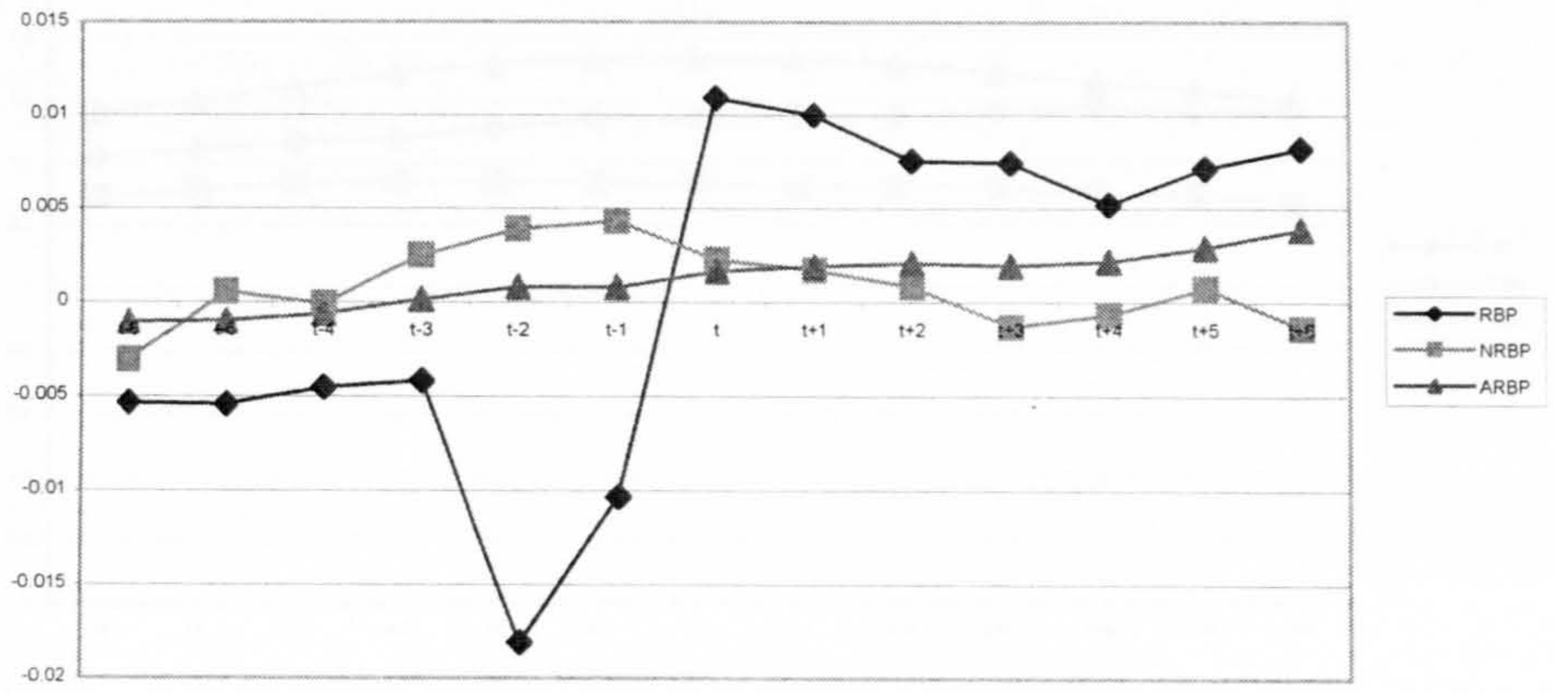
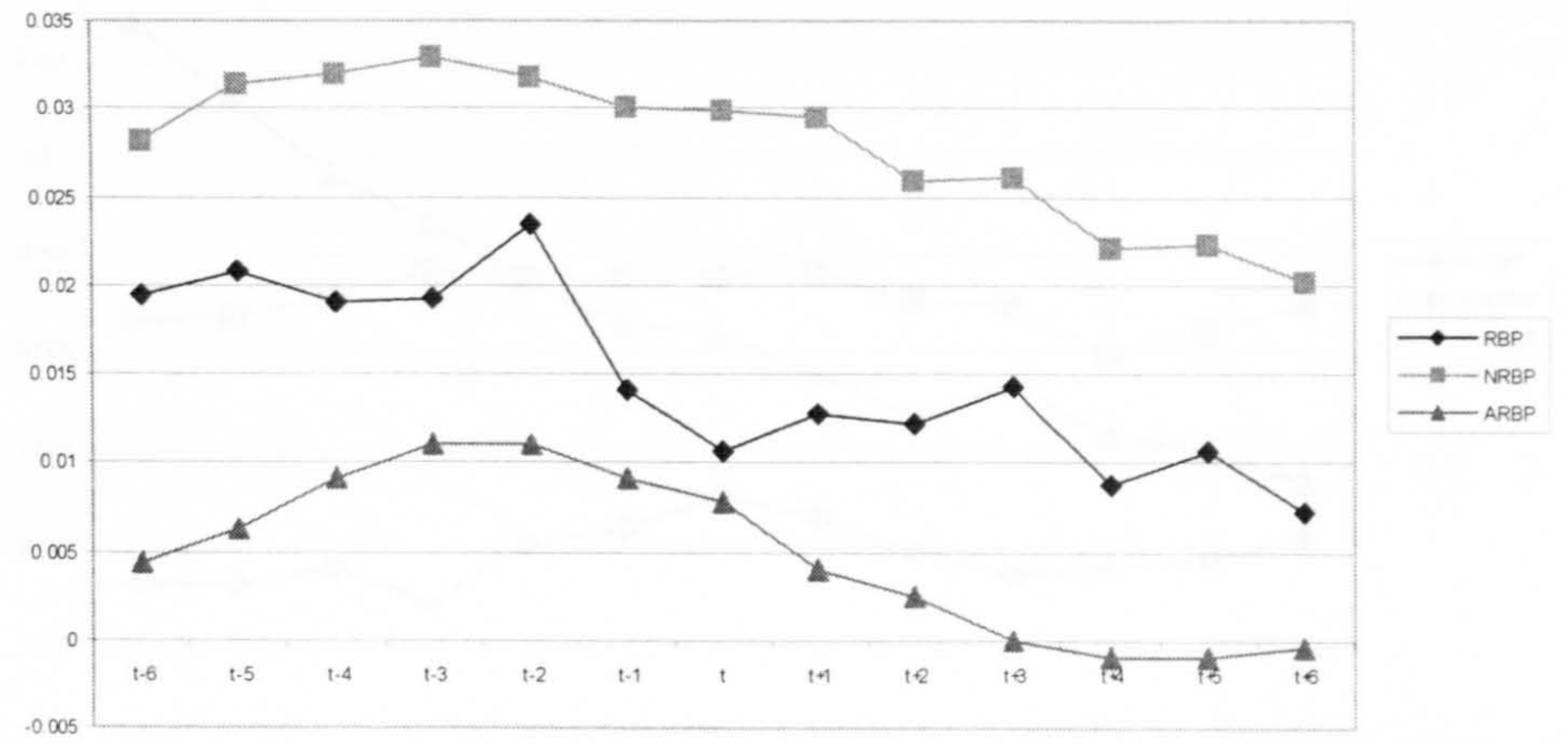


Figure 4.2. Firm behaviour in time over a longer time series (continued).

e. *Net Debt Issued*



f. *Net Equity Issued*



g. *Cash*

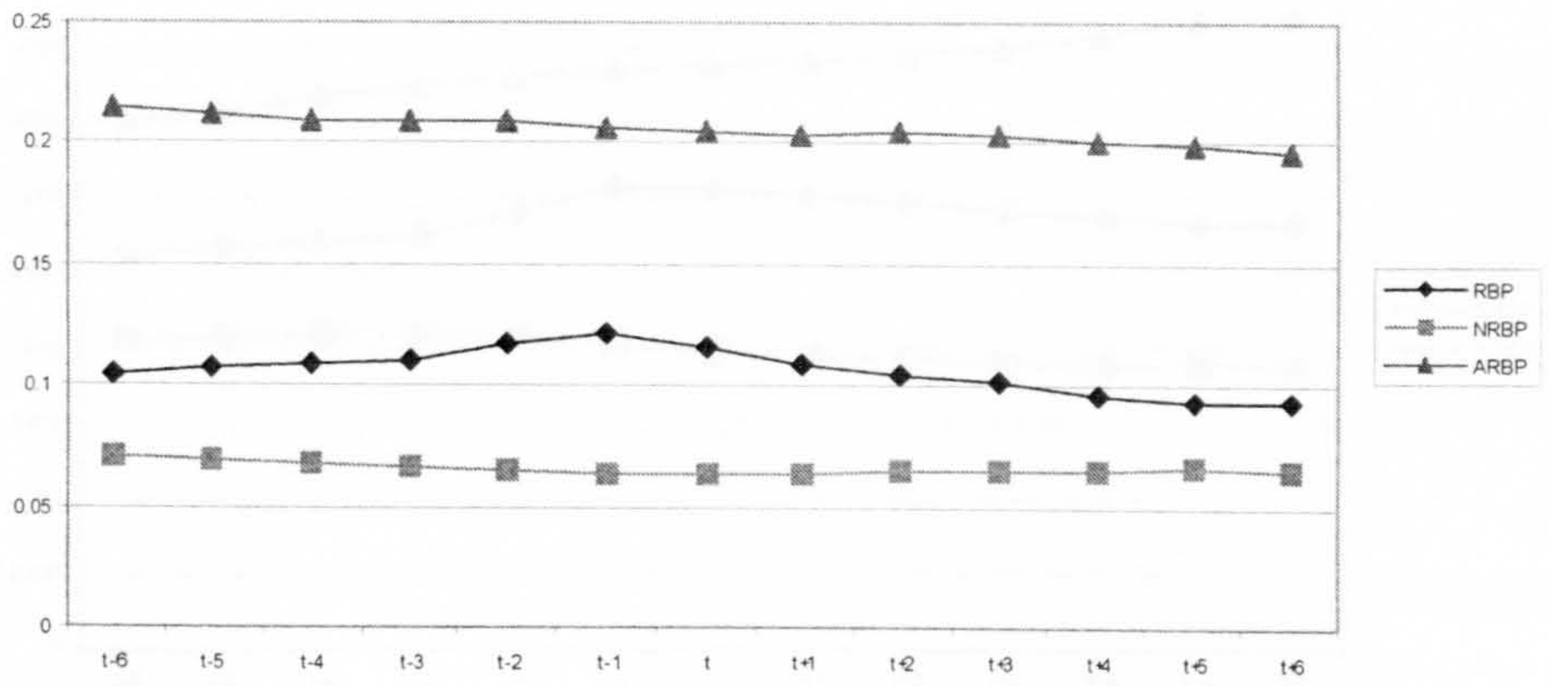
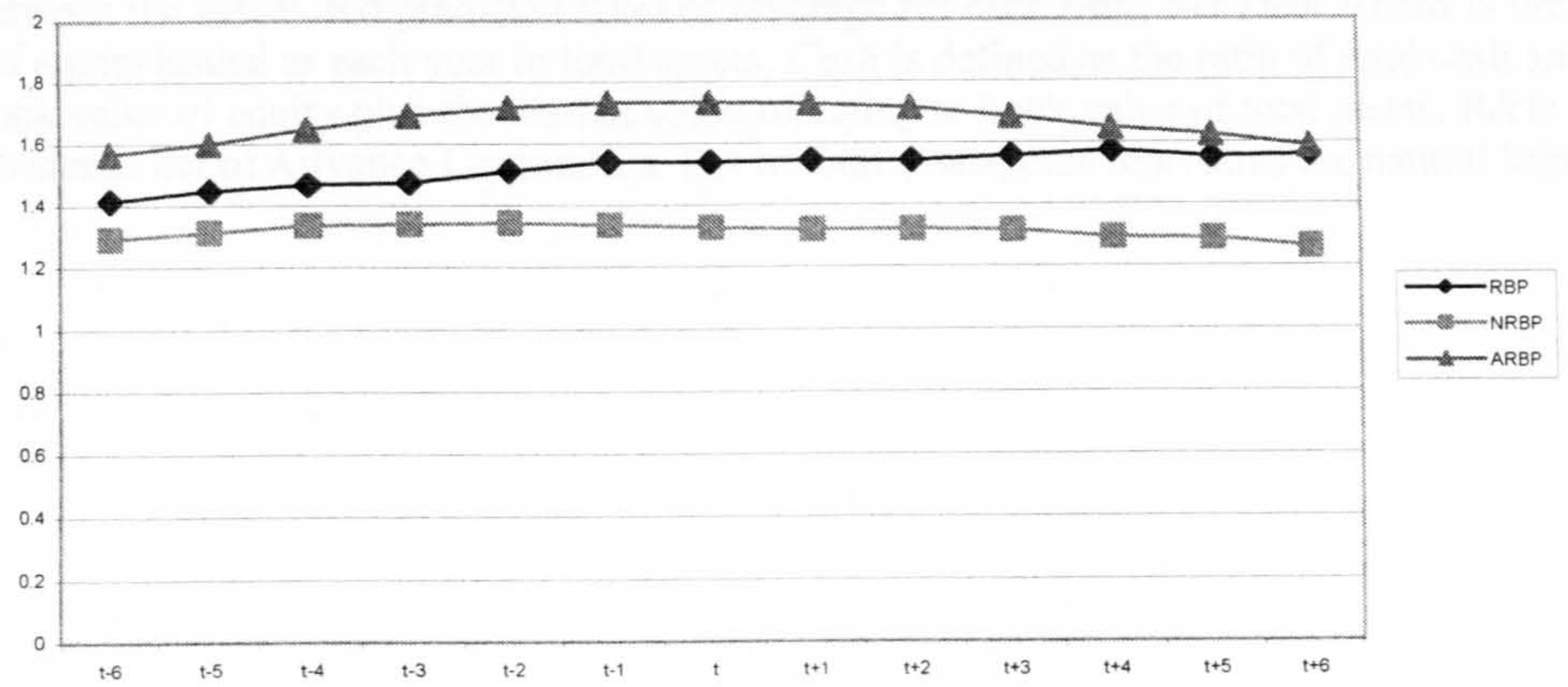
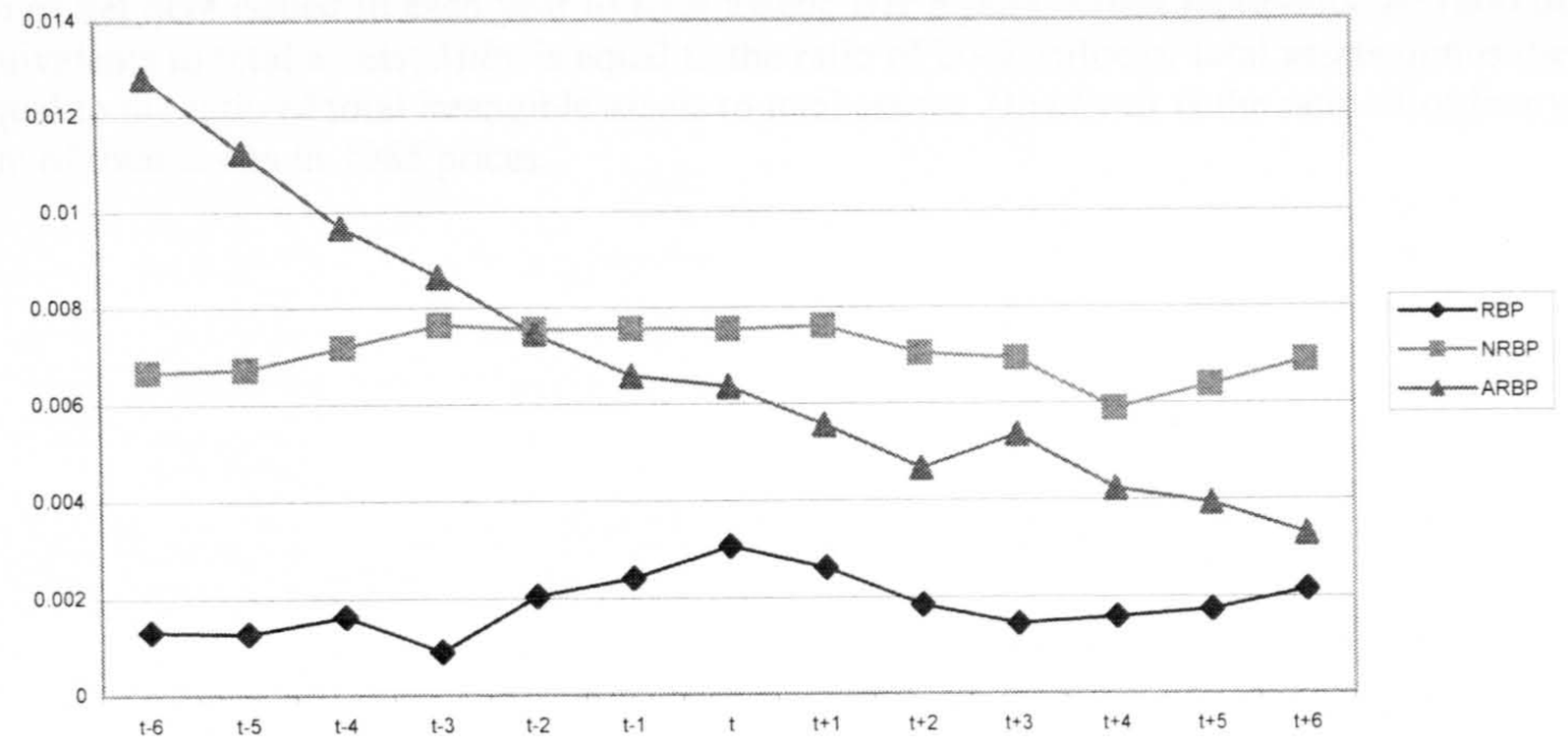


