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The Role of the Board of Directors in Private Equity Firms: An Empirical Analysis of the Performance of Listed Private Equity Firms

by

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For my mother

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1. Introduction

1.1. Motivation

"[…] I believe that directors ought to be relatively few in number – say, ten or less – and ought to come mostly from the outside. The outside board members should establish standards for the CEO's performance and should also periodically meet, without his being present, to evaluate his performance against those standards."

Warren E. Buffett (2001) on boards and managers

Jensen and Meckling (1976) describe the potential conflict between shareholders and managers that may arise in corporations where control and ownership is separated. This issue is captured in the corporate governance literature as the principal-agent problem, where managers control the operations of the firm and principals provide capital for investment projects. Jensen (1986) describes private equity as an efficient approach to solving the conflict between managers and shareholders.

Jensen (1989) argues that private equity portfolio firms have a superior organizational structure compared to typical public corporations with atomistic ownership, and that this superiority is particularly evident in their portfolio firms. In fact, private equity firms implement corporate governance mechanisms in the organizational structure of these firms. First, they create incentives for the management of the portfolio firm. Second, they use debt to finance their transactions – hence the term leveraged buyout. Moreover, the use of debt is an additional incentive for the management to perform well in order to avoid bankruptcy. Finally, private equity firms acquire the majority stakes of their portfolio firms, which allows them to monitor and advise the management of those firms.[1]

In this context, Shleifer and Vishny (1997) define corporate governance as entailing institutions and mechanisms that assure that the suppliers of capital receive an appropriate return on their investment. Corporate governance literature provides many findings relevant

[1] Compare besides Jensen (1989) also Kaplan and Strömberg (2009).

to Jensen's arguments. In particular, empirical studies analyze the impact of private equity investments on the value of portfolio firms. These studies mostly measure the value effects of the portfolio firms with an event study and an ordinary least square regression model.[2]

However, the literature provides little understanding of the internal governance structure of private equity firms. In other words, corporate governance literature fails to provide empirical evidence on the monitoring and advice requirements of private equity firms themselves. For instance, in their survey paper Kaplan and Strömberg (2009) provide four arguments why private equity firms have a superior structure. First, their organization is lean and decentralized. Second, they employ experts form different industries to restructure their portfolio firms. Third, the compensation structure of private equity managers is based on the pay for performance principle, which incentivizes the management to outperform their benchmark. Finally, due the fact that private equity funds are closed-end funds with a limited lifetime of ten to thirteen years, they have to outperform their benchmark to generate returns for their investors. In sum, all these arguments indicate that private equity firms have little requirement for internal monitoring, but require advice from outside directors. Yet the corporate governance literature does not provide much understanding of the role of the board of directors in private equity firms.

Besides investigations on private equity investments, the corporate governance literature provides many publications in recent years on the topic of the board of directors. In corporate governance literature, the board of directors monitors and advises the CEO on key corporate decisions (Larcker and Tayan 2011: 223). Several empirical studies show that characteristics such as board size, number of outside directors and founders influence corporate value and performance.[3] For instance, Coles et al. (2008) find evidence that industrial firms with high advisory requirements have larger boards and more outside directors on their board than those with less advisory requirements. On the role of founders on the board of directors Andres (2008) points out that German family firms in which family members actively participate on the board of directors outperform their benchmark.

[2] Compare findings such as Lehn and Poulsen (1989) on going private transactions, Renneboog et al. (2005) on LBO transactions in the UK, Betzer (2006) as well as Betzer (2007) on European LBOs, and Achleitner et al. (2010) on the announcement effects of hedge funds and private equity investments.

[3] Compare the publications of Yermack (1996), Coles, Daniel and Naveen (2008), Bonne et al. (2007) on the performance of industrial firms and Linck et al. (2008) on the performance of banks.

Moreover, Fahlenbrach (2009) investigates the impact of founder and non-founder CEOs in industrial firms. His findings indicate that founder CEOs have a positive and significant impact on the performance of such firms.

Taking these findings together, one can say that empirical investigations have considered the value effect of private equity investments and the role of the board of directors in industrial corporations. However, there is only limited empirical evidence for the organizational structure of private equity firms and the specific role of their boards of directors.

1.2. Aim

The aim of this thesis is to investigate the role of the board of directors in listed private equity (LPE) firms and its impact on the performance of such firms. In order to empirically answer the research question as to whether certain company and board characteristics impact the performance of LPE firms, the thesis applies a unique panel data set. In particular, it applies proxy variables to measure the advice requirements, founder status and managerial ownership of LPE firms. In doing so, it applies proxy variables such as number of board meetings, board size, ratio of outside directors, founder CEO on the board, and CEO ownership to the performance variables of Tobin's Q and return on assets (ROA).

1.3. Contribution and outline

This thesis uses a unique panel data set with over 600 observations on the corporate and board structure of listed private equity firms. The purpose of the dissertation is to show the differences and similarities between these characteristics in industrial, family and private equity firms. As far as I know there is no literature that investigates on an extensive empirical scale the board structure of private equity firms, therefore this dissertation contributes in several ways to the existing literature on private equity. First, it empirically describes the main differences in firm characteristics between industrial, family and LPE firms. These firm characteristics are e.g. performance measure such as Tobin's Q and ROA,

and other characteristics such as total assets, leverage and company age. Second, it seeks to investigate the role of the board of directors in LPE firms and its impact on company performance.

The remainder of this thesis is organized as follows. Chapter 2 presents the foundation for the corporate governance literature, first dealing with the principal-agent theory – which explains the problem between owners and managers in firms where ownership and control is separated – and secondly describing corporate governance and indicating institutions and mechanisms that reduce the principal-agent problem. Thirdly the chapter describes the superior organizational structure of private equity firms and discusses in particular the organizational structure of unlisted and listed private equity firms. Finally, to complete the picture of research into corporate governance in the private equity segment, it presents the empirical findings on private equity investments.

Chapter 3 provides an overview of the literature on the board of directors. The chapter starts with an explanation of the performance variables Tobin's Q and ROA. It goes on to provide an overview of the board, founder and ownership literature. I use the literature on the board of directors, founders and ownership characteristics to set my hypotheses, which will be part of the multivariate analysis of Chapter 5. Chapter 3 ends with an overview of the hypotheses on advice, founder status and managerial ownership of LPE firms.

Chapter 4 presents the unique data set of the present thesis and gives an overview of some descriptive statistics. Furthermore, it presents the existing literature on industrial, family and LPE firms, with a particular focus on the findings on company and board characteristics.

Chapter 5 uses the underlying panel data set to answer the hypotheses set in Chapter 3. As mentioned above, two performance measures are used: Tobin's Q and ROA. Besides the dependent variables, the thesis uses proxies to investigate the impact of advice from the board of directors, the impact of 'founder on the board', and the impact of managerial ownership on the performance of LPE firms. The chapter starts with an introduction into econometric methods. Discussion focuses in particular on the fixed effects and random effects model, and the Hausman test. Finally, Chapter 5 presents the empirical findings on the advice, founder and ownership proxies on the performance of LPE firms.

The thesis ends with the Conclusion in Chapter 6.

2. Corporate governance and private equity

"The directors of such companies, however, being the managers rather of other people's money than of their own, it cannot well be expected that they should watch over it with the same anxious vigilance with which the partners in a private copartnery frequently watch over their own."

Adam Smith in *Wealth of Nations* (1776)

The following chapter will start with an introduction into the principal-agent theory. The general concept of this theory is described in the publication of Jensen and Meckling (1976) on the theory of the firm. In that paper Jensen and Meckling (1976) describe the potential conflicts between shareholders and managers that may arise in corporations where control and ownership are separated. The owners' task to oversee the actions of the management becomes difficult in firms with a diffuse ownership structure.

After briefly expounding the principal-agent theory, this chapter will present an overview of corporate governance as a body of institutions and mechanisms that may help solve the agency problem, and will proceed to a description of the board of directors as a (theoretical) internal corporate governance mechanism. Chapter 3 will then give a detailed overview of the theoretical concepts and empirical findings of the board of directors' literature. The empirical analysis of this thesis deals with the board characteristics of private equity firms. But all board characteristics, according to the corporate governance literature, are internal governance mechanisms. Besides, it is interesting to observe that private equity firms use several governance mechanisms such as takeover, debt, monitoring and advice, as well as compensation incentives for the boards of their portfolio firms to solve the agency conflict. Nevertheless, the empirical analysis of this thesis will focus solely on board characteristics and their impact on the performance of private equity firms.

The present chapter covers the organizational structure of unlisted as well as listed private equity firms. However, the empirical literature of the last two decades mostly focuses on the effect of private equity investments at the portfolio firm level. In other words, scholars have generally failed to investigate the internal governance mechanisms of private equity firms.

However, given that Jensen (1986) describes private equity as a superior organization structure that solves the principal-agent problem, a better understanding of the internal governance mechanisms of private equity firms would certainly be beneficial for corporate governance literature. In particular, it would be interesting to see whether the governance and incentive mechanisms that private equity applies to its portfolio firms also pertain within the private equity firms themselves. In other words, the question arises whether the superior organizational structure is consistent internally and externally within the private equity industry. A further question is whether there are similarities and differences in firm and board characteristics between private equity[4] and other organizational structures such as family or industrial firms.

With a view to filling the gap in the corporate governance literature, the thesis will, therefore, focus on the board of directors of listed private equity (LPE) firms. The chapter will close with an overview of the findings on the wealth effects of shareholders and stakeholders in private equity investments.

[4] I follow here again the hypothesis of Jensen (1986) that private equity is a superior organization structure.

2.1. Principal-agent theory and corporate governance

The following sub-chapter will discuss the principal-agent theory, which is partly mentioned in the publications of Adam Smith (1776) and Alchian and Demsetz (1972). However, Jensen (1976) outlines the problem between owners and managers, who in his theory are both value-maximizing agents. He points out that in the principal-agent theory managers have an information advantage and use this advantage at the cost of the owners. This opportunistic behavior causes agency costs, which reduce overall economic welfare and value. Corporate governance mechanisms can help solve the problem. This sub-chapter will, then, first discuss the principal-agent theory and close with an overview of corporate governance mechanisms.

2.1.1. Principal-agent theory

Adam Smith (1776) provides a theory of markets but without elaborating a theory of the firms that operate in these markets. In Smith's theory they simply use input factors to generate their output. He describes firms as profit-maximizing actors. However, he does not describe the issue between managers and owners when ownership structure is divided. Alchian and Demsetz (1972) address the theory of the firm and describe different aspects of company behavior with a particular focus on property rights.[5]

The principal-agent theory of Jensen and Meckling (1976) explains the conflict between shareholders and managers that arises when ownership and control are separated. The conflict arises due to the different interests of both parties. Managers have an information advantage over shareholders on investment decisions. According to Jensen and Meckling

[5] Compare also the publications of Alchian (1965, 1968), Alchian and Kessel (1962) and Demsetz (1967).

managers can use their information advantage and their control over investment decisions to maximize their own interests. In the theory of the firm[6] the interest of the shareholder is straightforward: to maximize corporate value and, more specifically, the value of common stocks. On the other hand, managers may want to gain recognition, increase their power within the firm and industry, or even reduce their workload. There are three potential conflicts in this area that can lead to greater agency costs and hence further reduce shareholder wealth: managers' desire to remain in power[7], their risk aversion, and the free cash flow problem. These will now be described.

2.1.1.1. Management power

In general, managers prefer to stay in office than lose their job. One way to stay in office is to perform well. In theory shareholders will not remove managers when they achieve their expected goals. However, managers have different strategies to entrench themselves in corporations. First, they can increase their power within the company by increasing their equity ownership or sitting in important positions. The increase in power allows them to vote against their release. Secondly, they can invest in specific projects, which increase the information costs of the firm. This increase makes it difficult for the firm to find an adequate successor for the current manager.[8]

On the other hand, corporations hire management teams to lead the firm well. If management teams do not achieve their negotiated goals the shareholders will replace them.