Figure 4.2. Firm behaviour in time over a longer time series (continued).

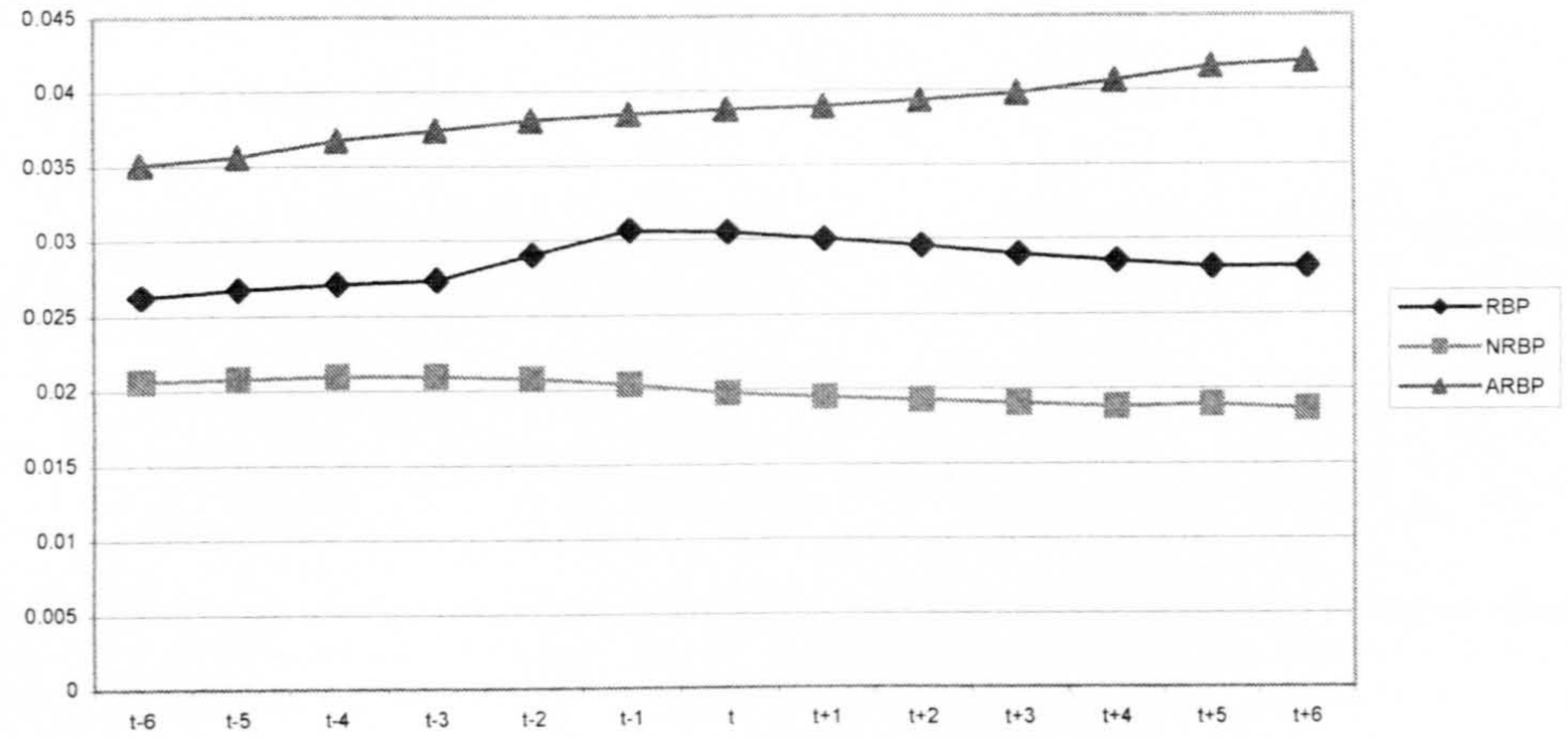
h. *Mtbv*



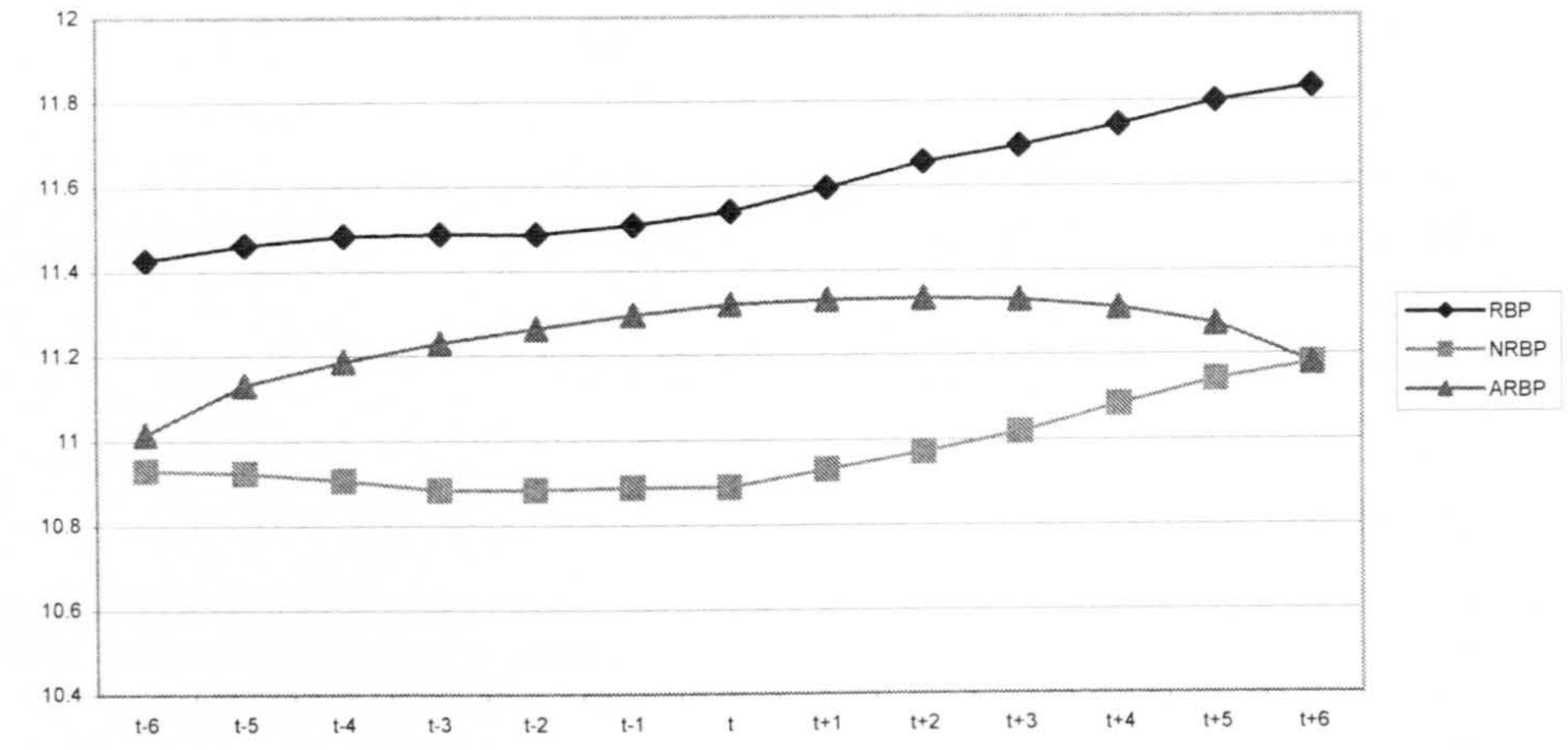
i. *R&D*



j. *Dividends*



k. *Size*



These figures are constructed with the leverage *status* dummies derived from the RZ leverage model over a longer time series (1985-2001). Firms are divided in three categories here: RBP are firms that at some point in time are identified with RBP=1 and they are separated from those firms that are always "low-leverage" for the entire period which are classified as ARBP. NRBP are those that are never identified as RBP. At time t the capital expenditures of RBP firms are examined after a period of low-leverage policy. The

analysis of the trends for each firm characteristic is conducted before and after this defining moment (from t-6 to t+6). *IK* is defined as the ratio of investment to capital stock; *Spike Value* is defined over a pattern of 3 years of investment data. The average value of investments is calculated in the extreme years. Thus, there is a spike in this pattern only if the investment value in the central year is at least twice the average of the extremes; *Leverage* is defined as the ratio of total debt to total assets; *Deviation* represents the difference between the actual and predicted level of leverage for each firm; *Net Debt Issued* is the ratio of net debt issued in each year to total assets; *Net Equity Issued* represents the ratio of net equity issued in each year to total assets; *Cash* is defined as the ratio of total cash and equivalents to total assets; *Mtbv* is equal to the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of total assets; R&D is equal to the ratio of total intangible assets to total assets; *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax to total assets; *Size* represents the natural logarithm of total assets in 1985 prices.

Table 4.7. Investment models with RBP status dummies computed through the percentile methodology.

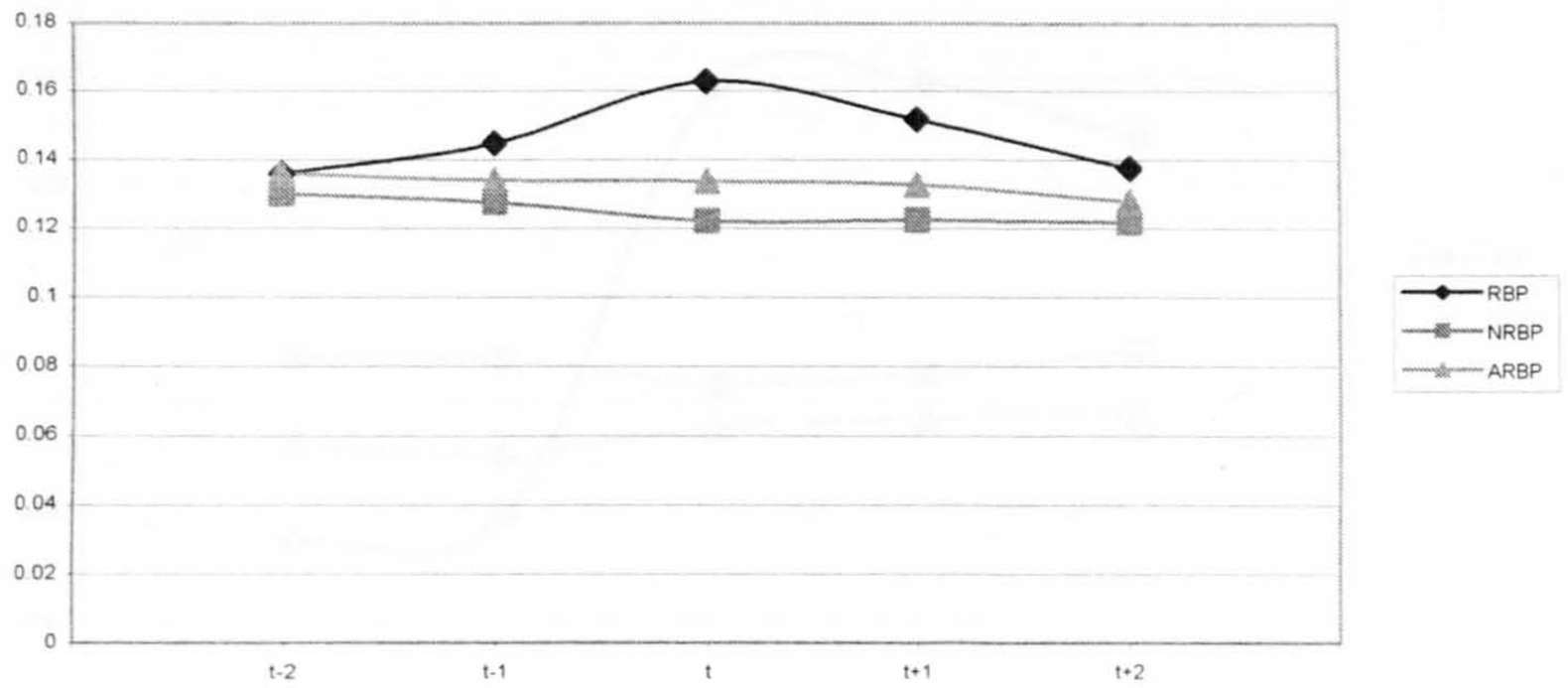
	A	B	C	D	E	F	G
IK_{t-1}	0.108***	0.084***	0.112***	0.097***	0.086***	0.112***	0.107***
	[0.001]	[0.006]	[0.002]	[0.001]	[0.003]	[0.000]	[0.000]
lCFK	0.150*	0.092***	0.054	0.076***	0.093***	0.075***	0.091***
	[0.057]	[0.000]	[0.158]	[0.006]	[0.001]	[0.006]	[0.000]
Q	0.021***	0.014***	0.005*	0.011***	0.010***	0.010***	0.009***
	[0.000]	[0.000]	[0.092]	[0.003]	[0.000]	[0.003]	[0.002]
RBP2				0.079***	0.084***		
				[0.000]	[0.001]		
interRBP2					-0.001		
					[0.975]		
RBP3						0.069***	0.089***
						[0.003]	[0.002]
interRBP3							-0.048
							[0.326]
Observations	4006	2867	1366	4006	4006	4006	4006
Number of firms	613	385	176	638	638	638	638
Sargan test	58.55	82.43	83.75	64.69	84.02	64.69	84.02
	[0.529]	[0.435]	[0.395]	[0.316]	[0.358]	[0.316]	[0.358]
m1 test	-7.84	-7.59	-4.04	-7.76	-7.9	-7.76	-7.9
	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]	[0.000]
m2 test	-1.00	-0.86	-0.55	-0.91	-0.93	-0.91	-0.92
	[0.318]	[0.389]	[0.584]	[0.361]	[0.370]	[0.361]	[0.374]