[6] The theory of the firms considers the definition of Jensen and Meckling (1976).

[7] The desire of the manager to stay in power is also called entrenchment.

[8] Adams, Almeida and Ferreira (2005) address the impact of CEO power on company value. The paper describes clearly the different types of CEO power.

But the conflict between shareholders and managers can be very costly for the shareholders and hence seriously reduce their wealth.[9]

2.1.1.2. Managerial risk aversion

The portfolio management literature suggests that all rational participants in the financial market are risk averse. From the shareholder point of view two circumstances matter. First, shareholders invest their capital in firms with positive net present value projects. Secondly, shareholders reduce their risk by selecting their portfolio and diversifying it by investing in different asset classes. The theory of portfolio diversification indicates that if the investment in a specific asset fails, the shareholder does not lose all the invested capital, because the portfolio is diversified. On the other hand, a manager is more concerned about risk within the firm. In general, managers invest their human capital and receive compensation for their work. This is partly performance related, and well-performing managers receive an equity stake as a reward for past performance. Taking the human capital investment and equity stake together, managers are heavily invested in a single firm. Jensen and Meckling (1976) point out that they are, therefore, necessarily risk-averse. In other words, they may be unwilling to invest in projects with a high downside risk because they can cost them their job, as well as reducing their equity stake.

2.1.1.3. Free cash flow

Jensen (1986) defines free cash flow as the discounted sum of all cash flows at the relevant cost of capital that remains after funding all projects with a positive net present value (NPV). Conflict between managers and shareholders arises when it comes to the utilization of the

[9] Jensen (1986) describes how private equity firms address managerial incentives and monitoring.

free cash flow. In firms with outstanding debt the management has to use a certain amount of the free cash flow to oblige the firm's creditors. After the firm has met its obligations, management can use the free cash flow in one of three ways. First, it can pay the free cash flow out to the shareholders. Managers can pay dividends to their shareholders or repurchase shares, which has in theory the same outcome for the shareholders. However, according to Jensen (1986), dividend payment is a weak promise because the dividend payments can change over time. Alternatively, managers can issue debt, which is a stronger promise than dividend payments. Debt creation is a strong promise because it binds the management to pay interest and principal to the creditors and furthermore pay out future free cash flow to the shareholders. Jensen (1986) points out that a firm faces bankruptcy charges if it does not maintain its interest and principal payments.[10]

Secondly, management can reinvest the free cash flow in new projects that increase shareholder value. However, this argument contradicts Jensen's definition, because the free cash flow results from cash flows after funding all projects with positive NPV. For this reason shareholders do not want management to invest free cash flow in projects with negative NPV.

Thirdly, management can hold free cash flow under its control and invest it in financial securities. In theory, shareholders know how to use free cash flow efficiently: they can use it for consumption or reinvest it in their portfolio. And managers are interested in investing in new projects. One reason for this behavior is that managers may mistakenly assume that there are still investment projects with a positive NPV. Moreover, managers want to increase the assets under their control because it increases their power and prestige. Finally, managerial compensation increases with firm size. On the hypothesis that managers want to increase the assets under management, Murphy (1999) points out that CEO compensation is affected by the size as well as by the industrial sector of a corporation.

Taking Jensen's arguments further, Tirole (2001) argues in his theoretical section that residual control and cash flow rights remain in the hands of shareholders. In other words, shareholders can claim both to control the management and to pay out free cash flow.

[10] Jensen (1986) sees the free cash flow problem as more important in mature industries in which firms have stable free cash flows and low growth rates. The same article describes how private equity firms use debt as an instrument for management incentives.

Jensen describes the life cycle of firms and notes that over their lifetime they require different degrees of entrepreneurial and managerial skill, as well as financial capital. He argues in his 1989 paper "The Eclipse of the Public Corporation" that the conflict between managers and shareholders is more intense in mature public organizations than in growth industries. However, the overall benefits of separating management and ownership must be greater than the costs, otherwise organizations with such a structure would not survive over time. Corporate governance takes a comprehensive view of all the mechanisms that help shareholders and managers to solve their conflict of interests.

2.1.1.4. Solution of the agency problem

Jensen and Meckling (1976) describe not only the interest conflict between shareholders and managers, but also three approaches that can reduce that conflict. All three approaches include transaction costs, which in the corporate finance literature are called agency costs. First, shareholders can bind the manager with a contract to act in their interests. Secondly, they can monitor management actions to ensure that these are in their interests. Finally, they can create incentives that align the manager's interests with their own.

One possible solution for the agency problem is a contract that binds the manager to maximize shareholder wealth. Jensen and Meckling (1976) observe that such contracts are generally costly, and there are a number of reasons why a contract of this sort cannot be perfect. First, it should include every future issue of the corporation and every possible action that a manager might undertake to solve that specific issue. Such a contract can only exist in theory, not in a world where the future is uncertain. Moreover, managers rather than shareholders know how to maximize company value: shareholders hire managers precisely because they do not themselves know how to run an organization. So a contract solution that binds the manager's every action will, from the shareholders' point of view, be counter-productive.

Another solution suggested by Jensen and Meckling (1976) is to monitor management actions and investment decisions. However, there are two objections to this idea. First, as already discussed with respect to contractual binding, shareholders lack management experience and expertise: they cannot distinguish between good and bad decisions. An investment decision that was good from the shareholder standpoint might turn out badly in future. Effective monitoring of management actions and investment decisions presumes a critical awareness of the difference between value creating and value destroying decisions.

A second instance described by Jensen and Meckling (1976) is that of corporations with diffuse ownership structure. Here a single shareholder with a small ratio of the common equity lacks the incentive to oversee management actions. Jensen and Meckling point out that monitoring is also associated with agency costs, and in the case of the small shareholder these may well outweigh the benefits. On the other hand, shareholders with large equity stakes have a proper incentive to monitor the actions of the management, and most large shareholders also perform well as monitors.

Finally, the corporate governance literature outlines the different effects on corporate value of monitors such as the board of directors, banks in the role of creditors, and private investors such as hedge funds and private equity investors.

The last approach outlined by Jensen and Meckling to solve the conflict between shareholders and management is to create incentives for the management to act in the shareholders' interests. The corporate governance literature calls this the *interest alignment hypothesis*. The hypothesis suggests that managerial ownership creates an incentive for managers to increase shareholder value because they are themselves shareholders. A manager with equity ownership is interested in paying out the free cash flow rather than investing it in negative NPV projects or keeping it in the firm. Manager ownership solves the conflict of interest by benefitting both parties: management as well as shareholders.[11]

A large number of empirical analyses provide evidence that private equity firms solve the principal-agent problem described by Jensen and Meckling (1976). In order to complete the picture on corporate governance, and in particular on private equity as one specific modality

[11] Jensen and Meckling (1976) provide the theoretical arguments for the alignment of interest hypothesis. Morck et al. (1988), among others, investigate the relationship between managerial ownership and company performance.

of corporate governance, sub-chapter 2.2. will discuss the organizational structure of private equity firms and give an overview on empirical findings with regard to private equity investments.

2.1.2. Corporate governance

The principal-agent theory is the basic concept that makes corporate governance necessary. It discusses the conflict that can arise between shareholders and managers and proposes institutions and mechanisms that may help solve it. This section discusses four corporate governance definitions and corresponding solution mechanisms proposed by Jensen (1993).

Jensen (1993) divides corporate governance into four categories. First, he describes *capital markets*, which operate under regulatory and legal constraints to safeguard the capital of investors. Secondly, the *legal-political-regulatory system* provides institutions through which investors can take legal action to punish misbehavior on the part of managers. Thirdly, Jensen mentions the *product and factoring markets* which, however, react relatively slowly to inefficient managerial behavior and can therefore waste valuable resources. Finally, *internal control systems* such as the board of directors can oversee managerial actions.

In general, corporate governance is concerned with institutions and mechanisms to alleviate conflict between shareholders and managers and safeguard investors' capital. Shleifer and Vishny (1997), Gillan and Starks (1998), Rajan and Zingales (2000), and Denis (2001) provide definitions of corporate governance that focus on different aspects of this issue. In their survey paper about corporate governance Shleifer and Vishny (1997) consider the relationship between the supply of finance and corporations. In their view, corporate governance concerns the mechanisms that ensure that financiers get an appropriate return on investment. Gillan and Starks (1998) focus on legal aspects, summarizing corporate governance as the body of laws, rules, and other factors that control the operations of a

corporation. Rajan and Zingales (2000) defines corporate governance as a complex set of constraints to ensure that investors realize part of the future profits of a firm. Finally, Denis (2001) describes corporate governance as a body of institutional and market mechanisms that motivate the self-interested agent to maximize shareholder value.

2.1.2.1. Legal and regulatory mechanisms

In general, the system of national, transnational, and international laws and regulations external to a company, which determines the context in which it operates, is nevertheless outside the remit of corporate governance (Denis 2001: 198). However, corporate governance literature deals with the question how such systems affect corporate finance, including external finance. For instance La Porta et al. (1997) investigate how legal protection affects shareholders and creditors. They see the legal system in which a firm operates as affecting its ability to access external finance.

Corporate governance research also investigates the impact of legal changes on shareholder wealth. A common approach is to investigate company performance before and after such change. For instance, Linck et al. (2008) examine the determinants of board structure pre and post the Sarbanes-Oxley Act. Finally, a large body of literature addresses the impact of antitakeover provisions on shareholder wealth and the employment market for directors.[12]

[12] Szewczyk and Tsetsekos (1992) and Coles and Hoi (2003) analyze antitakeover provisions on shareholder wealth and the labor market for directors.

2.1.2.2. Internal control mechanisms

This section presents different internal control mechanisms of corporate governance: the board of directors, executive compensation and ownership, and nonexecutive ownership. The characterization of the board of directors as an internal control mechanism is an important issue here, as the overall research objective of the thesis is to investigate the board of directors of private equity firms. In line with this, Chapter 3 will present the theoretical argumentation and findings of the relevant literature and Chapter 4 will present the findings of the empirical analysis. Secondly, this section covers the corporate governance view of executive compensation and ownership. This will also be part of the literature overview of Chapter 3 and of the empirical analysis in Chapter 4. Finally, the section deals with nonexecutive ownership as an internal control mechanism.

First, the legal system in question requires that a corporation should have a **board of directors**, but does not stipulate its size or how many independent directors should sit on the board. The board of directors is elected by the shareholders; its function is to monitor and advise the management on behalf of the shareholders. Shareholders have neither the ability nor the time to oversee management actions themselves, so the board of directors should ensure their interests. In practice the CEO and the management team will try to gain the understanding of the directors for their investment projects. Following corporate scandals such as the Enron fraud case, regulators and investment companies have called for board reforms. The general view is that a decrease in board size and an increase in the number of outside directors should increase shareholder value. The literature argues that small boards do their work more efficiently, because small teams need less time to discuss and make decisions on corporate questions. Furthermore, the composition of the board has an effect on its monitoring and advisory functions. Boards with a larger proportion of outside directors will oversee the CEO and management better than boards with more internal directors. This hypothesis suggests that directors who are members of the management team, or are otherwise affiliated to the company, will monitor its actions less effectively (Gillan 2006: 384-385).

Empirical research shows that board size and composition have an effect on company performance. However, board size and the ratio of outside directors[13] depend on information costs. Duchin et al. (2010) find that a decrease in board size increases performance for firms with low information costs. Conversely, a decrease in board size decreases performance for firms with high information costs. In line with these findings they further show that an increase in the ratio of outsiders has a negative impact on firms with high information costs. However, firms with low information costs increase in performance with an increase of outside directors.

Secondly, **executive compensation and ownership** is a common corporate governance mechanism in corporate finance. According to Jensen and Meckling (1976) executive compensation and ownership is a management incentive mechanism that reduces conflict between managers and owners. In theory, executive compensation and ownership align the interests of management and owner. Denis (2001) distinguishes two dimensions of compensation: cash compensation and pay for performance. Empirical investigations show that executive compensation has changed over the last 30 years. For instance, Murphy (1999) describes the development of executive compensation from 1970 to 1996 and concludes that over this period the median cash compensation for S&P 500 CEOs doubled. Taking stock options and other performance-related compensation into account, compensation quadrupled over the same period. Murphy also points out that executive compensation varies across industries, firm size, and countries.

On the one hand, compensation for performance, including executive ownership, should increase the incentive for managers to increase the value of the firm. But the dark side of such compensation is risk-averse behavior. First of all, managers are considered naturally risk averse and will prefer cash compensation to pay for performance, because they are presumed to have already invested a large portion of their human capital in the firm. It follows that performance-related compensation might lead them to invest in less risky projects. This behavior, however, is not in the interest of shareholders, who (in theory) have diversified portfolios and are not averse to risk at the corporate level (Denis 2001: 202-203).

[13] Defined as the number of outside directors divided by the total number of directors on the board.

Furthermore, management ownership can lead either to interest alignment or to management entrenchment. One of the first empirical investigations of management ownership and firm value is the analysis by Morck et al. (1988). Their findings show that management ownership of less than 5 percent leads to an increase in corporate value. However, management ownership of 5 to 25 percent decreases corporate value and leads to management entrenchment. The evidence thus shows that management ownership can align the interests of management and shareholders, whereas an overly large stake of ownership can lead to management entrenchment. Managers with a large stake in the company often have the power to remain in office even if they reduce shareholder value.

Thirdly, **nonexecutive ownership** is also considered to be an internal control mechanism. Shareholders who hold 5 percent or more of the common equity are defined in the corporate governance literature as significant shareholders or blockholders, and they naturally have a bigger incentive to oversee management decisions than shareholders with a relatively small stake in the common equity. Blockholders may be wealthy individuals, corporations or institutional investors. One type of institutional investor is the private equity firm, and such firms not only strictly monitor and advise the boards of their target firms,[14] but also employ incentives, for example compensation contracts that include pay for performance and equity stakes for the management.

Finally, **debt** is an instrument with a disciplinary effect that is often used in private equity transactions. Denis (2001) defines debt as one of four internal corporate governance mechanisms. In his theoretical paper Jensen (1986) describes the free cash flow problem and the conflict that arises between managers and shareholders in firms with large free cash flows when managers use the cash flow for consumption at the expense of the shareholders. Jensen's "control hypothesis" offers a solution to this problem. He recommends that firms should use the free cash flow to pay dividends or repurchase shares. In doing so, management can choose the amount of a dividend payment or share repurchase, and they can reduce these in future. However, because of this flexibility, dividend payment or share repurchase is considered a weak promise on the part of management. In contrast, debt creation is a stronger promise to pay out future free cash flows to the shareholders, because

[14] Target firm is the common term in the corporate governance literature for firms in which private equity companies invest.

debt binds the management both to pay interest and to repay principal. Management can lose some or all control rights if it does not fulfill its obligations. For this reason, Jensen recommends that dividends should be replaced by debt.

Private equity firms have taken up Jensen's basic idea of using debt financing as a market-based solution to the agency problem. During the 1980s they created the concept of leveraged buyouts. In the leveraged buyout transactions of that decade private equity firms bought target firms and financed these transactions with up to 90 percent debt – so called leverage. The typical candidates for leveraged buyout transactions were firms in the mature life cycle with no growth potential. Leveraged buyouts create value by solving the free cash flow problem. Section 2.2 will consider the private equity industry and leveraged buyouts in greater detail.

2.1.2.3. External control mechanisms

In addition to internal (and legal) corporate governance mechanisms, external control mechanisms such as mergers and acquisitions – in which, for example, an acquiring firm purchases the common stock of a target firm in order to control it – can provide a solution for the principal-agent conflict. The idea of such acquisitions is that the acquiring firm will improve the operations of the target firm and create value for its shareholders (Netter et al. 2009: 3).

Corporate governance research shows that poorly performing firms are more likely to be targets in takeover transactions. This mechanism creates an incentive for self-interested managers to perform well in order to avoid a takeover transaction, because poorly performing managers will likely lose their jobs, as well as control over the firm, in a takeover transaction. Such managers will, therefore, seek to increase the firm's value in order to survive in the market (Denis 2001: 206).

In theory the acquiring firm pays an appropriate price for the target firm on the market and creates value through the transaction. However, takeover transactions are related to so-called control contests, in which different acquirers bid for a target and thus raise the target price. However, takeovers are also time and money consuming: besides the transaction price the acquiring firm has to create an internal transaction division and hire transaction consultants. Moreover, target firms can use various anti-takeover tactics to avoid an unwanted offer (Netter et al. 2009: 2).

Most studies on takeover transactions find that the value for the shareholders of the target firm increases upon the announcement of a transaction. This suggests that takeover transactions create value for the target firm shareholders. However, these studies also find evidence that acquiring firms pay too much in takeover bids. The evidence on takeover transactions suggests that target shareholders increase their wealth, whereas the shareholders of the acquiring firm lose wealth in the transaction. In other words the takeover transaction is an investment project with a negative NPV for the shareholders of the acquiring firm.[15]

Holmstrom and Kaplan (2001) show that the number of takeover transactions increased from the beginning of the 1980s to the end of that decade. Between 1989 and 1992 the transaction volume decreased, and it increased again from 1992 to the end of the 1990s. Turning the focus onto private equity transactions[16] the same authors establish that private equity transactions rose from 1980 and reached their peak in 1988. After 1988 there was a sharp drop in these transactions. They conclude that corporate governance mechanisms changed over that period of time. Transactions in the 1980s were heavily leveraged: market participants used debt as a corporate governance mechanism to solve the conflict between management and shareholders. The mindset of participants changed in the 1990s, and they started to use monitoring and incentive-based compensation plans as corporate governance mechanisms to solve the conflict between managers and shareholders.

[15] Netter et al. (2009) provides an overview of several takeover papers e.g. Offenberg (2009), Moeller et al. (2004) and Eckbo and Thorburn (2009).

[16] Holmstrom and Kaplan (2001) discuss findings on going private transactions and mention that most of these are private equity deals.

2.1.2.4. Product market competition

Finally the product market is the last category of corporate governance. In general, every firm sells its products for a competitive price on its market. Firms with poor corporate governance systems tend to use their resources inefficiently. These firms often struggle with their performance on the product market and the cost of capital. In contrast, firms with good corporate governance systems will attract both investors to finance their projects and customers for their products. Consequently they will be able to produce with relatively low capital costs compared to firms with poor corporate governance systems. In the long run poorly governed firms will face financial distress and even bankruptcy. Jensen (1993) concludes, however, that product market competition is a weak instrument to solve the conflict between shareholders and managers.

Summary: The present sub-chapter has discussed all four corporate governance categories described by Jensen (1993). One specific corporate governance mechanism, among all others presented in this sub-chapter, is private equity. As a better understanding of the board of directors in private equity firms is the primary aim of this dissertation, the next sub-chapter will present an overview of the organizational structure of private equity, as well as the empirical findings in this area.

2.2. The private equity industry

In order to establish a foundation for a better understanding of the private equity industry, the following sub-chapters will describe the different organizational structures of this sector, with this section outlining the organizational structure of private equity firms, both unlisted and listed.

The corporate governance literature of the past decades only defines private equity in general, without differentiating between unlisted and listed private equity (LPE) companies. For instance, Jensen (1986) describes private equity in this sense as an efficient approach to solving the principal-agent conflict[17], and Kaplan and Strömberg (2008) describe private equity firms as specialized investment companies which acquire target firms using equity and debt. While other investment companies predominantly or solely use equity financing to purchase portfolio firms, private equity companies use a relatively small portion of equity and a large portion of debt for their transactions.

The more specialized private equity literature largely provides empirical findings on the effects of portfolio firms. The present section will give an overview of these findings[18] to complete the picture on private equity research, and in doing so will at the same time indicate the focal area of the thesis as a whole; for there is a notable lack of literature on the internal governance mechanisms of private equity firms. The thesis addresses this gap by using company and board characteristics made available due the fact that LPE firms are publicly traded, and therefore have to disclose information on their operational, financial, management, and business areas.

[17] Jensen (1986) refers in his paper to the term leveraged buyouts, which is used in the corporate governance literature synonymously for private equity.

[18] This sub-chapter will refer to scholars such as Lehn and Poulsen (1989), Kaplan (1989), Andres et al. (2007), as well as Achleitner et al. (2010), to show that private equity transactions create value for shareholders. On the other hand, the effects on the stakeholders in private equity transactions will also be considered. For this purpose the sub-chapter will refer to findings of Kaplan (1989), Asquith and Wizman (1990), Warga and Welch (1993), Harris et al. (2005), and Billett et al. (2010).

2.2.1. Private equity: a superior organizational structure

The corporate governance literature describes private equity as a construct of private equity firms employing general partners and investment professionals, and of private equity funds in which investors commit their capital as limited partners; finally it describes the restructuring process of portfolio companies.[19]

Metrick and Yasuda (2011) define private equity funds by four characteristics.[20] First, an investment firm is classified as a private equity firm when its business model is private equity: i.e. these firms raise capital from investors[21] to acquire and restructure portfolio firms. Second, according to Metrick and Yasuda (2011) private equity funds only invest in private companies.[22] This means that private equity funds either acquire private firms or take public firms private after the acquisition. Third, private equity funds actively monitor and advise the management of the portfolio companies to increase the value of these companies.[23] Finally, private equity firms create value for their investors through the sale of their portfolio companies via different channels, such as initial public offerings, secondary buyouts, or strategic sales.

Most of the literature on private equity refers to private equity transactions conducted by private equity limited partnerships. However, the literature on private equity is cited here

[19] In their paper on venture capital and private equity investments Metrick and Yasuda (2011) describe the structure of private equity funds. Compare also further sources on fund structure for instance Bergmann et al. (2009), Kasper et al. (2012), or Lahr (2010).

[20] Although, Metrick and Yasuda (2011) characterize private equity funds, this definition can be used similarly for private equity firms, which are the general partners and investment professionals managing these funds.

[21] The investor of private equity funds are mainly institutional investors such as pension funds, insurance companies as well as wealthy individuals. These investors are also called qualified purchasers in the private equity industry, because they invest a significant amount in private equity funds. On the other hand, small investors can participate in private equity investments due private equity fund of funds.

[22] The literature on private equity refers to public acquisitions where the private equity firms just invest as minority shareholder as co-investments (see for instance Kasper et al. 2012).

[23] See Jensen (1989) or Kaplan Strömberg (2007).

with a view to differentiating between unlisted and listed private equity firms. The following sections will accordingly present an overview of the organizational structure of these firms.

2.2.1.1. Unlisted private equity: organizational structure

Kaplan and Strömberg (2008: 3) state that private equity firms are generally organized as limited partnerships or limited liability corporations. As well as describing their legal structure, Jensen (1989) notes that private equity firms are lean decentralized organizations with relatively few investment professionals and employees, who in the 1980s almost always had a financial background, for example in investment banking. Over the past three decades this background has changed: nowadays private equity firms employ experts from different industries to create value for their investors.[24] Acharya et al. (2013) investigate the impact of partners' backgrounds on private equity fund returns, specifically examining how general partners with a strategic and financial background impact fund returns.