This table shows the GMM results for the investment model with the leverage *status* dummies computed through the percentile methodology. The estimation period for GMM is 1993-2001, depending on the availability of leverage *status* dummies. GMM is the model in the first differences with levels dated [t-2, t-5] of all regressors as instruments. In GMM model time dummies are included. Asymptotic standard errors robust to heteroskedasticity are used in all the estimations. P-values are reported in parentheses. Sargan test is a test of overidentifying restrictions, distributed as chi-square under the null of instrument validity; m1 and m2 are test statistics for first and second order autocorrelations in residuals, respectively, distributed as standard normal N(0,1) under the null of no serial correlation. *IK* is defined as the ratio of investment to capital stock; *CFK* is equal to the ratio of cash flow to capital stock; *Q* represents the ratio of market value of assets to capital stock; *RBP2* is a dummy equal to 1 if a company is identified as low-leverage (with the percentile methodology) for the two consecutive years before the investment decision and 0 otherwise; *RBP3* is a dummy equal to 1 if a company is identified as low-leverage (with the

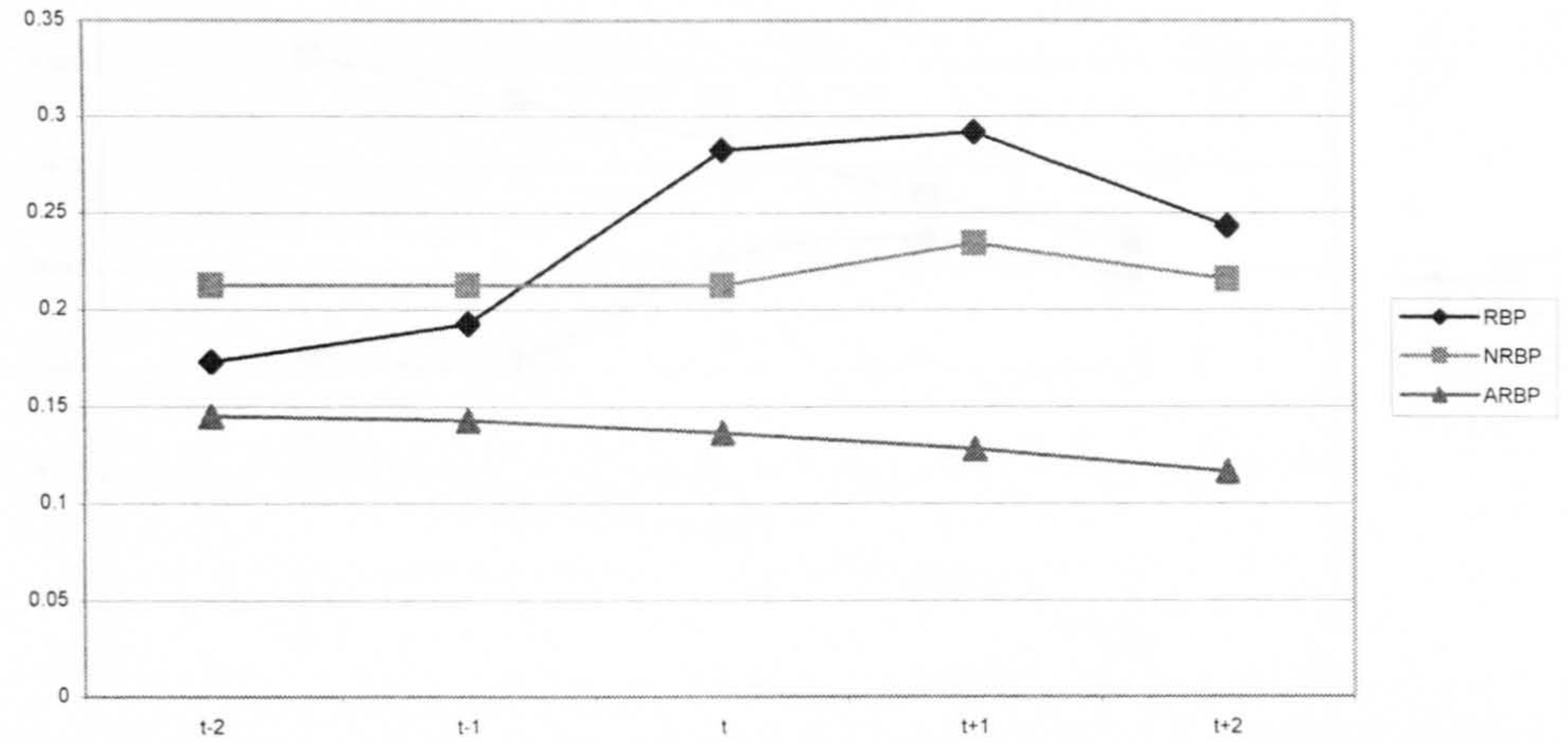
percentile methodology) for the three consecutive years before the investment decision and 0 otherwise; *interRBP2* is the interaction term between *RBP2* and *CFK*; *interRBP3* is the interaction term between *RBP3* and *CFK*. * significant at 10%; ** significant at 5%; *** significant at 1%.

Figure 4.3. Firm behaviour in time with RBP status dummies computed through the percentile methodology.

a. *IK*



b. *Spike Value*



c. *Leverage*

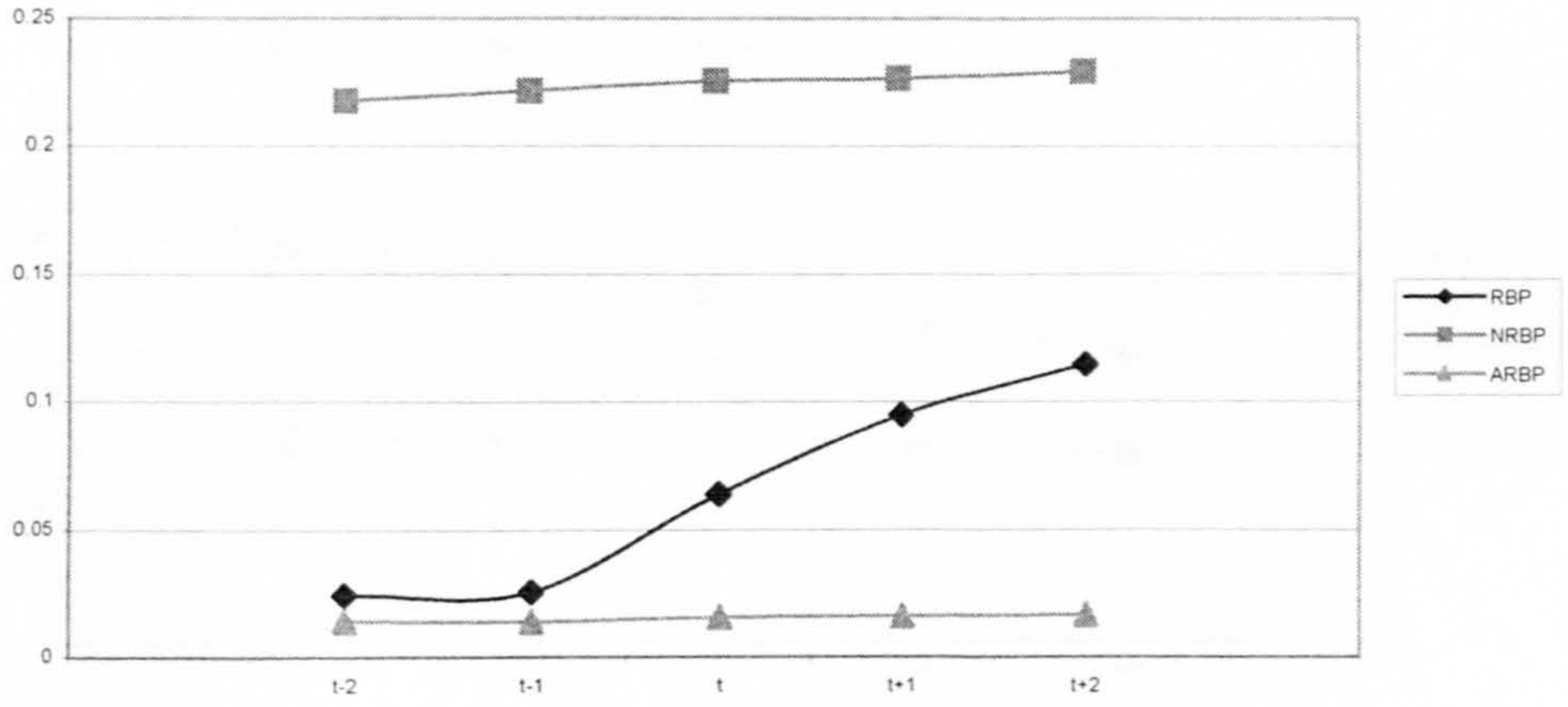
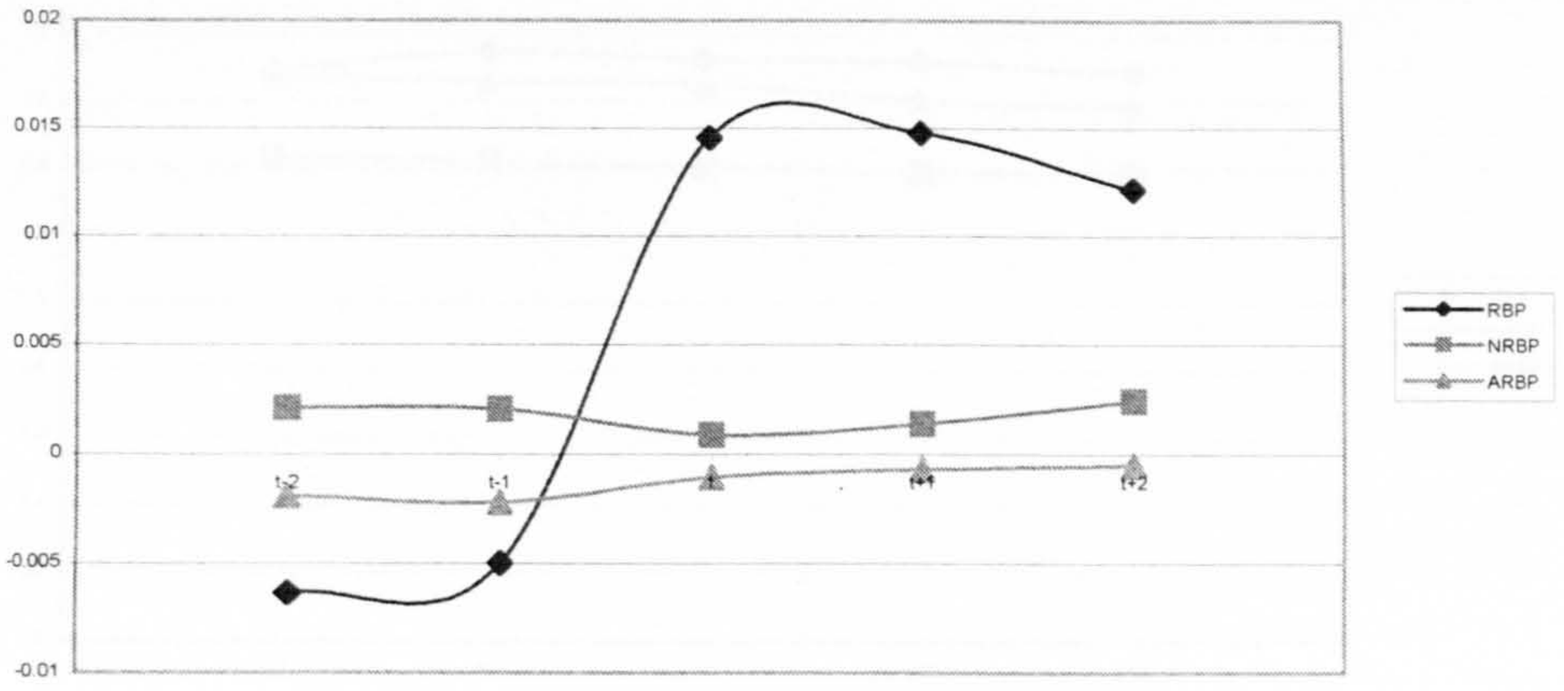
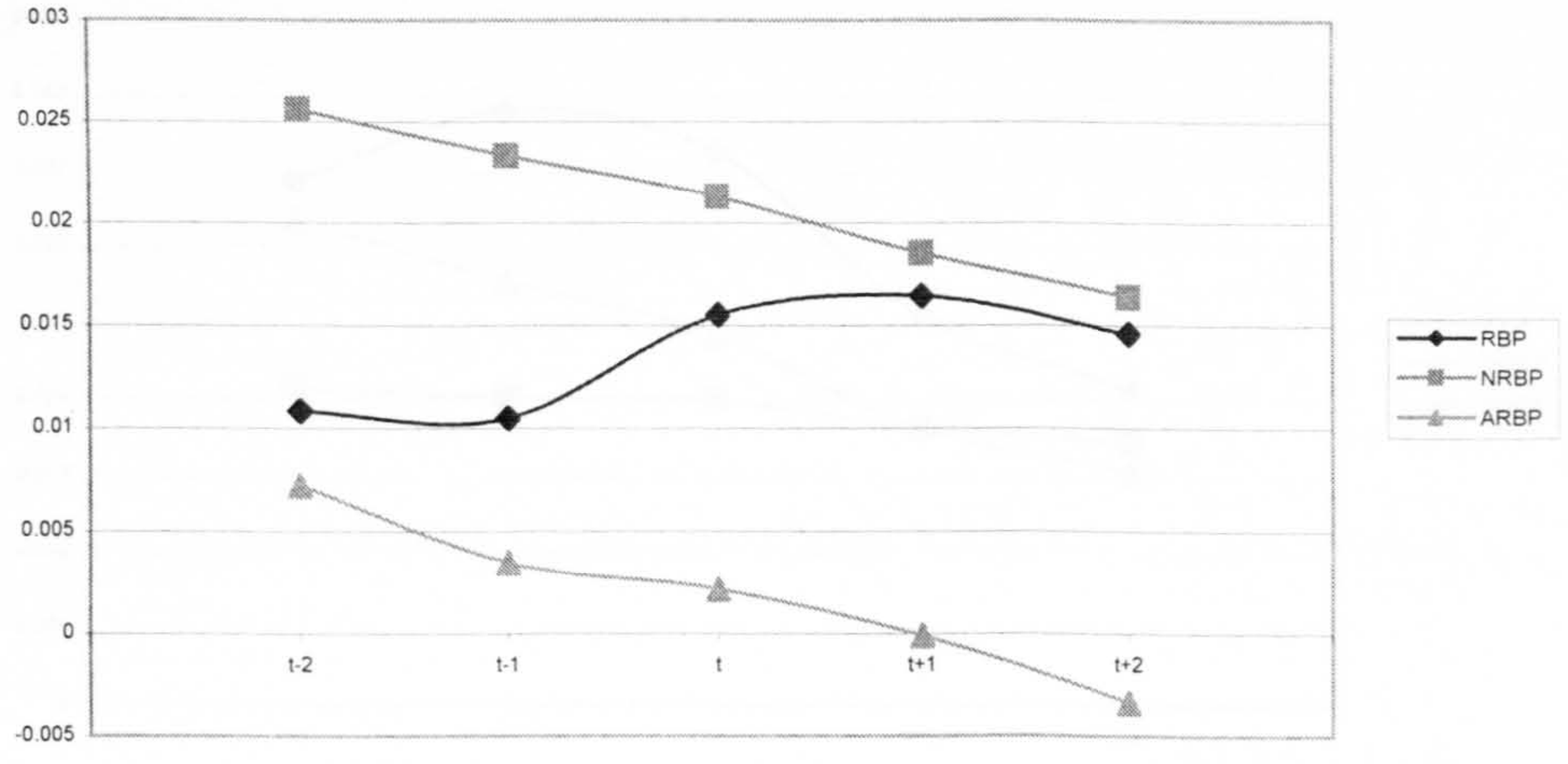


Figure 4.3. Firm behaviour in time with RBP status dummies computed through the percentile methodology (continued).

d. *Net Debt Issued*



e. *Net Equity Issued*



f. *Cash*

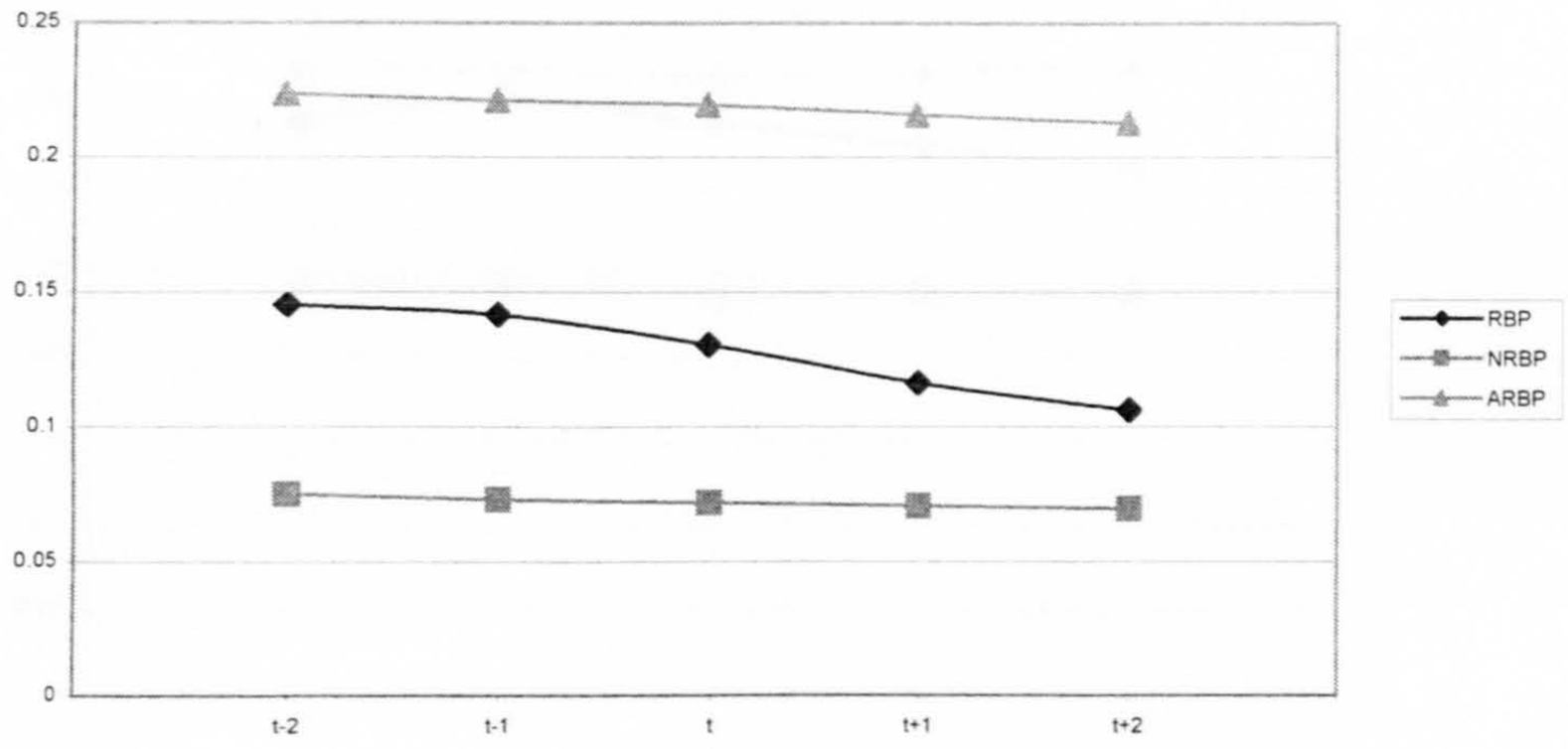
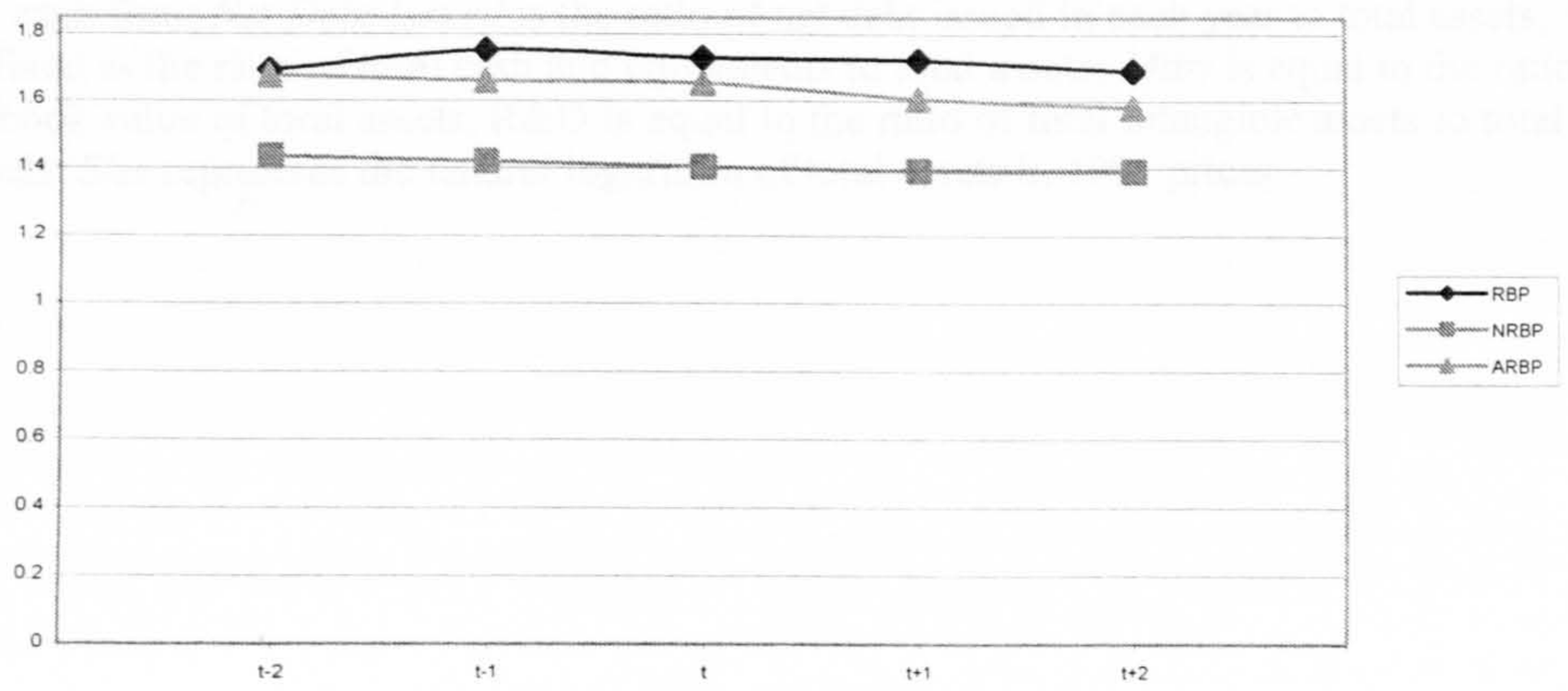
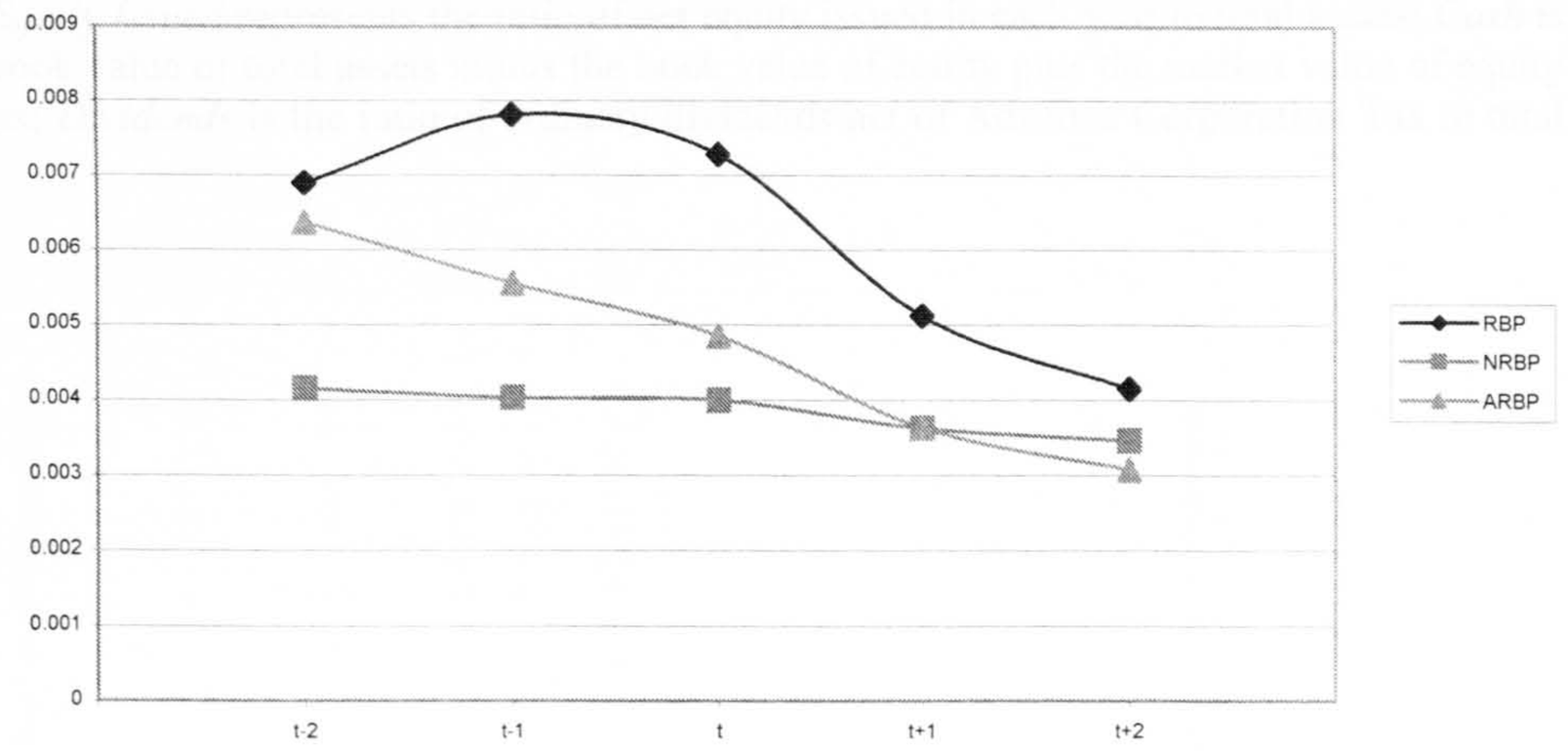


Figure 4.3. Firm behaviour in time with RBP status dummies computed through the percentile methodology (continued)