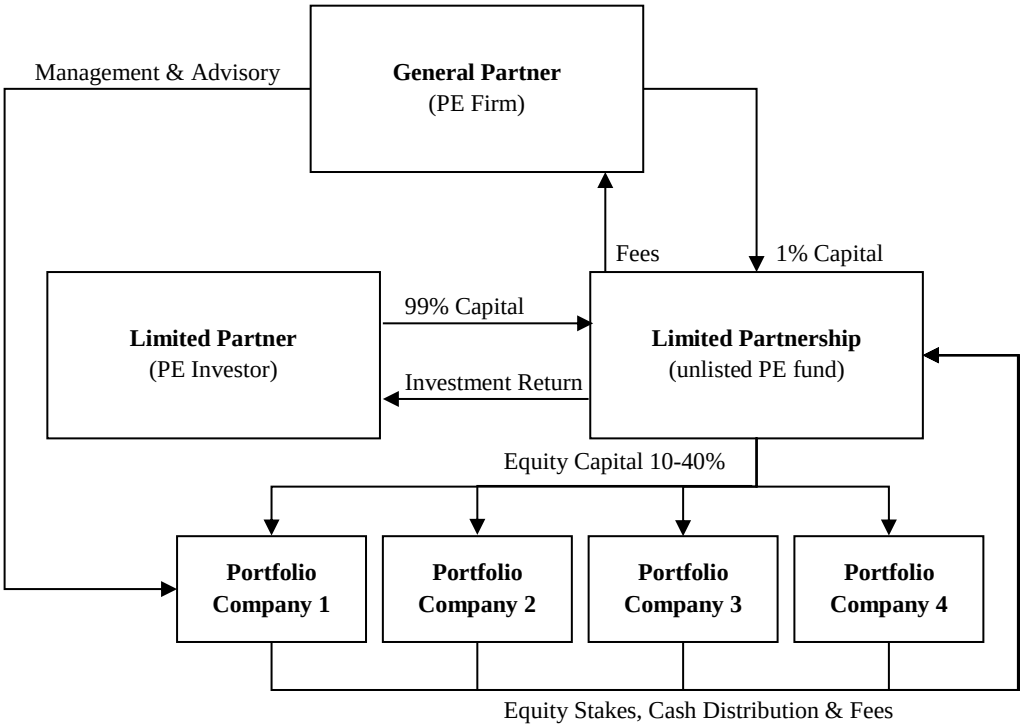
The private equity firms described above raise investment funds, which they then invest in portfolio firms. Kaplan and Strömberg (2008: 3) indicate that private equity companies raise their investment funds through so called private equity funds, which are legally investment vehicles with general and limited partners. Generally, private equity funds are organized as closed-end funds with a limited lifetime of ten years and an additional option to extend the lifetime up to thirteen years. Investors (also called limited partners) commit their capital until the fund has matured, before which point they cannot withdraw their capital. The general partners manage the funds within this period, whereas the limited partners have little to say. General partners are investment professionals from the private equity firms. In contrast, limited partners are wealthy individuals and institutional investors such as banks, insurance companies or mutual funds. However, the investment behavior of the general

[24] Our sample shows that private equity boards consist of former bankers, accountants, lawyers and engineers.

partners is regulated by a number of common covenants – e.g. restriction on debt, or investment limits for a single firm – which protect the investments of the limited partners.

Limited partners provide most of the investment capital. In contrast, the general partners invest at least 1% of the investment capital. Typically, the general partners use the committed capital to invest in portfolio companies. Private equity firms generally use the first five years to invest in portfolio companies and the last five years to sell the portfolio companies and return the capital to the investors.[25]

Figure 2.1: Organizational structure of unlisted private equity firms



Axelson et al. (2009: 1550) describe the compensation structure of general partners in private equity firms. First, general partners receive an annual management fee, which is a certain age of the committed capital, and an additional fee for the capital employed after the

[25] Compare also the paper of Sahlman (1990) on the structure and governance of venture capital firms, and Gompers and Lerner (2000) on the structure of venture capital funds.

investments have been realized. Second, general partners receive a performance fee, which is known as carried interest and is usually 20% of the fund's earnings. Finally, general partners can additionally charge deal and monitoring fees for the companies under their management.[26]

In private equity transactions private equity firms pay regular premiums to acquire portfolio firms. In public to private transactions, in which private equity firms purchase public firms and take them private, portfolio firm shareholders receive premiums of 15–50% over the current stock price. For example, Bargeron et al. (2008: 376) investigate the difference in premiums paid in public acquisitions, and find evidence that public bidders pay 36% higher premiums than private bidders (ibid. 390), and that private equity firms pay even less than other private or public bidders. Furthermore, when private equity firms are involved in public transaction target shareholders receive 63% less than from public acquisitions. Finally, because private equity firms finance their transactions with debt, the corporate governance literature refers to private equity transactions as leveraged buyouts (LBOs). Typically, private equity firms use 60–90% debt to finance their acquisitions.[27]

2.2.1.2. Listed private equity: organizational structure

Besides unlisted private equity firms there is also a pendant in the form of so-called listed private equity (LPE) firms. The literature on private equity provides several terms relating to LPE firms such as publicly traded private equity, quoted private equity or liquid private

[26] For fee structure see Metrick and Yasuda (2010), Axelson, Strömberg and Weisbach (2009), and Kaplan and Schoar (2005).

[27] On the use of debt in LBO transactions see Jensen (1986), as well as Jensen (1989).

equity.[28] As far as I know the abbreviation 'LPE' is generally accepted in private equity literature and will, therefore, be used in this dissertation.[29]

The corporate finance literature provides different definitions of LPE. According to Bilo et al. (2005) a LPE firm is one that is conducted in the private equity industry and whose funds are traded on an exchange. Bilo et al. (2005) classify LPE firms in three categories. First, listed investment firms can be classified as LPE firms if their core business is private equity. Second, private equity firms can also be categorized as LPE, even if they are not listed on an exchange, if their investment funds are quoted on an exchange. Finally, an investment company can be classified as LPE when investments in private equity are made directly or indirectly through its funds.

On the other hand, Lahr (2010) defines LPE firms from the investor's perspective, seeing LPE firms as firms that provide investors with the possibility to participate in private equity investments. In many cases private equity investors are wealthy individuals and institutional investors who invest a qualified amount in private equity funds. According to an article in the *Financial Times* private equity firms such as Blackstone, Apollo and Carlyle require a minimum investment of $1–5 m from their investors. On the other hand, small investors can participate in private equity investments by buying shares in an LPE firm. For instance, the share price of Blackstone was in the last 52 weeks in the range of $26.06–43.59.[30] Furthermore, banks and other financial service companies provide indexes and ETFs that allow small investors to participate in a broad portfolio of LPE investments.

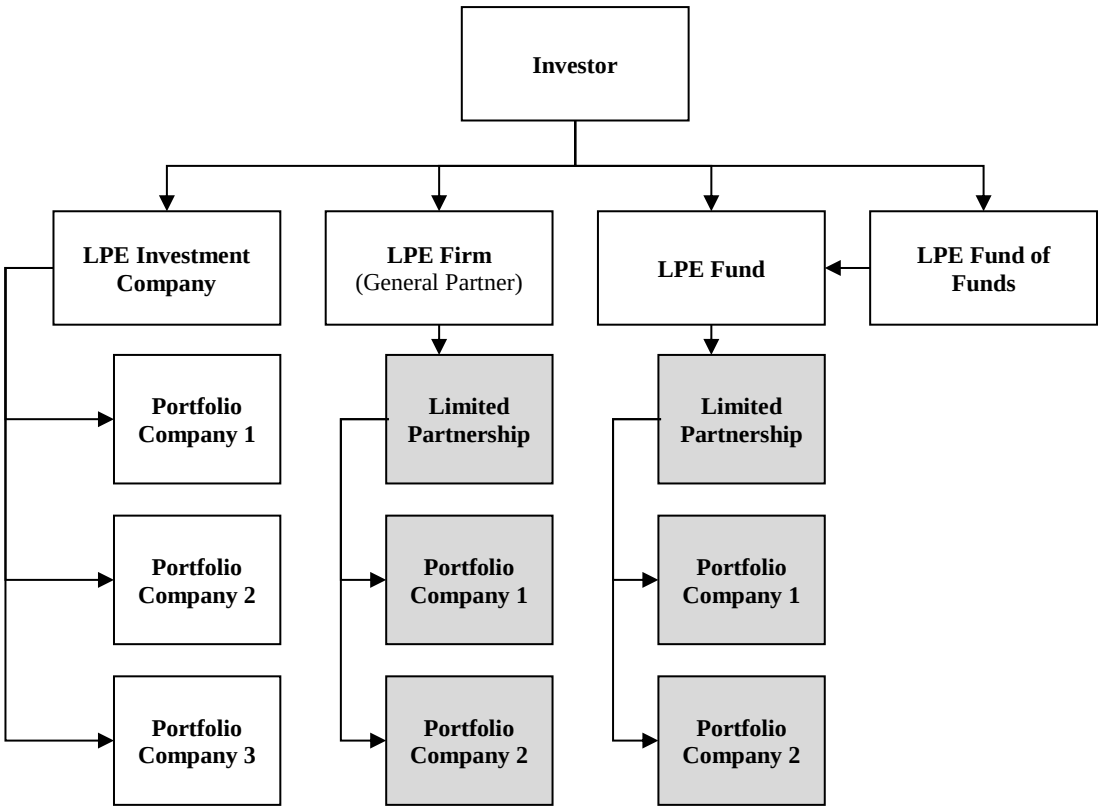
Lahr (2010) follows Bilo et al. (2005) in classifying different types of listed private equity firms, but adds to the existing literature in distinguishing between direct and indirect participation in private equity investments. His definitions also focus on the management aspect and differentiate between internally and externally managed LPEs.

[28] See, for example, Cochrane (2005), Bilo et al. (2005), and Lahr and Kaserer (2010).

[29] Empirical research on LPE is a relatively new area in the corporate governance literature compared to traditional unlisted private equity research. The term LPE is used in the publications of Bilo et al. (2005), Fleming (2010), Brown and Kräussl (2010), and Bergmann et al. (2010).

[30] The data source is Bloomberg and the 52 week range is calculated between 16-10-2014 and 16-10-2015.

Figure 2.2: Organizational structure of LPE firms[31]



Lahr's first definition suggests that the LPE business model is similar to that of Warren Buffett's Berkshire Hathaway. First, LPE investment companies[32] are committed to the private equity model, employ their own investment professionals, and invest directly in portfolio companies. With regard to accounting aspects, they consolidate their investments on their balance sheet and sometimes also report detailed portfolio information. The dark side of this type of LPE is that the debt at portfolio firm level is also reported on the financial statement of the LPE investment firm. As a consequence, the consolidation of the

[31] Figure 2 shows the organization structure of LPE. The gray fields in the figure high light the organizational parts of the LPEs structure, which are not public, but rather private.

[32] Lahr (2010) uses the terms company, firm and partnership to define the different types of LPE firms.

usage of debt in the financial statements increases the investment risk of the LPE firm. Second, LPE firms are, like LPE investment firms, internally managed. These companies have the legal structure of PLC, AG or Corp. depending on where the company is headquartered. In contrast to LPE investment companies, LPE firms invest in their portfolio firms through general partner funds and limited partnerships. Because LPE firms invest their capital through general partner funds, they receive management fees as their primary income. Considering the definition of LPE firms, it seems, then, that the business model of unlisted private equity firms is retained, the only difference being that the private equity firm is not private anymore but listed on the stock market.

The last two types of LPE were both internally managed. However, there are also two externally managed LPE types. LPE funds are externally managed, but invest directly in limited partnerships of private equity firms as limited partners, and can also realize co-investments with unlisted private equity firms. Despite the fact that LPE funds are externally managed entities, investment decisions on the portfolio firm level will be made by the general partner of the limited partnership. Finally, Lahr (2010) defines an LPE fund of funds as an intermediary between private equity investors and LPE funds, which passes the capital from investors to LPE funds.

Given the description of LPEs presented above, the question arises if there might be differences in the structure between LPE, family, and other industrial firms. As the business models and organizational structures of these firms differ, there may also be differences in their corporate and governance structure. Accordingly, Chapter 4 will present descriptive findings on corporate and board characteristics of family and industrial firms and at the same time provide unique descriptive findings on the corresponding characteristics of LPE firms.

To complete the picture on private equity research in corporate governance, the next sub-chapter will present empirical findings on private equity investments. Its primary goal is to show that there have been many empirical findings regarding wealth effects on private equity portfolio firms, but relatively few on the internal governance structure of such firms.