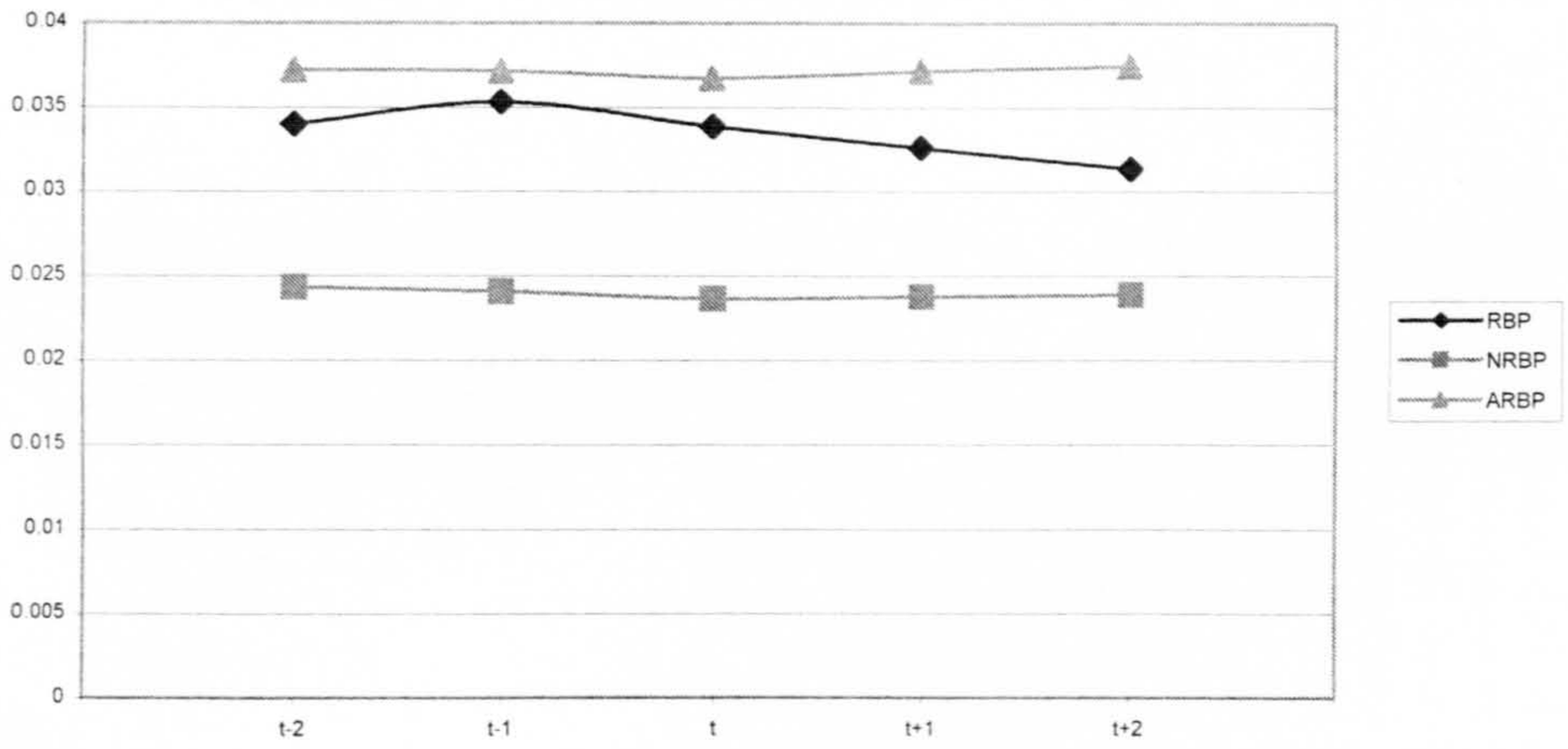
g. *Mtbv*



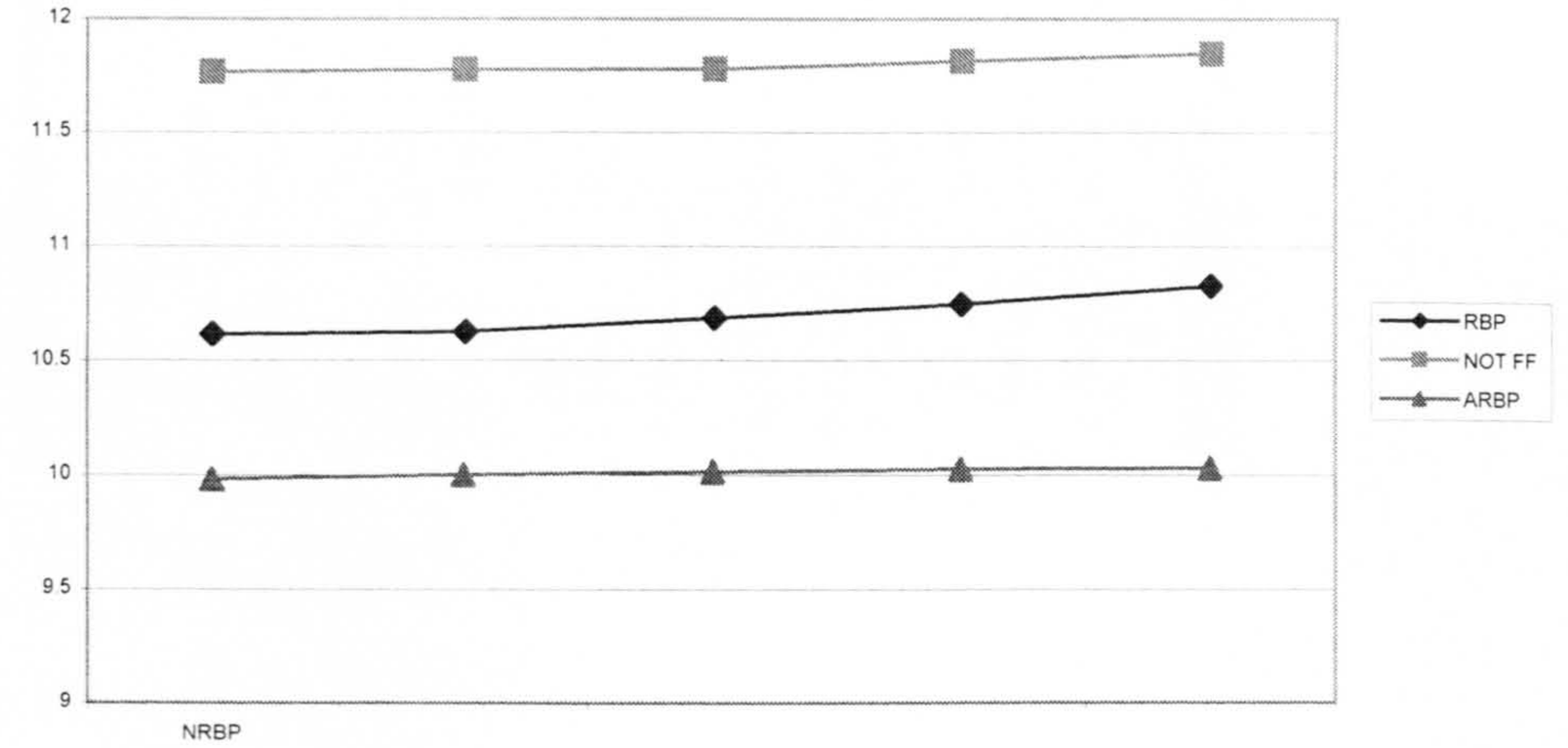
h. *R&D*



i. *Dividends*



j. *Size*



These figures are constructed with the leverage *status* dummies derived from the percentile methodology. Firms are divided in three categories here: RBP are firms that at some point in time are identified with RBP=1 and they are separated from those firms that are always "low-leverage" for the entire period which are classified as ARBP. NRBP are those that are never identified as RBP. At time t the capital expenditures of RBP firms are examined after a period of low-leverage policy. The analysis of the trends for each firm characteristic is

conducted before and after this defining moment (from t-2 to t+2).). *IK* is defined as the ratio of investment to capital stock; *Spike Value* is defined over a pattern of 3 years of investment data. The average value of investments is calculated in the extreme years. Thus, there is a spike in this pattern only if the investment value in the central year is at least twice the average of the extremes; *Leverage* is defined as the ratio of total debt to total assets; *Deviation* represents the difference between the actual and predicted level of leverage for each firm; *Net Debt Issued* is the ratio of net debt issued in each year to total assets; *Net Equity Issued* represents the ratio of net equity issued in each year to total assets; *Cash* is defined as the ratio of total cash and equivalents to total assets; *Mtbv* is equal to the ratio of book value of total assets minus the book value of equity plus the market value of equity to book value of total assets; R&D is equal to the ratio of total intangible assets to total assets; *Dividends* is the ratio of ordinary dividends net of Advance Corporation Tax to total assets; *Size* represents the natural logarithm of total assets in 1991 prices.

.

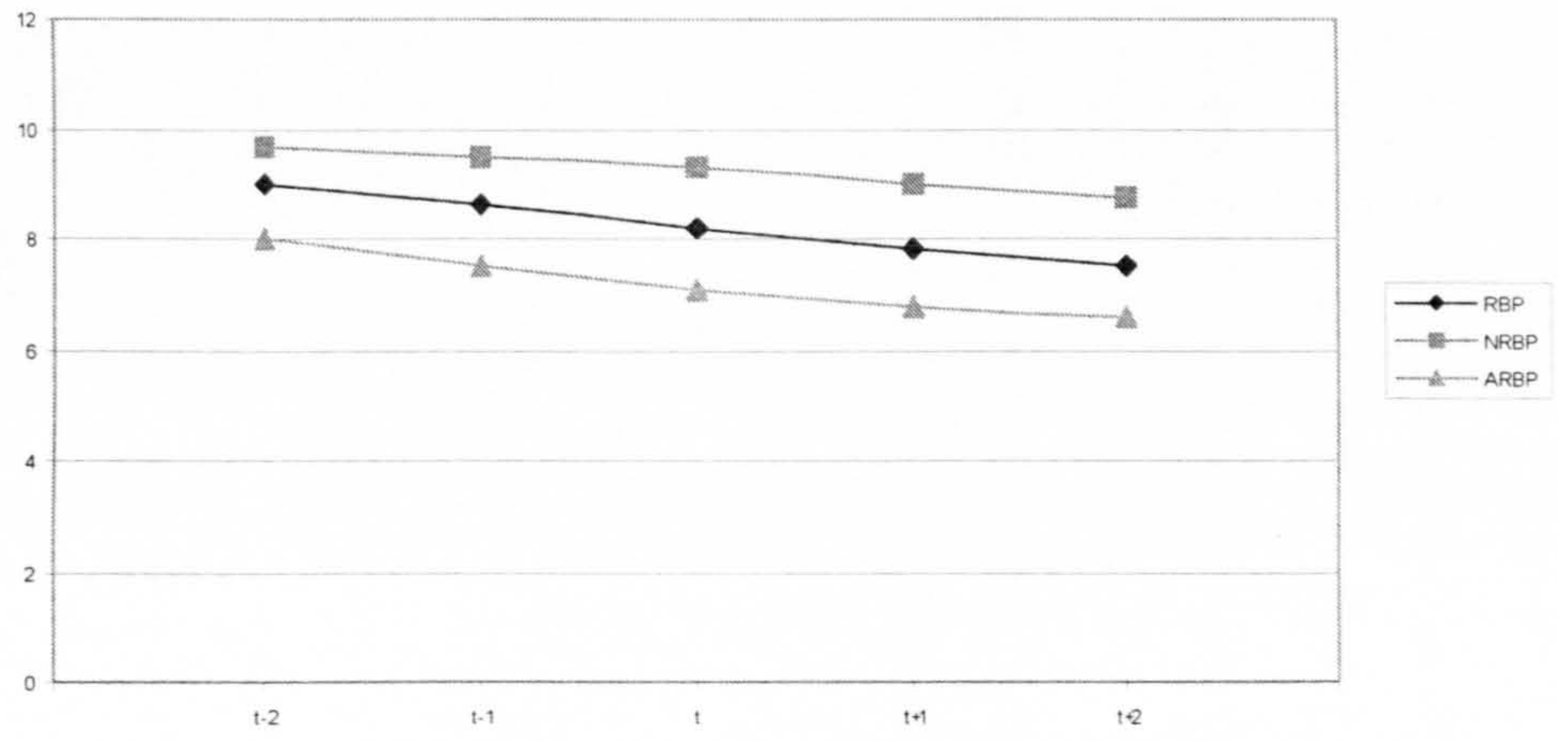
Table 4.8. Investment model: splits of the sample.

	A	B	C
IK_{t-1}	0.108***	0.082*	0.104**
	[0.001]	[0.089]	[0.040]
lCFK	0.150*	0.188*	0.13
	[0.057]	[0.065]	[0.127]
Q	0.021***	0.017***	0.027***
	[0.000]	[0.008]	[0.002]
Observations	4006	1720	1561
Number of firms	613	277	270
Sargan test	58.55	66.61	67.05
	[0.529]	[0.260]	[0.248]
m1 test	-7.84	-5.08	-5.19
	[0.000]	[0.000]	[0.000]
m2 test	-1.00	-0.50	-0.75
	[0.318]	[0.378]	[0.453]

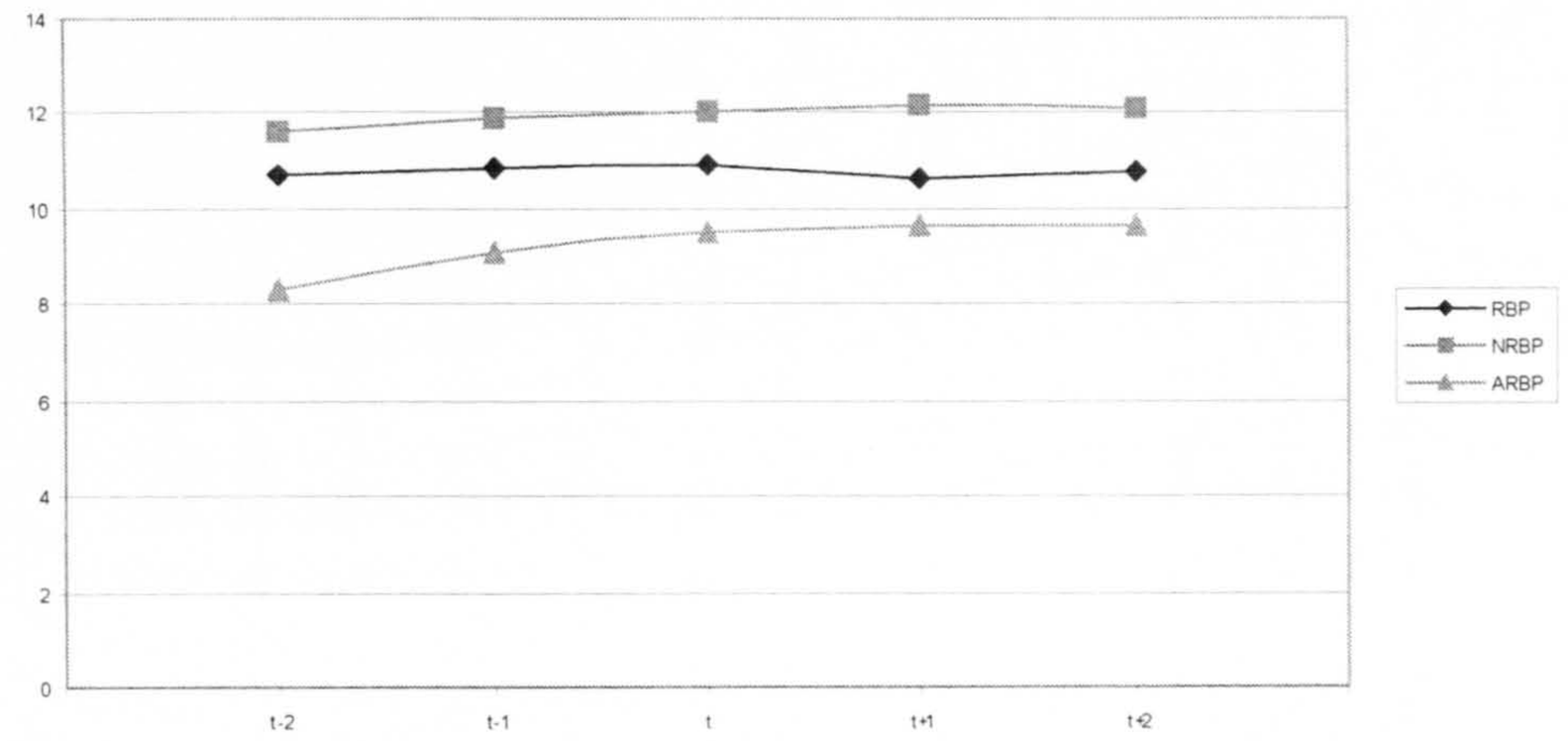
This table shows the GMM results for the investment model. Specification "A" refers to the whole sample; specification "B" refers only to NRBP firms; specification "C" refers to RBP firms. The estimation period for the GMM is 1994-2001. GMM is estimated in first differences with levels dated [t-2, t-5] of all regressors as instruments. Time dummies are always included. Asymptotic standard errors robust to heteroskedasticity are used in all the estimations. P-values are reported in parentheses. Sargan test is a test of overidentifying restrictions, distributed as chi-square under the null of instrument validity; m1 and m2 are test statistics for first and second order autocorrelations in residuals, respectively, distributed as standard normal N(0,1) under the null of no serial correlation. *IK* is defined as the ratio of investment to capital stock; *CFK* is equal to the ratio of cash flow to capital stock; *Q* represents the ratio of market value of assets to capital stock. * significant at 10%; ** significant at 5%; *** significant at 1%.

Figure 4.4. Firm behaviour in time: an ownership perspective.

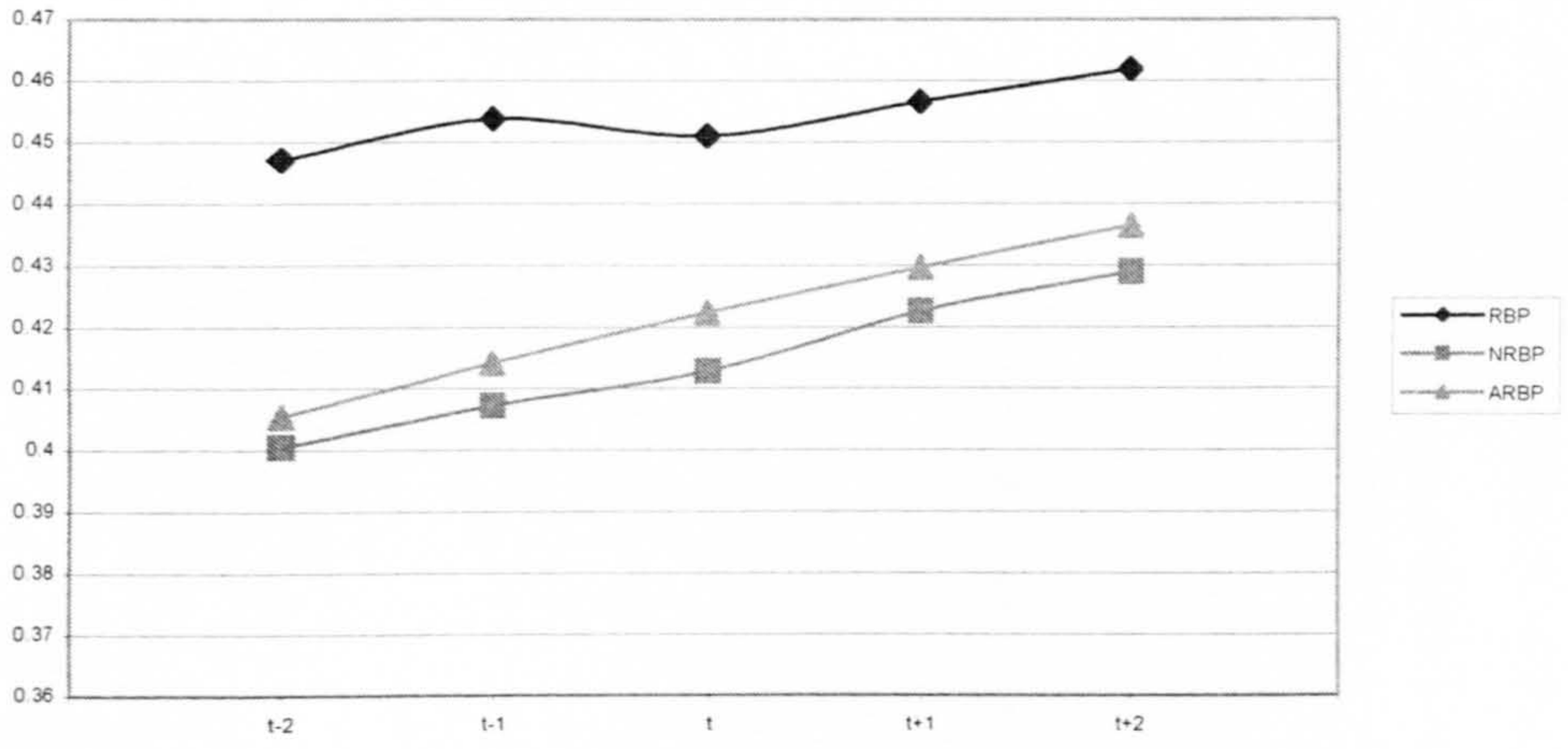
a. *Exec*



b. *Blockholding*



c. *Ratio*



These figures are constructed with the leverage *status* dummies derived from the target methodology. Firms are divided in three categories here: RBP are firms that at some point in time are identified with RBP=1 and they are separated from those firms that are always "low-leverage" for the entire period which are classified as ARBP. NRBP are those that are

never identified as RBP. At time t the capital expenditures of RBP firms are examined after a period of low-leverage policy. The analysis of the trends for each firm characteristic is conducted before and after this defining moment (from t-2 to t+2). *Exec* is defined as the sum of ordinary shareholdings by executive directors (%). *Blockholding* is defined as the sum of all external shareholdings above 3%. *Ratio* is defined as the proportion of non-executive directors on total board.

Appendix 4.1: The Partial Adjustment Model

The underlining assumption of a partial adjustment model is that firms have a LEV target (LEV^*_{it}) that is a function of K firm-specific characteristics, ($\sum_{k=1}^{k} \beta_k X_{kit}$) and a disturbance term, (u_{it}).

$$LEV^*_{it} = \sum_{k=1}^{k} \beta_k X_{kit} + u_{it} \qquad (A1)$$

Firms try to adjust their current LEV holding level to be closer to their target. This produces a partial adjustment process as follows:

$$LEV_{it} - LEV_{it-1} = \lambda\left(LEV^*_{it} - LEV_{it-1}\right) \qquad (A2)$$

where LEV_{it} is the current LEV holding, $\left(LEV^*_{it} - LEV_{it-1}\right)$ is the target change and λ is the adjustment factor or, in other words, what can effectively be adjusted.

If we substitute the function (A1) in the partial adjustment equation (A2) and include η_i and η_t, we obtain our model (A3)

$$LEV_{it} = \delta LEV_{it-1} + \sum_{k=1}^{k} \gamma_k X_{kit} + \eta_i + \eta_t + \nu_{it} \qquad (A3)$$

where now $\delta = (1 - \lambda)$, $\gamma_k = \lambda\beta_k$ and $v_{it} = \lambda u_{it}$. From the estimated coefficient of the lagged dependent variable, thus, we derive the estimated adjustment factor λ for our sample. λ can take any value between 0 and 1. If λ=1 there is an immediate adjustment ($LEV_{it} = LEV^*_{it}$) which, in turn, means that both the costs of adjustment are very low and the costs of being off-target are relatively high. On the other hand, if λ =0, implying $LEV_{it} = LEV_{it-1}$, the costs of adjustment are so high that firms cannot change their actual LEV holding level. This may also imply that the costs of being away from the target are negligible.

CHAPTER 5

CONCLUSIONS

The aim of this study has been to provide more insights into our understanding of a number of issues pertaining to the evolution of ownership characteristics in the UK market, to the impact of agency costs on firm performance and to the links between the financial and investment decisions of firms. Our work contains a number of important and original aspects that potentially contribute to the literature on several grounds.

Chapter 2 presented a series of stylized facts of both direct and ultimate ownership structure and board composition for a unique database, which we hand-collected for this thesis, for a large sample of UK non-financial listed firms between 1991 and 2001. This work significantly contributes to the existing body of knowledge, by extending and complementing existing US evidence (Denis & Sarin, 1999) on the evolution of ownership and governance systems. The detailed investigation performed in Chapter 2 documented that substantial changes in ownership structures are not uncommon, and that the classic argument of ownership stability may not fully apply in the UK case. These changes have involved several different aspects of the shareholding and governance of firms. For instance, managerial ownership shows a sharp decreasing trend, driven mainly by executive shareholding. On the other hand, ownership by outsiders seems to increase when it is less than 45% in the first year in which firms entered the sample. Above that level, it decreases sharply. In addition, average board size displays a mean reversion pattern around the average size of seven members, with an increasing number of non-executives over time. Other interesting facts were revealed by the analysis of the ultimate ownership structure of a sub-sample of our firms. For example, widely held firms are decreasing over time at each cut-off level, which suggests a possible re-concentration process in UK ownership. Additionally, the presence of complex structures, such as pyramids, multiple control chains

and cross-holdings, is far from negligible. This is not entirely in line with what we were led to expect by the arguments of the law and finance literature on the degree of minority protection in *common law* countries.

In Chapter 3, we provide significant contributions to the literature. We directly investigated how agency relations between managers and outside shareholders affect the financial performance of firms. More specifically, the focus is on the role of non-executive directors, and we investigated in detail whether they act independently from executives in determining firm performance. To this end, we first tested the relationship between board ownership and firm value. Then we divided the board of directors between executives and non-executives, and we tested whether ownership by non-executives is also a relevant factor. We also checked if the mere presence of outside directors on the board was significantly linked to firm value, by introducing a proxy for board composition. We exploited the documented evolution in ownership characteristics to investigate this link, using the GMM methodology (Arellano and Bond, 1991). In contrast with the previous literature, this technique enabled us to produce a set of systematic results, which are robust both to the endogeneity of all the explanatory variables, and to the presence of unobservable heterogeneity, an issued that has affected all previous studies in this field. Moreover, in endogenizing not only managerial ownership but also all the ownership structure of firms, we tested whether the presence and identity of a large shareholder, besides firm capital and financial structure, has an impact on firm performance.

Our analysis revealed a cubic relationship between executive ownership and financial value. No significant relationship was detected between ownership by non-executives and performance. This result casts doubt on the efficacy of direct equity

ownership as an alignment mechanism for outside directors. However, a positive and significant effect of the ratio of non-executives to total board is reported. A negative relation between performance and blockholding is detected, and no evidence is consistent with the efficient monitoring hypothesis for institutional investors; whereas investment in physical capital, cash flow and dividend payments are all reported to exert a positive impact. Finally, no significant impact of company size, debt ratio or RD expenditures was detected.

In Chapter 4, we empirically investigated the hypothesis that firms, anticipating financial constraints in the future, may respond by accumulating reserve borrowing power. More specifically, we analyzed whether, by employing a policy of low leverage for a certain number of years, firms may accumulate financial flexibility that enables them to have access to the external market in the future, and to be able to raise funds to invest more than their internal resources alone would allow. The analysis in Chapter 4 provides a set of original and important results.

First, we report how a low-leverage policy is a transitory one. Following a period of low leverage, firms that have accumulated reserves of borrowing power appeared able to make significantly more capital expenditures. Estimation results of the investment equation confirmed that firms that are classified as having accumulated reserve borrowing are able to invest more. Moreover, our results reveal that the interaction of this dummy with the cash flow parameter is consistently negative and generally insignificant. This further corroborates the hypothesis that these firms may not be any more constrained in their investment decisions than other firms. We also performed a set of intertemporal descriptive analyses of firms' choices around the investment decision moment, which also revealed

how, consistent with econometric results, firms with reserves of borrowing power sharply increase their capital investments after acquiring *RBP* status. They are reported to do so by issuing new debt and approaching their target leverage. An additional interesting aspect is that we detected a significant increase of abnormal investment (spikes) by firms after acquiring RBP status. A further important insight of these results is that they appear to indicate that this strategy is value enhancing, as documented by the increasing average market to book ratio for this group of firms. We further investigated these results by conducting several robustness checks in different directions. These confirm the previous set of results. We replicated all the above analyses with different leverage models (which are used instrumentally to define low-leverage firms and therefore *reserve borrowing power firms*), and all the results appear consistent.

Several lines for future research can be identified within the framework described above.

First, it would be interesting to develop a more formal analysis of the evolution of ownership characteristics that we documented in Chapter 2. For example, through a model of the determinants of insider ownership, we could investigate in more detail the issue of the opposite trends in executive and non-executive shareholding.