2.2.2. Empirical findings on private equity investments

The theoretical principles of private equity transactions are laid out by Jensen (1989), who argues that these transactions create value by improving the financial, governance, and operational aspects of their portfolio firms. On the other hand, scholars such as Kaplan (1989) suggest that private equity creates value through other sources such as tax deductions. Kaplan (1989) finds evidence that 4-40% of the value creation in private equity transactions can be explained by tax deductions.

In the first place, after a buyout private equity firms as a rule create management incentives to increase shareholder value. Among these are large equity stakes, which constitute an upside incentive for the management (although in the 1980s this was an unusual practice in public corporations). On the other hand, managers of private equity portfolio firms have to invest a significant amount in the portfolio firm. Taking the equity stakes and the management investment into account, they participate on the upside as well as on the downside.

Secondly, private equity firms use leverage as a mechanism to increase the management incentive not to waste the free cash flow.[33] The increase in leverage binds the management to make interest and principal payments. If management defaults, the firms will be forced by the creditors to file for bankruptcy. Additionally, leverage increases the company value, because expenses for debt are tax deductible.

Thirdly, in a typical leveraged buyout private equity firms acquire majority control over the target firm (Kaplan and Strömberg 2009). This enables them to establish a concentrated ownership with a lean and efficient organizational structure throughout their portfolio firms. For instance, they can use their majority ownership to monitor management actions in portfolio firms more effectively. Cornelli and Karakas (2012) establish that the board size of portfolio companies significantly decreases after a leveraged buyout (LBO): in their sample, board size decreased on average from 6.5 to 5.5 directors. In management buyouts (MBO)

[33] The increase in leverage creates pressure on weak managers not to waste the free cash flow on investment projects with negative net present value, which is described as a free cash flow problem by Jensen (1986).

average board size decreased from 6 to 4 directors. In sum, the board size of LBO portfolio companies decreased by 15 percent and the board size after MBO transactions by 30 percent. On the number of meetings Acharya et al. (2013) establish that portfolio companies average twelve meetings per year. They also observe that private equity firms do not hesitate to replace poorly performing portfolio company management, with one third of the CEOs being replaced in the first 100 days. Finally, most top private equity firms are organized around specific industries and hire top professionals with a strategic and operational background. For instance, Jack Welch, the legendary CEO of GE, was affiliated to Clayton Dubilier.

As a consequence of the governance aspects mentioned above, several scholars have published empirical findings on the effects of private equity investments on portfolio firms.

2.2.2.1. Performance of private equity investments

There is a general consensus in the corporate governance literature that private equity investments generate value for shareholders. Several authors investigate the short term and long term effects on shareholder wealth. For instance, Lehn and Poulsen (1989) study public to private transactions in the US during the 1980s and establish that going private transactions generate abnormal stock returns of between 16.3% and 20.5% around the announcement. They also find evidence for Jensen's (1986) free cash flow hypothesis.[34] Andres, Betzer and Weir (2007) investigate LBO transactions in Europe and find positive abnormal returns of 24.20% around the announcement window.[35] Finally, Achleitner et al. (2010) also find significant positive results for private equity investments on the German

[34] Lehn and Poulsen (1989) investigate hostile takeovers from 1980 to 1987. For their event study they estimate the event window for [-1;+1], [-10;+10] and [-20;+20] days around the announcement.

[35] Andres, Betzer and Weir (2007) study European LBO transactions from 1997 to 2005. The event windows in their study are [-1;+1], [-5;+5], [-15;+15] and [-30;+30].

stock market, with private equity investments creating wealth effects of 5.9% around the announcement date.[36]

In addition to the above-mentioned short term effects, corporate governance literature also investigates operating performance and productivity change after private equity investments. For instance, Kaplan (1989) examines the change in operating performance in US MBO transactions. He finds that companies which underwent MBO transactions increase their operating performance[37] and net cash flow within three years after the transaction. Boucly et al. (2008) study the operating performance of LBO transactions in France. In order to take in long term effects, they examine performance over three years after the LBO transaction and find evidence that private equity portfolio firms generate excess performance measured by return on assets. Moreover, these authors establish that LBO portfolio firms increase in sales, assets, and employment ratios after an LBO.[38]

Guo et al. (2007) investigate public to private transactions between 1990 and 2006. According to them, public to private transaction in the 1990s and 2000s were priced more conservatively and with less leverage than transactions in the 1980s. Moreover, the increase in operating and cash flow margins were much smaller than in the 1980s.

Two recent papers investigate private equity fund returns. Kaplan and Schoar (2005) apply the internal rate of return to measure private equity fund performance. Their empirical study demonstrates that private equity funds generate only 80% return of the S&P 500. In contrast, reputable private equity funds which have operated for at least five years generate fund returns of 170% of the S&P 500.[39] Finally, Kaplan and Schoar (2005) point out that fund managers' skills affect fund performance. Acharya et al. (2013) close this gap by studying the skills of private equity general partners in relation to fund performance. They establish that private equity partners generate abnormal performance in organic deals by, for instance,

[36] Achleitner et al. (2010) investigate private equity investment in the German stock market from 1998 to 2007. They use event windows from [-1;+1], [-2;+2], [-10;0], [-20;0] and [-20;+20].

[37] More specifically, Kaplan (1989) investigates operating income before depreciation.

[38] Boucly et al. (2008) estimate the excess return on asset by calculating the return on asset of the portfolio firm minus the median return on asset of the portfolio firm's peer group.

[39] Kaplan and Schoar (2005) estimate mean and median fund returns. Private equity funds which have operated for at least five years generate a median performance of 150% of the S&P 500 and a mean performance of even 170%.

cutting costs, or expanding to new customers or new geographies. On the other hand, partners with a background in finance generate abnormal performance in non-organic deals by pursuing M&A activities.

2.2.2.2. Productivity

Examining the productivity changes of private equity portfolio firms, Harris et al. (2005) find evidence that MBO transactions in the UK increase productivity. MBO portfolio firms are less productive than their peer group before the transaction. After the MBO, productivity increases due to outsourcing and reduction in labor intensity. This implies that MBO transactions reduce agency costs and enhance economic efficiency.

It may, then, be concluded in general that private equity investments create value for shareholders. On the other hand, scholars such as Kaplan (1989), Warga and Welch (1993), Renneboog and Szilagyi (2008), Billett et al. (2010), and Davis et al. (2013) establish that private equity investments decrease stakeholder wealth for bondholders.

2.2.2.3. Bondholder wealth

Asquith and Wizman (1990) examine the price reaction of bonds in leveraged buyouts. In general the authors find that the announcement of a leveraged buyout has a negative impact on bond returns of between -1.1% and -2.2%. However, bonds with covenant protection react positively to LBO announcements. Bonds with strong covenant protection show average abnormal returns of +2.6%. Warga and Welch (1993) investigate the effects of

LBOs on bondholder wealth and find that the announcement of an LBO transaction causes negative abnormal returns of -2.75% to -7.33% for unconvertible bonds.[40] They also investigate whether shareholder gains are at the expense of bondholders (known as the wealth transfer hypothesis – see below).[41] Here they point out that bondholder losses only describe a small fraction of shareholder gains. A recent empirical study of Billett et al. (2010) shows the bond price reaction to LBO transactions over the period 1980-2006, covering 407 LBO deals. These authors establish that bonds with covenant protection show positive abnormal returns of 2.30%, whereas unprotected bonds show negative abnormal returns of -6.76%. In order to answer the wealth transfer hypothesis, which explains the gains of one group by the losses of another, Billett et al. (2010) investigate whether bondholder losses are a source of shareholder gains. They come to the conclusion that private equity investors consider potential wealth expropriation and prefer target firms without change-in-control covenants. Finally, change-in-control covenants have a significant effect on the outcome of the deal.

2.2.2.4. Employment

Lichtenberg and Siegel (1990) investigated the effect of leveraged buyouts on corporate productivity in the 1980s and established that LBO transactions had a significant positive effect on total factor productivity (TFP): the productivity of LBO portfolio firms increased by 8.3% above mean industry productivity three years after the buyout. Focusing on the employment and compensation effect of LBO transactions, they found that both factors declined for white-collar workers but remained unchanged for blue-collar workers.

[40] Warga and Welch (1993) use different price datasets with abnormal return variance of between +2.63% and -7.33%.

[41] This hypothesis is known as wealth transfer hypothesis, where the authors try to explain the gains of one group (shareholders) with the losses of the other group (bondholders).

Amess and Wright (2007) examined the effects of MBOs and MBIs on employment and compensation in the UK. Using a panel regression they established that MBOs as well as MBIs had a negative impact on compensation, but MBOs showed a higher employment growth rate relative to their peer group than did MBIs.

Boucly et al. (2009) showed in an empirical study that French LBOs created additional employment within three years of the transaction. LBO portfolio firms exhibited an average excess growth rate of 13% for employment.

More recently Davis et al. (2013) have investigated the effects of private equity investments on employment, productivity, and compensation. They establish that leveraged buyouts decrease employment by 3% within two years and by as much as 6% within five years of the transaction. They conclude that employment positions are at great risk after LBO transactions. Moreover, private equity firms tend to increase total factor productivity by building new production plants, and to reduce labor costs by lowering compensation.

2.2.2.5. Taxes

Investigating tax benefits in management buyouts from 1980 to 1986, Kaplan (1989) saw the pre-buyout debt ratio and related tax deduction as important characteristics for private equity investors in the USA. He found evidence that tax benefits in management buyouts are between 21% and 143% of the premium paid. This implies that they are an important source of wealth creation in management buyouts. Newbould et al. (1992) investigated tax benefits in US leveraged buyouts after the Tax Reform Act (TRA) of 1986. Their findings suggest that TRA'86 reduced tax benefits in LBO transactions. However, the limitation of their empirical study is that the results are based on a relatively small sample of only 23 LBOs, and on the brief time period of 1988-1990.

Renneboog et al. (2007) studied public to private transactions in the UK. Among other results, they found that tax payments prior to private equity transactions were not related to

wealth effects. However, private equity firms paid higher premiums for target firms with low levels of debt than for those with high debt levels. However, they concluded that this finding provided only weak support for the tax benefit hypothesis.

As mentioned above, Billett et al. (2010) establish that bonds with change-in-control covenants protect bondholders against wealth expropriation in leveraged buyouts. Besides the wealth expropriation hypothesis they also test the tax benefit hypothesis proposed by Kaplan (1989). Their findings suggest that private equity investments are dominated by wealth expropriation rather than by tax benefits.

Summary: This chapter has revealed the issue that arises from the separation of ownership and control, known in corporate governance literature as the principal-agent problem. And it has discussed four corporate governance mechanisms as corresponding solutions for the principal-agent problem as defined by Jensen (1993). Finally, the chapter has presented the literature on private equity. In doing so, it has shown that private equity is one specific corporate governance modality or mechanism. Furthermore, the empirical literature on private equity investments finds evidence that private equity improves the governance of portfolio firms due to its different incentive mechanisms. However, there is a lack of literature on the internal governance mechanisms of private equity firms themselves.

Taking the argument forward, the next chapter will, therefore, present the theoretical arguments and empirical findings on internal governance mechanisms discussed in the board of directors literature. It will, furthermore, implement the findings of this literature on the private equity industry. The main purpose of the chapter will be to develop hypotheses on the internal governance mechanisms in private equity firms.

3. Literature overview and hypotheses development

"Companies win when their managers make a clear and meaningful distinction between top- and bottom-performing businesses and people, when they cultivate the strong and cull the weak. Companies suffer when every business and person is treated equally and bets are sprinkled all around like rain on the ocean."

Jack Welch

Chapter 3 provides the foundation of my own empirical analysis, which will be presented in Chapter 4 and 5. First, this chapter will define two depending variables, which will be used in the empirical analysis. Since the empirical analysis of Morck et al. (1988) corporate governance scholars have been using Tobin's Q to measure the market performance of firms. Beside the market performance the accounting performance is a widely used performance measure in corporate governance. The accounting performance measure in this thesis is the Return on Assets (ROA). For this reason sub-chapter Chapter 3.1 and 3.2 will discuss Tobin's Q and the ROA.