Second, a natural extension of our work would be to investigate the potential impact of ultimate ownership structures on firm value. Ultimate ownership in fact can be viewed as an alternative manifestation of agency conflicts inside firms. Ultimate controllers are expected to be expropriators of minority investors, because, unlike managers, they cannot be aligned. This generates an entirely different set of agency conflicts, and these have been shown to be greater than those investigated at the direct ownership level (Bebchuck et al.,

2000). The literature on ultimate ownership structure has so far provided very few empirical studies of the impact of ultimate controllers on corporate performance (Claessens et al., 2002) and other corporate decisions (Faccio et al., 2001). Given the evidence, provided in Chapter 2, that complex structures in the UK market are not negligible, an original approach would be to empirically investigate their potential impact on firm performance. A further contribution that this study might provide would be the analysis of this link, taking into account the possibility that complex structures may be endogenously determined, an issue that is discussed in Claessens et al. (2002). Indeed, because of lack of data, the existing body of work was conducted in a cross-sectional framework only. Appropriate econometric techniques should then be adopted in this case. This, in turn, could be achieved by extending our biannual panel data to an annual one.

Third, as far as investment choices are concerned, a potential extension to our work would be to model a joint determination of different financial policies. A recent branch of the literature has provided some evidence for the possibility that firms may adopt alternative policies to leverage, in order to achieve financial flexibility. For instance, Jagannathan et al. (2000) focus on dividend payouts and stock repurchase decisions, and show how firms with less volatile cash flows opt for larger dividend payments, whereas firms with larger cash flow volatility rely more on stock repurchases. This result tallies with the view that the flexibility inherent in repurchase programs is one reason why they are sometimes used instead of dividends. On the other hand, Childs et al. (2005) theoretically investigate the relationship between leverage and maturity choices in firm financing, and argue that financial flexibility encourages the choice of short-term debt, thereby dramatically reducing the agency costs of underinvestment and overinvestment problems.

Therefore, in spite of the estimation issues that could arise in adopting simultaneous partial adjustment models, one way to extend the framework of Chapter 4 would be to incorporate other financial instruments, such as cash holding, dividend policy and debt maturity, that firms may use in pursuing a financial flexibility policy.

REFERENCES

Admati, A. R., P. Pfleiderer and J. Zechner, 1994. Large Shareholder Activism, Risk Sharing and Financial Market Equilibrium, Journal of Political Economy, 102, 1097-1130.

Agrawal, A., Knoeber, C. R., 1996. Firms performance and mechanisms to control agency problems between managers and shareholders. Journal of Financial and Quantitative Analysis 31, 377-397.

Aivaziana, V. A., Geb, Y., Qiu, J., 2005. The impact of leverage on firm investment: Canadian evidence. Journal of Corporate Finance, forthcoming.

Alti, A., 2003. How sensitive is investment to cash flow when financing is frictionless? Journal of Finance 58, 707-722.

Arellano, M., Bond, S., 1991. Some tests of specification for panel data: Monte Carlo evidence and an application to employment equations. Review of Economic Studies 58, 277-297.

Arellano, M., Bover, O., 1995. Another look at the instrumental variable estimation of error component models. Journal of Econometrics 68, 29-51.

Attig, N., Gadhoum, Y., Lang, L.H.P., 2003. Bid-ask spread, asymmetric information and ultimate ownership. EFMA 2003.

Baker, M., Wurgler, J. 2002. Market timing and capital structure. Journal of Finance 57, 1-32.

Bancel, F., Mittoo, U. R., 2004. The determinants of capital structure choice: A survey of European firms. Financial Management 33, 103-132.

Barclay, M. J. Smith, C.W., 1995. The maturity structure of corporate debt. Journal of Finance 50, 609-632.

Barclay, M. J., Marx, L. M., Smith, C. W., 2003. The joint determination of leverage and maturity. Journal of Corporate Finance 9, 149-167.

Baysinger, R. D., Butler, H. N., 1985. Corporate governance and the board of directors: Performance effects of changes in board composition. Journal of Law Economics and Organization 1, 101-124.

Bearle, A., Means, G. 1932., The modern corporation and private property. London: MacMillan.

Bebchuk, L., Kraakman R., Triantis G., 2000. Stock pyramids, cross-ownership, and dual class: The creation and agency costs of separation between control and cash flow rights, in Morck, R. (ed.) Concentrated Corporate Ownership. Chicago: University of Chicago Press, 295-315.

Becht, M., Bolton, P., Röell, A., 2002. Corporate governance and control, in Constantinides, G., Harris, M., Stulz, R. (eds.), Handbook of the Economics and Finance. Amsterdam: North-Holland.

Benito, A., Young, G., 2002. Financial pressure and balance sheet adjustment by UK firms. Bank of England Working Paper n. 168.

Berger, P. G., Ofek, E., Yermak, D. L., 1997. Managerial entrenchment and capital structure decisions. Journal of Finance 52, 1411-1438.

Bevan, A. A., Danbolt, J., 2004. Testing for inconsistencies in the estimation of the determinants of capital structure in the UK. Applied Financial Economics 14, 55-66.

Bhagat, S., Black, B. S., 2002. The non-correlation between board independence and long-term firm performance. Journal of Corporation Law 27, 231-273.

Black, B.S., Coffee, J.C., 1994. Hail Britannia? Institutional investor behaviour under limited regulation. Michigan Law Review 92, 1997-2087.

Blundell, R., Bond, S., 1998. Initial conditions and moment restrictions in dynamic panel data models. Journal of Econometrics 87, 115-143.

Blundell, R., Bond, S., Devereux, M., Schiantarelli, F., 1992. Investment and Tobin's Q: Evidence from company panel data. Journal of Econometrics 51, 233-57.

Blundell, R., Bond, S., Windmeijer, F. 2000. Estimation in dynamic panel data models: Improving on the performance of the standard GMM estimators. IFS working paper, WP 00/12.

Bond, S., 2002. Dynamic panel data models: A guide to micro data methods and practice. CWP09/02, Cemmap working paper, IFS, London.

Bond, S., 2002. Dynamic panel data models: A guide to micro data methods and practice. IFS working paper, WP 09/02.

Bond, S., Klemm, A., Newton-Smith, R. Syed, M., Vlieghe, G., 2004. The roles of expected profitability, Tobin's Q and cash flow in econometric models of company investment. The Institute for Fiscal Studies, Working Paper, 04/12.

Bond, S., Meghir, C., 1994. Dynamic investment models and the firm's financial policy. Review of Economic Studies 61, 197-222.

Booth, L., Aivazian, V., Dermiguc-Kunt, A., Maksimovic, V., 2001. Capital Structures in Developing Countries, The Journal of Finance 56, 87-130.

Bowsher, C., 2002. On testing overidentifying restrictions in dynamic panel data models. Economic Letters 77, 211-220.

Brickley, J. A., Lease, R. C., Smith, C. W., Jr., 1988. Ownership structure and voting on anti-takeover amendments. Journal of Financial Economics 20, 267-291.

Brounen, D., De Jong, A., Koedijk, K. 2005. Capital structure policies in Europe: Survey evidence. Journal of Banking and Finance, forthcoming.

Burkart, M., Gromb, D., Panunzi, F., 1997. Large shareholders, monitoring and the value of the firm. The Quarterly Journal of Economics 112, 693-728.

Cadbury Report, 1992. Report of the committee on the financial aspects of corporate governance. Chairman: Sir Adrian Cadbury, London, GEE.

California Public Employees Retirement System, 1998. Corporate Governance Core Principles and Guidelines.

Chan, S. H., Martin, J. D., Kesinger, J. W., 1990. Corporate research and development expenditures and share value. Journal of Financial Economics 26, 255-276.

Charkham, J., 1994. Keeping good company. Oxford: Oxford University Press.

Childs, P.D., Mauer, D.C., Ott, S.H., 2005. Interactions of corporate financing and investment decisions: the effects of agency conflicts. Journal of Financial Economics, 75, 667-690

Chirinko, R. S., Schaller, H., 1995. Why does liquidity matter in investment equations? Journal of Money, Credit and Banking 27, 527-548.

Cho, M.-H., 1998. Ownership structure, investment, and the corporate value: An empirical analysis. Journal of Financial Economics 47, 103-121.

Claessens, S., Djankov, S., Fan, J. P. H., Lang, H. P., 2002. Disentangling the incentive and entrenchment effects of large shareholdings. Journal of Finance 57, 2741-2771.

Claessens, S., Djankov, S., Lang, L.H.P., 2000. The separation of ownership and control in East Asian corporations. Journal of Financial Economics 58, 81-112.

Cleary, S., 1999. The relationship between firm investment and financial status. Journal of Finance 54, 673-692.

Conyon, M. J., Peck, S. I., 1997. Recent developments in UK corporate governance. In A. Buxton, P. Chapman, P. Temple, Eds., Britain's Economic Performance. London, Routledge, 253-277.

Conyon, M.J., 1994. Corporate governance changes in UK companies between 1988 and 1993. Corporate Governance: An International Review 2, 87-99.

Cosh, A., Hughes, A., 1997. Executive remuneration, executive dismissal and institutional shareholdings. International Journal of Industrial Organization 15, 469-492.

Crespi Cladera, R., Renneboog, L., 2003. Corporate monitoring by shareholder coalitions in the UK. ECGI, working paper 12/2003.

Crutchley, C. E., Jensen, M. R. H., Jahera, J. S., Jr., Raymond, J. E., 1999. Agency problems and the simultaneity of financial decision making: The role of institutional ownership. International Review of Financial Analysis 8, 177-197.

Cubbin, J., Leech, D., 1983. The effect of shareholding dispersion on the degree of control in British companies: Theory and measurement. The Economic Journal 93, 351-369.

Dahya, J., McConnell, J.J., 2005. Board composition, corporate performance and the Cadbury committee recommendation. SSRN, WP687429.

Dahya, J., McConnell, J.J., Travlos, N.G., 2002. The Cadbury committee, corporate performance and top management turnover. Journal of Finance 57, 461-483.

Datta, S., Iskandar-Datta, M., Raman, K., 2005. Managerial stock ownership and the maturity structure of corporate debt. Journal of Finance, forthcoming.

Davies, J. R., Hillier, D., McColgan, P., 2005. Ownership structure, managerial behavior and corporate value. Journal of Corporate Finance 11, 645-660.

Davies, P., 2002. Introduction to Company Law. Oxford: Clarendon Law Series.

DeAngelo, H., Masulis, R.W., 1980. Optimal capital structure under corporate and personal taxation. Journal of Financial Economics 8, 3-29.

Dedman E., 2002. The Cadbury Committee recommendations on corporate governance – A review of compliance and performance impacts. International Journal of Management Reviews 4, 335-352.

Dedman, E., 2003. Executive turnover in UK firms: The impact of Cadbury. Accounting and Business Research 33, 33-50.

Demirag I., Sudarsanam S., Wright M., 2000. Corporate governance: Overview and research agenda. British Accounting Review 32, 341-354.

Demsetz, H., 1983. The structure of ownership and the theory of the firm. Journal of Law and Economics 26, 375–390.

Demsetz, H., Lehn, K., 1985. The structure of corporate ownership: Causes and consequences. Journal of Political Economy 93, 1155–1177.

Demsetz, H., Villalonga, B., 2001. Ownership structure and corporate performance. Journal of Corporate Finance 7, 209–233.

Denis, D.J., Sarin, A., 1999. Ownership and board structures in publicly traded corporations. Journal of Financial Economics 52, 187-223.

Denis, D.K., 2001. Twenty-five years of corporate governance research...and counting. Review of Financial Economics 10, 191-212.

Devereux, M, Schiantarelli, F., 1990. Investment financial factors and cash flow: Evidence from UK panel data. In R.G. Hubbard, Ed., Asymmetric information, corporate finance and investment. Chicago: Chicago University Press, 270-306.

Duggal, R., Millar, J. A., 1999. Institutional ownership and firm performance. Journal of Corporate Finance 5, 103-117.

Easterbrook, F. H., 1984. Two agency costs explanations of dividends. American Economic Review 74, 650-59.

Elston, J. A., 1998. Investment, liquidity constraints and bank relationships: Evidence from German manufacturing firms. In S.W. Black, M. Moersch, Eds., Competition and convergence in financial markets: The German and Anglo-Saxon models. Amsterdam: Elsevier Science Publishers, 135-155.

Erickson, T., Whited, T. M., 2000. Measurement error and the relationship between investment and q. Journal of Political Economy 108, 1027-1057.

Faccio, M., Lang, L.H.P., 2002. The ultimate ownership of western European corporations. Journal of Financial Economics 65, 365-395.

Faccio, M., Lang, L.H.P., Young, L. 2001. Dividends and expropriation. American Economic Review 91, 54-87.

Faccio, M., Lasfer, A. M., 2000. Do occupational pension funds monitor companies in which they hold large stakes? Journal of Corporate Finance, 6, 71-110.

Faccio, M.., Lasfer, A. M., 1999. Board structure and agency costs. SSRN, WP179008.

Fama, E., French, K.R., 2002. Testing tradeoff and pecking order predictions about dividends and debt. Review of Financial Studies 15, 1-33.

Fama, E., Jensen, M.C., 1983. Separation of ownership and control. Journal of Law and Economics 26, 301-325.

Fama, E.F., 1980. Agency problems and the theory of the firm. Journal of Political Economy 88, 288-307.

Farinha, J., 2003. Dividend policy, corporate governance and the managerial entrenchment hypothesis: An empirical analysis. Journal of Business Finance and Accounting 9-10, 1173-1209.

Fazzari, S. M., Hubbard, R.G., Petersen, B., 1996. Financing constraints and corporate investment. NBER Working Paper, No. 5462.

Fazzari, S.M., Hubbard, R.G., Petersen, B.C., 1988. Financing constraints and corporate investment. Brookings Papers on Economic Activity, 141-195.

Flannery, M. J., Rangan, K.P., 2005. Partial adjustment toward target capital structures. Journal of Financial Economics, forthcoming.

Frank, M. Z., Goyal, V. K., 2003. Testing the pecking order theory of capital structure. Journal of Financial Economics 67, 217-248.

Franks, J., Mayer, C., Renneboog, L., 2001. Who disciplines management in poorly performing countries? Journal of Financial Intermediation 10, 209-248.

Franks, J., Mayer, C., Rossi, S., 2003. The origination and evolution of ownership and control. ECGI working paper 09/2003.

Friend, I., Lang, L. H. P., 1988. An empirical test on the impact of managerial self-interest on corporate capital structure. Journal of Finance 43, 271-281.

Gadhoum, Y., Lang, L. H. P., Young, L., 2004. Who controls US? European Financial Management, forthcoming.

Goergen, M., Renneboog, L., 2001a. Strong managers and passive institutional investors in the UK. In F. Barca and M. Becht, Eds., The control of corporate Europe, Oxford: Oxford University Press.

Goergen, M., Renneboog, L., 2001b. Investment policy, internal financing and ownership concentration in the UK. Journal of Corporate Finance 7, 257-284.

Graham, J. R., Harvey, C. R., 2001. The theory and practice of corporate finance: Evidence from the field. Journal of Financial Economics 60, 187-243.

Graham, J., 2000. How big are the tax benefits of debt? Journal of Finance 55, 1901-1942.

Greenbury Report, 1995. Directors' remuneration: Report of a study group. Chairman, Sir Richard Greenbury, London, GEE.

Greenwald, B., Stiglitz, J., Weiss, A., 1984. Informational imperfections and macroeconomic fluctuations. American Economic Review 74, 194-199.

Guedes, J., Opler, T., 1996. The determinants of the maturity of corporate debt issues. Journal of Finance 51, 1809-1833.

Hampel Report, 1998. Committee on corporate governance: Final report. Chairman, Sir Ronald Hampel. London, GEE.

Harris, M., Raviv, A., 1990. Capital structure and the informational role of debt. Journal of Finance 45, 321-349.

Hart, O., 1995. Corporate governance: Some theory and implications. The Economic Journal 105, 678-689.

Hayashi, F., 1982. Tobin's average q and marginal q: A neoclassical interpretation. Econometrica 50, 213-224.

Hermalin, B., Weisbach, M., 1991. The effect of board composition and direct incentives on firm performance. Financial Management 20, 101-112.

Hermalin, B., Weisbach, M.,2003, Boards of Directors as an Endogenously-Determined Institution: A Survey of the Economic Evidence. Economic Policy Review, – Federal Riserve Bank of New York 9, 7-26.

Higgs Report, 2003. Review of the role and effectiveness of non-executive directors. London, GEE.

Himmelberg, P. C., Hubbard, R. G., Palia, D., 1999. Understanding the determinants of managerial ownership and the link between ownership and performance. Journal of Financial Economics 53, 353-384.

Holdemess, Clifford G., Randall S. Kroszner and Dennis P. Sheehan, 1999. Were the old days that good? Changes in managerial stock ownership since the great depression. Journal of Finance, 54, 435-469

Holderness, C. G., 2003. A survey of blockholders and corporate control. Economic Policy Review, – Federal Riserve Bank of New York 9, 51-64.

Holderness, C. G., Sheehan, D. P., 1988. The role of majority shareholders in publicly held corporations: An exploratory analysis. Journal of Financial Economics 20, 317-347.

Hoshi, T., Kashyap, A., Scharfstein, D., 1991. Corporate structure, liquidity and investment: Evidence from Japanese industrial groups. Quarterly Journal of Economics 20, 33-60.

Hovakimian, A., Opler, T., Titman, S., 2001. The debt-equity choice. Journal of Financial and Quantitative Analysis 36, 1-24.

Hovakimian, G. and Titman, S., 2003. Corporate investment with financial constraints: Sensitivity of investment to funds from voluntary asset sales. NBER Working Paper, No. 9432.

Hubbard, R. G., 1998. Capital-market imperfections and investment. Journal of Economic Literature XXXVI, 193-225.

Iona, A., Leonida, L., Ozkan, A., 2004. Determinants of financial conservatism: Evidence from low-leverage and cash-rich UK Firms. Discussion Papers in Economics, University of York, n.2004/01.

Jaffee, D.M., Russell, T., 1976. Imperfect information, uncertainty, and credit rationing. Quarterly Journal of Economics 90, 651-666.

Jagannathan, M., Stephens, C.P., Weisbach, M.S., 2000, Financial Flexibility and the choice between dividends and stock repurchases. Journal of Financial Economics, 57, 355-384

Jennings, W. W., 2005. Further evidence on institutional ownership and corporate value. Advances in Financial Economics 11, 167-207.

Jensen, C. M., 1986. Agency costs of free cash flow, corporate finance and takeovers. American Economic Review 76, 323-329.

Jensen, C. M., 1993. The modern industrial revolution, exit and failure of internal control systems. Journal of Finance 48, 831-880.

Jensen, C. M., Meckling, W., 1976. Theory of the firm: Managerial behaviour, agency cost and capital structure. Journal of Financial Economics 3, 305-360.

Jensen, G. R., Solberg, D. P., Zorn, T. S., 1992. Simultaneous determination of insider ownership, debt, and dividend policies. Journal of Financial and Quantitative Analysis 27, 247-263.

John, T. A., 1993. Accounting measures of corporate liquidity, leverage, and costs of financial distress. Financial Management 22, 91-100.

Johnson, S. A., 2003. Debt maturity and the effects of growth opportunities and liquidity risk on leverage. Review of Financial Studies 16, 209-236.

Kahn, C. Winton, A. 1998. Ownership Structure, Speculation and Shareholder Information. Journal of Finance, (53) 99-130

Kaplan, S. N., Zingales, L., 1997. Do investment-cash flow sensitivities provide useful measures of financing constraints? Quarterly Journal of Economics 112, 159-216.

Kaplan, S. N., Zingales, L., 2000. Investment-cash flow sensitivities are not valid measures of financing constraints. Quarterly Journal of Economics 115, 707-712.

Kim, C., Mauer, D. C., Sherman, A. E., 1998. The determinants of corporate liquidity: Theory and evidence. Journal of Financial and Quantitative Analysis 33, 335-359.

Kim, W. S., Sorenson, E. H., 1986. Evidence on the impact of the agency costs of debt on corporate debt policy. Journal of Financial and Quantitative Analysis 21, 131-144.

Kremp, E., Stöss E., Gerdesmeier, D., 1999. Estimation of a debt function: Evidence from French and German firm panel data. In A. Sauvé, M. Scheuer, Eds., Corporate finance in Germany and France. A joint research project of Deutsche Bundesbank and the Banque de France, SSRN working paper.

La Porta, R., De Silanes, L. F., Shleifer, A., 1999. Corporate ownership around the world. Journal of Finance 54, 471-517.

La Porta, R., De Silanes, L. F., Shleifer, A., Vishny, R. W., 2002. Investor protection and corporate valuation. Journal of Finance 58, 1147-1169.

Lang, L. E., Ofek, E., Stulz, R., 1996. Leverage, investment and firm growth. Journal of Financial Economics 40, 3-29.

Lasfer, M.A., 1995. Agency costs, taxes and debt. European Financial Management 1, 265-85.

Lasfer, M.A., 2002. Board structure and agency costs. Working Paper, Cass Business School, City University, London.

Lasfer, M.A., 2004. On the monitoring role of the board of directors: The case of the adoption of Cadbury recommendations in the U.K. Advances in Financial Economics 9, 1287-1326.

Leech, D., 2002. Shareholder voting power and ownership control of companies. Homo Oeconomicus XIX, 345-373.

Leech, D., 2003. Computing power indices for large weighted voting games. Management Science 49, 831-838.

Leech, D., Leahy, J., 1991. Ownership structure, control type classification and the performance of large British companies. Economic Journal 101, 1418-1437.

Leland, H. E., Pyle, D. H., 1977. Informational asymmetries, financial structure, and financial intermediation. Journal of Finance 32, 371-387.

Loderer, C. F., Martin, K., 1997. Executive stock ownership and performance: Tracking faint traces. Journal of Financial Economics 45, 223-255.

Marchica, M.-T., Mura, R., 2005. Direct and ultimate ownership structures in the UK: An intertemporal perspective over the last decade. Journal of Corporate Governance: An International Review 13, 26-45.

Maug, E., 1998. Large shareholders as monitors: is there a trade-off between liquidity and control? Journal of Finance, 53, 65-98.

Mayer, C., Sussman, O., 2004. A new test of capital structure. CEPR Discussion Paper No. 4239.

McConnell, J.J., Muscarella, C. J., 1985. Corporate capital expenditures and the market value of the firm. Journal of Financial Economics 14, 399-422.

McConnell, J.J., Servaes, H., 1990. Additional evidence on equity ownership and corporate value. Journal of Financial Economics 27, 595-612.

McConnell, J.J., Servaes, H., 1995. Equity ownership and the two faces of debt. Journal of Financial Economics 39, 131-157.

Mehran, H. 1995., Executive compensation structure, ownership, and firm performance. Journal of Financial Economics 38, 163-184.

Mehran, H., 1992. Executive incentive plans, corporate control, and capital structure. Journal of Financial and Quantitative Analysis 27, 539-560.

Mikkelson, W.H., Partch, M.M., 2003. Do persistent large cash reserves hinder performance? Journal of Financial and Quantitative Analysis 38, 275-294.

Milgrom, P., Roberts, J., 1992. Economics, organization and management. Englewood Cliffs, New Jersey: Prentice Hall.

Minton, B. A., Wruck, K. H. 2001. Financial conservatism: Evidence on capital structure from low-leverage firms. Working paper.

Modigliani, F., Miller, M., 1963. Taxes and the cost of capital: A correction. American Economic Review 53, 3-443.

Morck, R., Shleifer, A., Vishny, R. W., 1988. Management ownership and market valuation: An empirical analysis. Journal of Financial Economics 20, 293-315.

Myers, S. C., 1977. Determinants of corporate borrowing. Journal of Financial Economics 5, 147-75.

Myers, S. C., 1984. The capital structure puzzle. Journal of Finance 39, 575-592.

Myers, S., Majluf, N., 1984. Corporate financing and investment decisions when firms have information that investors do not have. Journal of Financial Economics 13, 187-221.

Nenova, T., 2003. The value of corporate voting rights and control: A cross-country analysis. Journal of Financial Economics 68, 325-351.

Nickell, S., 1981. Biases in dynamic models with fixed effects. Econometrica 49, 1417-26.

Opler, T., Pinkowitz, L., Stulz, R., Williamson, R., 1999. The determinants and implications of cash holdings. Journal of Financial Economics 52, 3-46.

Ozkan, A., 2001., Determinants of capital structure and adjustment to long run target: Evidence from UK company panel data. Journal of Business Finance and Accounting 28, 175-198.

Ozkan, A., Ozkan, N., 2004. Corporate cash holdings: An empirical investigation of UK companies. Journal of Banking and Finance 28, 2103-2134.

Parrino, R., Sias, R. W., Starks, L. T. 2003. Voting with their feet: Institutional ownership changes around forced CEO turnover. Journal of Financial Economics 68, 3-46.

Peasnell, K. V., Pope, P. F., Young, S., 2003. Managerial equity ownership and the demand for outside directors. European Financial Management 9, 99-118.

Petersen, M., Rajan, R., 1994. The benefits of lending relationships: Evidence from small business data. Journal of Finance 49, 3-37.

Plender, J., 1997. A stake in the future: The stakeholding solution. London: Nicholas Brealey Publishing.

Pound, J., 1988. Proxy contests and the efficiency of shareholder oversight. Journal of Financial Economics 20, 237-265.

Rajan, R. G., Zingales, L., 1995. What do we know about capital structure? Some evidence from international data. Journal of Finance 50, 1421-60.

Roe, M., 1993. Some differences in corporate structure in Germany, Japan, and the United States. Yale Law Journal 102, 1927-2003.

Rosenstein, S., Wyatt, J.G., 1990. Outside directors, board independence and shareholder wealth. Journal of Financial Economics 26, 175-191.

Ross, S. A., 1977. The determination of financial structure: The incentive signalling approach. Bell Journal of Economics 8, 23-40.

Seifert, B., Gonenc, H., Wright, J., 2005. The international evidence on performance and equity ownership by insiders, blockholders, and institutions. Journal of Multinational Financial Management 15, 171-191.

Shleifer, A., Vishny, R. W., 1986. Large shareholders and corporate control. Journal of Political Economy 94, 461-488.

Shleifer, A., Vishny, R. W.,1989. Management entrenchment: The case of manager-specific investments. Journal of Financial Economics 25, 123-140.

Shleifer, A., Vishny, R., 1997. A survey of corporate governance. Journal of Finance 52, 737-783.

Shleifer, A., Wolfenzon, D., 2002. Investor protection and equity markets. Journal of Financial Economics 58, 3-27.

Short, E., Keasey, K., 1999. Managerial ownership and the performance of firms: Evidence from the UK. Journal of Corporate Finance 5, 79-101.

Short, H., 1994. Ownership, control, financial structure and the performance of firms. Journal of Economic Surveys 8, 202-249.

Shyam-Sunder, L., Myers, S. C., 1999. Testing static trade-off against pecking order models of capital structure. Journal of Financial Economics 51, 219-244.

Smith, C. W., Watts, R. L., 1992. The investment opportunity set and corporate financing, dividend, and compensation policies. Journal of Financial Economics 32, 263-92.

Smith, C., Warner, J., 1979. On financial contracting: An analysis of bond covenants. Journal of Financial Economics 7, 117-161.

Stapledon, G., 1996. Analysis of data and share ownership and control in UK. Mimeo.

Stiglitz, J. E., 1985. Credit markets and control of capital. Journal of Money, Credit and Banking 17, 133-152.

Stulz, R., 1988. Managerial control of voting rights. Journal of Financial Economics 20, 25-54.

Sudarsanam, S., 1996. Large shareholders, takeovers and target valuation. Journal of Business Finance & Accounting 23, 295-314.

Titman, S., Wessels, R., 1988. The determinants of capital structure choice. Journal of Finance 43, 1-19.

Tobin J., 1969. A general equilibrium approach to monetary theory. Journal of Money, Credit and Banking 1, 15-29.

Vogt, S. C., 1994. The cash flow/investment relationship: Evidence from U.S. manufacturing firms. Financial Management 23, 3-20.

Webb, R., Beck, M., McKinnon, R., 2003. Problems and limitations of institutional investor participation in corporate governance. Corporate Governance: An International Review 11, 65-73.

Weir, C., Laing, D., McKnight, P., 2002. Internal and external governance mechanisms: Their impact on the performance of large UK public companies. Journal of Business Finance & Accounting 29, 579-611.

Whited, T., 1992. Debt, liquidity constraints, and corporate investment: Evidence from panel data. Journal of Finance 47, 1425-1460.

Williamson, O., 1988. Corporate finance and corporate governance. Journal of Finance 43, 567-591.

Wolfenzon, D., 1999. A theory of pyramidal structures. Mimeo, Harvard University.

Yermack, D., 1996. Higher market valuation of companies with small board of directors. Journal of Financial Economics 40, 185-213.

Young, S., 2000. The increasing use of non-executive directors: Its impact on UK board structure and governance arrangements. Journal of Business Finance & Accounting 27, 1311-1342.

Zeckhauser, R.J., Pound, J., 1990. Are large shareholders effective monitors? An investigation on share ownership and corporate performance. In R. G. Hubbard, Ed., Asymmetric information, corporate finance and investment. Chicago: University of Chicago Press, 149-180.

Zhou, X., 200. Understanding the determinants of managerial ownership and the link between ownership and performance: Comment. Journal of Financial Economics 62, 559-571.