Second, sub-chapter 3.2 to sub-chapter 3.5 will present the literature on board size, outside directors, board meetings and committees, founders on the board, leadership structure and ownership. These sub-chapters include the theoretical argumentation and empirical evidence on the board of directors in general and in particular on founders, leadership structure and ownership. The main purpose of these chapters is the discussion of the theoretical and empirical findings and the implication on the private equity research. In other words, I will use the argumentation and findings in sub-chapter 3.2 to 3.5 to develop the hypotheses for my empirical analysis. Finally, I will finish chapter 3 with a summary of my hypotheses.

3.1. Performance measures in corporate governance

The following section will present an overview of the dependent variables to be used in the empirical analysis. First, this section will define two performance variables widely used in the corporate governance literature: Tobin's Q and Return on Assets (ROA). Tobin's Q is a market-based performance measure calculated as the market value of the firm divided by the firm's replacement costs. ROA is an operating performance measure. Secondly, this section will present an overview of the performance literature in corporate governance.

The proxy used here for Tobin's Q is market-to-book ratio, which has been used as a performance measure in the majority of empirical studies in the finance literature. Tobin's Q has its origins in the publication of Brainard and Tobin (1968) on econometric models and financial model building. The authors define the market value of equity as a multiple of the market valuation of equities and the stock of capital at replacement costs. Corporate governance literature has been using Tobin's Q since the work of Demsetz and Lehn (1985) and Morck, Shleifer and Vishny (1988). Recent empirical analyses show that Tobin's Q is determined by industry classification, book value and company age, as well as by listing on a specific index and by the legal system governing the firm's HQ. All these aspects will be discussed in this section in light of selected papers that use Tobin's Q to measure the market performance of firms. Furthermore, this section will debate the various definitions of ROA. These two performance variables will be used for the empirical analysis to cover the market performance as well as the accounting performance of the sample firms.

3.1.1. Tobin's Q as a market-based performance measure in corporate governance

One of the first empirical investigations on ownership structure and corporate performance was the paper of Demsetz and Lehn (1985) analyzing the relationship between large

blockholders and the market and accounting performance of U.S. companies. Basing their conclusions on a broad sample of 511 observations, Demsetz and Lehn use the ownership of blockholders as a measure of corporate governance. In their empirical analysis they use the blockholdings as dependent variables and the performance measures as independent variables (ibid. 1156). Company performance is measured with market and accounting variables, including the market value of common equity, stock market returns, return on equity, and the standard deviation of these variables (ibid. 1165). The authors find no clear evidence that large blockholders impact either the market or the accounting performance of the firms under consideration.

Another milestone paper is the publication of Morck, Shleifer and Vishny (1988) which uses Tobin's Q for an empirical study. These authors study the relationship between management ownership and the value of a firm. In a cross-section analysis they use Tobin's Q as proxy for the market value of the firm. In a sample of 371 Fortune 500 firms they establish a mixed relationship between management ownership and corporate performance. To test their data they adduce two theoretical arguments. First, the convergence-of-interests hypothesis suggests a positive relationship between Tobin's Q and management ownership; secondly, the entrenchment hypothesis suggests that market valuation might be adversely affected for a specific range of high management ownership (ibid. 294). They consequently divide management ownership into three groups: 0-5%, 5-25% and more than 25%. The empirical results suggest that Tobin's Q increases sharply for management ownership of 0-5%, that it decreases for ownership of 5-25% percent, and that it increases again for ownership of more than 25%.

Taking the findings of Morck, Shleifer and Vishny (1988) together, corporate performance and management ownership have a U-shaped relationship. This suggests that management ownership between 0-5% and 25% confirms the convergence-of-interests hypothesis, whereas management ownership between 5-25% does not. On the contrary, it confirms the entrenchment hypothesis.

Morck, Shleifer and Vishny define average Tobin's Q, which they use as a measure of company performance, as the ratio of the firm's market value to the replacement cost of its physical assets (ibid. 296). More precisely, market value is defined as the sum of the market value of common stock, estimated market value of preferred stock and debt. The

replacement costs are the costs of the firm's plant and inventories. The definition of Tobin's Q suggests that this ratio increases with valuable intangible assets, which may be monopoly power, goodwill, a stock of patents or even good management. The authors call Tobin's Q a very noisy signal of management performance (ibid. 296); however it is still an appropriate proxy for an empirical analysis of management performance and ownership.

Daines (2001) investigates the legal aspects and its effects on Tobin's Q. The existing literature suggests that legal systems affect corporate value. For example, LaPorta et al. (1999) argue that legal rules may affect corporate value and ownership structure. Furthermore, Winter (1977) argues that Delaware law in particular improves corporate value. On the other hand Cary (1974) argues that for several reasons Delaware law has a negative effect on a firm's value.

For a sample of more than 4,000 exchange traded U.S. corporations between 1981 and 1996 Daines (2001) applies three empirical methods to show the effects of Delaware incorporation on Tobin's Q.[42] For his first analysis he applies the ordinary least square (OLS) model, and checks his findings with a pooled OLS regression and a fixed-effects regression model (ibid. 537). Consistently with the argumentation of Winter (1977) he finds a positive and significant relationship between Delaware incorporation and Tobin's Q (ibid. 532-533). Furthermore, he finds that IPO firms incorporated in Delaware increased in share value from 29% in 1981 to 61.4% in 1996 (ibid. 539). According to Daines (2001), Delaware law reduces agency costs and managerial entrenchment once ownership is dispersed.[43] Based on the theoretical arguments of Romano 1985, Jarrell et al. 1988, Jahera and Pugh 1991, and Coates 1999, Daines studies the probability of a takeover bid for Delaware firms. His findings show that Delaware firms receive significantly more takeover bids than those listed elsewhere (ibid. 543).[44] In sum, Delaware legal rules have a positive effect on corporate value in general and on the value of IPO firms in particular, because Delaware's legal system favors takeover bids and increases the probability of a takeover.

[42] His sample distinguishes between firms incorporated in Delaware and those incorporated in other states.

[43] Following the theoretical model of Jensen and Meckling (1976) and the argumentation of Grossman and Hart (1988).

[44] 20.11% of Delaware firms receive a takeover bid, whereas only 14.40% of other firms do so. Daines shows similar findings for acquisitions.

Following Demsetz and Lehn (1985), and Morck, Shleifer and Vishny (1988), Daines (2001) estimates Tobin's Q as the ratio of a firm's market value to its replacement cost (ibid. 530). After controlling for firm size, diversification, industry, investment opportunity and profitability, Daines compares the difference between Delaware and non-Delaware firms and concludes that legal systems can be seen as an intangible asset with a positive or negative effect on corporate value (ibid. 530).[45]

In contrast, Morck and Yang (2001) show the impact of the S&P 500 listing on average Tobin's Q. In their paper they (2001) analyze passive investment strategies for a twenty-year period from 1978 to 1997 and establish that an S&P 500 listing has a positive and significant effect on average Tobin's Q. Given this finding they also control for firm size, industry membership, R&D expenses, total debt and industry fixed effects (ibid. 21-22), which strengthens their empirical conclusion that membership in the S&P 500 positively affects average Tobin's Q.

Gompers, Ishii and Metrick (2003) consider shareholder rights and their effect on Tobin's Q. They establish that firms with high shareholder rights earn 8.5% more abnormal returns than firms with low shareholder rights (ibid. 107). They then construct a Governance Index, which measures shareholder rights in terms of restrictions on those rights and adds one point to the firm's governance account for every restrictive provision (ibid. 114-116). Because of the number of restrictive provisions, firms with low shareholder rights are grouped in a higher range than firms with high shareholder rights.[46] For an empirical analysis the firms are categorized in deciles. Companies from the first decile are called "democratic", and firms from the last decile are ranked as "dictatorships" (ibid. 116). The authors construct two portfolios with the first and the last decile to compare the return characteristics of "democracy" and "dictatorship". Through a sample period from 1990 to 1999 the "democracy" portfolio outperforms the "dictatorship" portfolio (ibid. 123).

Using Tobin's Q as a proxy for corporate value, Gompers, Ishii and Metrick also study the relationship between their Governance Index and corporate value (ibid. 125). To compute

[45] According to Daines' definition (2001) corporate value is estimated as the market value of outstanding common stocks (using the stock price at the end of the fiscal year), preferred stocks, and debt equal to book value, divided by replacement costs.

[46] The catalog of provisions which restrict shareholder rights has 24 provisions. Thereby the possible range is between 1 and 24 (Gompers, Ishii and Metrick 2003: 115).

Tobin's Q they use the Fama and French (1997) industry adjusted regression model, adding a vector with governance variables to the regression model for greater precision. They also include the log of the book value of assets and the log of company age, as well as a dummy for Delaware firms and the listing on the S&P 500 (ibid. 126).[47] The result for Tobin's Q is positive and significant for the "democracy" portfolio over the period from 1990 to 1999 (ibid. 127).

Finally, these authors regress the Governance Index and the "democracy" portfolio on the operational measures of net profit margin, return on equity and one-year sales growth (ibid. 129).[48] For the "democracy" portfolio all coefficients are positive but not significant (ibid. 129). In other words, Gompers, Ishii and Metrick (2003) show that the shareholder rights developed in democratic firms have a positive impact on corporate performance.

In contrast, Andres (2008) studies the relationship between founding-family ownership and corporate performance. In a sample of 275 German exchange-traded companies he defines family firms as those with a family blockholding of at least 25% (ibid. 435). Andres further examines the impact of active founder families in the board of directors in German exchange-listed companies. In this context he distinguishes between founder CEOs, descendant CEOs, and professional CEOs (ibid. 439-440). In his empirical analysis he uses Tobin's Q and Return on Assets (ROA) as performance measures.[49] Andres employs a random effect GLS regression and a pooled regression model to test the effect of founder families on performance. His findings show that family firms in Germany outperform firms with a widely-held ownership structure and also other types of blockholders. Not that a family blockholding in itself creates value: outperformance of blockholding family firms can be observed only in firms where at least one family member actively participates on the board of directors. Andres concludes that the superior performance of family firms is only given under certain conditions (ibid. 439-440).

On the other hand, Dybvig and Warachka (2015) argue that Tobin's Q and ROA do not appropriately measure firm performance. The authors suggest that performance and

[47] This approach follows Daines (2001) for Delaware firms and Morck and Yang (2001) for S&P 500 firms.

[48] The operational measures are defined as net profit margin, which is income divided by sales. For calculating the return on equity Gompers, Ishii and Metrick use income divided by book equity.

[49] In particular Andres (2008: 435) calculates ROA based on EBIT and EBITDA.

governance measures should maximize the corporate value of net invested capital. The authors point out that the book value in the denominator measuring Tobin's Q can be adjusted by write-offs or intangible assets. For example, write-offs can reduce book value, whereas intangible assets are only considered by production costs.

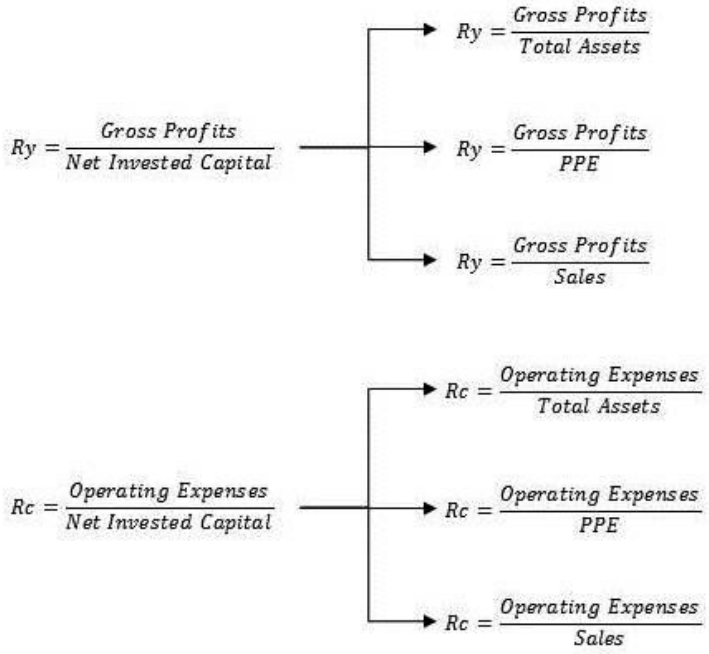
Assuming that a firm has a market value of €100 and only one tangible asset with a value of €100 in t_0: in this case Tobin's Q would be equal to 1. Considering that this tangible asset has a life cycle of four years. In this case the book value of the tangible asset is €75 in t_1, €50 in t_2, €25 in t_3 and €0 in t_4. This example shows that book value decreases over time by its write-offs. Taking this into account, Tobin's Q will increase from 1 in t_0 to 2 in t_2. In other words, Tobin's Q only increases in this example due the fact that the firm writes off its tangible assets.

Dybvig and Warachka (2015) consequently suggest that operating efficiency and cost discipline are more appropriate measures of corporate performance and efficient corporate governance than Tobin's Q. They also discuss how operating efficiency and cost discipline affect Tobin's Q, suggesting, in particular, two ratios for analyzing operating efficiency. The first ratio is defined as gross profit[50] divided by net invested capital. The second is defined as operating expenses divided by net invested capital.

Dybvig and Warachka's empirical findings suggest operating efficiency and cost discipline will lead to more precise results in corporate governance research. For this purpose they estimate six different ratios incorporating 'gross profits' and 'operating expenses' in the nominator and 'total assets', 'sales' and 'plant, property and equipment' in the denominator. In particular, the authors find that gross profit divided by property, plant and equipment is a better operating efficiency measure than Tobin's Q.

[50] Gross profit measures the scale efficiency whereas operating expenses measure the cost efficiency.

Figure 3.1: Overview of ratios considering scale-based and cost-based operating efficiency[51]



3.1.2. Return on assets as an operating performance measure

The second performance measure besides Tobin's Q is return on assets (ROA). While Tobin's Q measures market performance, ROA is an accounting based performance measure (Brealey and Myers 2000: 828). Generally, ROA is defined as fiscal year income divided by the total corporate assets (Berk and DeMarzo 2011: 30). According to Siegel and Slim (2000: 379) ROA measures return on each dollar of assets invested, which they also see as overall earning power or profitability. The corporate finance literature provides different approaches to measuring fiscal income. Two common approaches to estimating ROA are

[51] Own representation based on Dybvig and Warachka (2015). R_y measures the scale-based operating efficiency and R_c measures the cost-based operating efficiency. PPE is defined as property, plant and equipment.

EBIT and EBITDA. Bodie, Kane and Marcus (2005) suggest calculating ROA as the ratio of EBIT (or EBITDA) divided by total assets. Finally, Berk and DeMarzo (2013: 43) observe that ROA is less sensitive than ROE[52] to leverage due the fact that interest expenses are taken into account. Nevertheless, ROA is sensitive to working capital. For instance, an increase in a firm's receivables and payables, which has no impact on profitability, will increase total assets and ceteris paribus decrease ROA. These authors suggest the ratio return on invested capital (ROIC) to solve this issue.

ROA is an accounting based performance measure and therefore a subject of international accounting standards like IFRS, which sets clearly defined standards to measure EBIT, EBITDA and the valuation of total assets. In contrast, Tobin's Q is defined as the market value of a firm divided by its replacement costs. However, the assessment of market value for calculating Tobin's is affected by several exogenous variables, as discussed in the last section. This section will end, therefore, with a brief definition of ROA as stated above.

3.2. Board of directors and corporate governance

Adams et al. (2010) provide a well-structured survey of the literature on the board of directors, based on the work of Hermalin and Weisbach (2003). The survey gives an overview into the determinants and actions of the board. Furthermore, it provides an overview of the theoretical framework as well as empirical findings on board literature. Empirical research in recent years has been studying the relationship of structural differences across boards, and the implications on behavior. For example, one can study the ratio of outside directors and assume the difference in structure will affect the behavior of the management. Doing so, one might presume that given a certain ratio of outside directors the board would dismiss the CEO if corporate performance is poor (Adams et al. 2010: 59).

[52] ROE stands for return on equity and is defined as the ratio of net income to common equity.

One important concern in studying board structure is the endogeneity problem. This arises, among others, when unobserved variables are correlated with the error term in the regression model. Referring the endogeneity issue to the given example with the ratio of outside directors and CEO performance, one could also argue that poor past performance of the CEO will increase the number of outsider directors, because more outside directors will implement more monitoring and advice by the board which, according to Jensen and Meckling (1976), has a positive impact on performance.

Furthermore, boards operate as teams, where the effort of all members impacts the firm. Adams et al. (2010) mention the team problem as an example for the relationship of effort and the size of the team. Larger boards do not necessarily mean more effort from every single board member. The team problem suggests that as the share of a member's output decreases, the member will supply less effort. A further challenge is the complexity of corporations. In a real life approach every firm uses its own structure to solve management and governance problems. This makes it difficult for research to develop abstract models that will capture the relationship of governance structure and firm behavior. Concluding the challenges in board research, Adams et al. (2010: 63) point out that modern corporate governance literature overlaps with management, psychology and sociology literature, which provide new research models and approaches.

The following sections present the literature and empirical evidence on board size, outside directors, board committees and meetings, founders on the board, leadership structure, and finally ownership structure. Besides the theoretical arguments and empirical findings, this section develops hypotheses for the empirical analysis of Chapter IV.

3.2.1. Board size, outside directors, and company performance

One of the first empirical studies on board size is the paper of Yermack (1996), which investigates the relationship of board size and corporate performance. Yermack argues that small boards tend to work more efficiently than large ones. His main hypothesis is that corporate value depends on the quality of monitoring and decision-making by the board of directors (1996: 189). Furthermore, board size is a significant determinant of a board's performance. Thus, limiting the size of the board of directors improves its effectiveness (ibid. 186). To investigate his hypothesis Yermack (1996) uses a panel dataset with 3,438 observations for 452 US companies between 1984 and 1991. For the estimation of the hypothesis he uses the ordinary least squares (OLS) regression and a fixed-effect regression model (ibid. 194).

Regarding improvement of the effectiveness of the board of directors Yermack (1996) pursues three main research questions. First, he investigates board size and corporate value (ibid. 189). Using Tobin's Q, he finds a significant and inverse association between board size and Tobin's Q. Studying the relationship between board size and corporate performance, Yermack considers numerous control variables such as company size, industry membership, stock ownership, growth opportunities and alternative corporate governance structures. Furthermore, in his cross-sectional analyses Yermack finds that the negative relation between board size and firm value decreases as boards become large from small-to-medium sized. Secondly, he tests whether past corporate performance affects current board size and concludes that there is no significant influence there. However, he finds evidence supporting the opposite influence. In his regression analysis he finds a significant influence of past board size on current firm value (ibid. 198-200). Finally, he investigates the effect of announcement of board size reduction on stock returns. His event study includes only six companies that reduced their board size for corporate governance reasons. These six firms realized positive significant abnormal returns around the event period (ibid. 201).

Coles et al. (2004) investigate the question if a single board size is efficient for all firms. Regulators and institutional investors argue that large and outsider-dominated boards are more efficient than small and insider-dominated ones (ibid. 1). However, these authors are skeptical that a one-size-fit-all approach is always optimal. For this purpose they study the

impact of board size and board independence on performance. To do so, they investigate the impact of the number of directors and the proportion of outsiders on Tobin's Q (ibid. 2).

Corporate governance theory suggests that the members of the board monitor and advise top management. Therefore, one might think the larger the board and the greater its independence the more efficient the monitoring and advice would be (Coles et al. 2004: 1). In contrast, several papers[53] show evidence that small boards are more effective than large in monitoring and advising the board of directors. According to Lipton and Lorsch (1992) and Jensen (1993) large boards have coordination problems and directors in large boards tend to behave as free-riders. In contrast to the monitoring function of the board of directors, there is only a limited amount of empirical evidence on their advisory function. One of their main functions is to provide top management with information (Coles et al. 2004: 3). On the one hand, outsiders can provide top management with new information and this can be seen as additional advice. On the other hand, insiders have more firm-specific information and can support management in uncertain environments. Coles et al. (2004) expect that Tobin's Q will increase for large boards in diversified firms, and for firms with relatively high debt ratio (ibid. 2004: 8). Tobin's Q will also increase in R&D intensive industries with a large fraction of insiders on the board (ibid. 10).

The sample of Coles et al. (2004) includes 2,740 observations for a time period form 1992-1998 (ibid. 10). To test their hypothesis these authors run several OLS regressions and control their findings in a 2-stage OLS regression (ibid. 23-25). They establish that board size has a positive and significant effect on Tobin's Q for diversified firms and high debt firms (ibid. 15-17). They conclude that these firms have a greater advice requirement and benefit from large boards. In contrast, in firms where firm-specific knowledge is an important factor Tobin's Q drops with an increasing ratio of outside directors (ibid. 25).

Coles et al. (2008) re-examines the same authors' working paper of 2004 and investigates the relationship between board structure and corporate performance. As in their earlier paper, they address the conventional wisdom, which suggests that greater board independence allows more effective monitoring and increases firm value (2008: 329). In this context, recent regulators, institutional investors and stock market exchanges require greater

[53] Compare Lipton and Lorsch 1992 and Jensen 1993 about the effectiveness of large boards.

board independence for listed corporations in the U.S. For instance, in 2002 the Sarbanes-Oxley Act required that audit committees should consist entirely of outside directors. Furthermore, the New York Stock Exchange and Nasdaq require listed companies to employ independent boards with a large body of outside directors. The TIAA-CREF pension fund, one of the largest pension funds in the world, announced that their funds will only invest in firms with a large ratio of outside directors.

The sample of Coles et al. (2008) includes more than 8,000 observations on board, firm and CEO characteristics. Compared with the sample of the 2004 working paper, the number of observations has quadrupled. First, Coles et al. (2008) investigate the relationship between firm characteristics and board structure. Doing so, they seek to capture the advisory requirement of companies with the proxy variables of firm size, diversification and leverage (ibid. 338-339).[54] The findings of the first regression model suggest that advisory requirement has a positive and significant impact on board size. Moreover, the relationship between outside directors and advisory requirement is positive and significant, which supports the hypothesis that firms with greater advisor requirements tend to have more outside directors. In other words, larger firms tend to have larger boards and more outside directors. Secondly, Coles et al. (2008) examine the determinants of board composition. The findings of the regression model show that companies with high advisory requirements have a) larger boards and b) more outside directors on their boards than companies with lower advisory requirements. On the other hand, R&D intensive companies have more inside directors on the board. This finding is in line with the literature, because the integration of outside directors is more costly in companies with high R&D expenditure than in companies with low R&D expenditure. Furthermore, Coles et al. (2008) study the relationship between Tobin's Q and board structure. In general the coefficient of board size has a negative impact on Tobin's Q. However, for large firms with a high advisory requirement Tobin's Q increases with board size. This finding implies that large complex firms with diversified business fields and high leverage benefit from large boards (ibid. 342). But in R&D intensive firms inside directors have a positive and significant impact on Tobin's Q (ibid. 344). Additional robustness checks, such as controlling for endogeneity, support these findings (ibid. 348-349).

[54] Coles et al. (2008) follow the theoretical argument that large firms operating in different business segments require larger boards. Furthermore, firms with a high debt ratio also require more advice.

Bonne et al. (2007) address the conventional wisdom of several shareholder advocates, who argue that smaller boards with a large proportion of outside directors boost corporate performance. In a similar sense, the Sarbanes-Oxley Act of 2002 required that audit committees should consist only of independent directors. In light of the conventional wisdom and the regulatory changes Bonne et al. (2007) analyze the determinants of corporate boards using a sample of IPO firms and their board structure development 10 years through the initial public offering. In particular, these authors investigate the relation between development of board size and independence.

Their well-structured paper discusses three main hypotheses: i) the *scope of operations hypothesis* ii) the *monitoring hypothesis* and iii) the *negotiation hypothesis*. The argumentation of Fama and Jensen (1983) on corporate organization suggests that larger and more complex firms face more complex processes, which lead to larger and more hierarchical organizations. Furthermore, Lehn, Patro and Zhao (2005) as well as Coles, Daniel and Naveen (2014) argue that companies growing into new product lines and new markets will seek new board structures. Therefore the number of directors will increase to ensure their supervisory function as regards managerial performance. Moreover, monitoring costs are affected by the operating environment of the firm (Bonne et al. 2007: 70). For instance, Lehn, Patro and Zhao (2005) argue that firms with high R&D expenditure will have small boards with a small proportion of outsiders, because the cost of monitoring is high for high-growth firms.[55] In line with this argumentation Coles, Daniel and Naveen (2007) as well as Linck, Netter, and Yang (2008) argue that high-growth firms have high monitoring costs and therefore will tend to have small, more insider-dominated boards than mature firms (cf. also Bonne et al. 2007: 70-71). Finally, the theoretical argumentation of Hermalin and Weisbach (1998) shows that high-performing CEOs will negotiate more insider-dominated boards. In line with this argumentation Kieschnick and Moussawi (2004) develop the hypothesis that a board's independence is determined by the influence of the CEO and institutional investors. They propose that board independence will decrease if the influence of the manager or the institutional investor increases.

[55] Cokes, Daniel, and Naveen (2007) argue that R&D expenditures is a proxy variable for high-growth firms.

In line with previous literature Bonne et al. (2007) use several multivariate regression models to estimate their panel data on the dependent variables of board size and proportion of independent directors. First they investigate their three hypotheses and the impact of these on board size. Consistently with the *scope of operations hypothesis* the proxy variables firm size, firm age and number of business segments have a positive and significant impact on board size. These findings imply that growing firms increase in board size (ibid. 79). The findings on the *monitoring hypothesis* show that free cash flow, industry concentration and takeover defense have a positive and significant impact on board size. Furthermore, the results of the regression model show that R&D expenditure, return variance[56] and CEO ownership have a negative and significant impact on board size. These findings support the *monitoring hypothesis*.

Secondly, Boone et al. analyze the proxy variables for the monitoring, scope of operations and negotiation hypotheses, and establish significant results for market-to-book ratio and CEO ownership. Both variables have a negative impact on the fraction of outside directors (ibid. 84-85). Testing the negotiation hypothesis, they find significant evidence for all proxy variables for CEO negotiation on board independence. In particular, CEO tenure and CEO ownership have a negative and significant impact on the proportion of outside directors. Furthermore, outside directors' ownership, venture backing and the Carter-Manaster underwriter ranking have a positive and significant impact on the proportion of outside directors.

Linck et al. (2008: 314) investigate the determinants of corporate boards of more than 53,000 US firms from 1990 to 2004, specifically board size, board independence, and board leadership (ibid. 311). In the corporate governance literature boards of directors provide monitoring and advice for management, which includes costs and benefits. Following the theoretical arguments and prior empirical research[57] on boards of directors, Linck et al. use the number of directors for the proxy 'board size', the fraction of outside directors for 'board

[56] Measured as stock price volatility.

[57] Linck et al. (2008) refer to Adams and Ferreira (2007) and Raheja (2005).

independence', and a dummy variable for 'board leadership'[58] whether the CEO is at the same time chairman[59] or not.

For their empirical analysis Linck et al. select several independent variables of firm characteristics and ownership structure (ibid. 315).[60] In line with their hypotheses the coefficients for the market value of equity, debt, number of business segments and company age have a positive and significant impact on board size, and the coefficients of market-to-book value, R&D expenses, stock price volatility and CEO ownership have a negative and significant impact on board size, as predicted. Directors' ownership has a negative impact on board size, which is contrary to their predictions (ibid. 321). The regression model on board independence also shows positive and significant coefficients for the market value of equity[61], debt, number of business segments, firm age, directors' ownership and free cash flow. Market-to-book value, R&D expenses, stock market volatility, CEO ownership, CEO age and performance have a negative and significant impact on board independence. Finally, Linck et al. investigate the relationship between board leadership and board structure. Their findings show that market value of equity, stock price volatility and CEO tenure have a positive and significant impact on board leadership. On the other hand, market-to-book ratio, R&D expenses and performance have a negative and significant impact on board leadership.

Linck et al. apply three further robustness checks to confirm their findings on board structure. First, they apply a principal components analysis and create two new proxy variables for their test. The results confirm the findings that complex firms have larger and more independent boards, whereas firms with higher monitoring and advisory costs have smaller and less independent boards (ibid. 322). Secondly, they divide their sample into sub-samples for small, medium and large firms and conclude that the board structure of small firms can be explained by fewer factors than medium and large boards. For instance, CEO age has no significant impact on board independence for small enterprises. On the other

[58] The dummy variable board leadership equals one if the CEO is the chairman at the same time, zero otherwise.

[59] The term 'chairman' refers indiscriminately in this thesis to female and male chairpersons.

[60] These independent variables for the regression analysis include total assets, market value of equity, market to book ratio, CEO ownership, director's ownership, and institutional ownership.

[61] Linck et al. (2008) use the logarithm of the market value of equity. Furthermore, the authors use the logarithm of number of business segments for their empirical analysis.

hand, CEO age has a negative and significant impact on board independence for medium and large boards. Overall, the robustness checks support the findings of the first regression model. Finally, Linck et al. test whether board structure changed after the Sarbanes-Oxley act (SOX) in 2001. Using a dummy variable for the impact of SOX, they find evidence that board independence increased after SOX. Moreover, ownership structure had a weaker impact on board structure after SOX.

Duchin et al. (2010) study the effectiveness of outsiders on the board of directors (ibid. 195). Based on the corporate governance regulation form 2002-2003[62] and the Sarbanes-Oxley Act of 2002 the authors investigate outside director composition and its impact on company performance (ibid. 196). In contrast to the regulators, who require a basic increase in outside directors, the authors believe that a one-size-fit-all approach does not increase the effectiveness of boards.

Theoretical research in corporate governance has recognized that the effectiveness of outside directors on monitoring and reducing agency conflict between shareholders and management is limited (ibid. 195). Furthermore, according to Duchin et al., the challenge of board endogeneity has not been resolved so far in empirical research on the effectiveness of boards and outside directors. Many empirical investigations only study the impact of board independence on performance, which does not address endogeneity concerns (ibid. 196). For this reason Duchin et al. look at changes in board composition after an exogenous event, such as the regulation required by the NYSE and Nasdaq between 1999 and 2003. They use three variables to measure the information costs of firms. Corporate governance literature shows that effective monitoring and advising by outside directors depends on the information environment of the firm. If information costs of a firm are low, an increase in the number of outside directors might increase performance. In contrast, if the information costs of a firm are high, an increase in outside directors need not necessarily increase performance. The reason is that in some cases information costs are higher than the increase in performance (ibid. 196). To measure information costs of the sample firms Duchin et al. use analyst forecasts. Firms with more (and more precise) information measured by the number of forecasts have lower information costs and are less complex than firms with fewer forecasts and more forecast errors (ibid. 201-202).

[62] Compare the regulation requirements of NYSE and NASD from 1999-2003.

For their empirical analysis Duchin et al. use a sample of 15,820 observations for the period from 1996-2005 (ibid. 201). They use a base line regression and control for fixed effects. Using Tobin's Q, ROA and stock returns as performance measures, they establish that the effectiveness of outside directors depends on information costs (ibid. 200). Their main finding is that firms with low information costs increase their performance by increasing the percentage of outsiders on the board. However, if acquisition costs for information are high, the increase in outside directors decreases performance. This finding is consistent with the theoretical view in corporate governance (ibid. 195-196). These authors conclude that firms will compose their boards optimally if they understand the issue of information costs.

Larmou and Vafeas (2010: 65) investigate the relationship between board size and firm performance in firms with poor past operating performance[63]. Using a sample of 257 firms, they apply a baseline regression model, an event study and finally an OLS regression model to investigate their research question (ibid. 72-77).

The corporate governance literature has several arguments both in favor of and against large boards. For example, Lipton and Lorsch (1992) argue that large boards do not operate efficiently, because in large boards it becomes less likely that directors criticize the decisions of the CEO. Furthermore, larger boards tend to become less productive, generating coordination issues and slower decision making. In large boards directors become free riders and more risk averse. Jensen (1993) maintains that large boards will tend to be in favor of the CEO, because they are easier to control. On the other hand, boards provide primary monitoring and advice mechanisms. An increase in board size might therefore also increase the capacity of the board. In this context Lipton and Lorsch (1992), as well as Jensen (1993) point out that both overly small and overly large boards are detrimental to effectiveness.

The empirical design of Larmou and Vafeas (2010) includes several empirical methods to study the impact of board size on firm performance.[64] First, they identify firms with three years of poor operating performance and use these for further analysis (ibid. 67). Secondly, they study the impact of several independent variables, including board size, on corporate performance (ibid. 72-74). Using market to book ratio and stock market returns over the past

[63] The authors use income before depreciation divided by total assets as a measure of operating performance.

[64] Here again Larmou and Vafeas (2010) use sample firms with a history of poor operating performance.

three and five years respectively as dependent variables, they show that board size has a significant and positive impact on both performance measures.

Concluding the analysis of the impact of board size on performance, Larmou and Vafeas apply an additional event study that measures abnormal returns around the announcement of change in board size (ibid. 76). The result of this study is positive and significant for increases of board size around the event window. On the other hand, the result for decreases in board size is negative, but not significant. This implies that the capital market reacts in favor of an increase in board size for poorly performing companies. However, the findings of the event study cannot be confirmed by an OLS regression.

Several papers address the issue of bank boards. The findings on bank boards are, for several reasons, important for the empirical analysis in the present research. First, banks, as well as private equity firms, operate in the financial industry, which plays an important role in the economy. The failure of financial corporate governance can create significant costs for the whole economy and can lead to financial crises. Yet corporate governance literature provides little understanding of the role of governance either in banks or in private equity firms.

Adams and Mehran (2012) and Pathan and Faff (2013) address the issues of bank board structure and bank performance. Adams and Mehran study the relationship between board structure and performance. Their paper addresses in particular the impact of board size and board independence on performance. Furthermore, they analyze M&A activities in the banking industry and bank board complexity to address endogeneity issues.

In recent year several empirical studies have investigated the role of the board of directors and its impact on corporate value. However, most studies excluded companies from the banking and insurance industries. Moreover, the Sarbanes-Oxley Act of 2002 and the listing rules of NYSE and Nasdaq follow a "one-size-fits-all" approach, which emphasizes greater board independence. Addressing these issues, Adams and Mehran use a sample of 35 bank holding companies from 1986 to 1999 to study the impact of bank board structure on Tobin's Q. Using a fixed effect regression model, they show that the proxy variable 'board size'[65] for board structure has a positive and significant impact on Tobin's Q (Adams and

[65] Adams and Mehran (2012: 257) use several proxy variables for board size, in particular logarithm of board size, number of directors on the board, and board size splits between 8 and 15, 16 and 20, and 21 and 36.

Mehran 2012: 257). On the other hand, board independence measured by the proxy variable 'fraction of outside directors' has no significant impact on Tobin's Q. The authors investigate two further factors that might diminish the impact of board size on performance. In particular, they use proxy variables for M&A transactions, such as 'directors added after M&A transactions' and 'number of M&A directors' to study the potential M&A impact on Tobin's Q (ibid. 259-260). Their findings suggest that M&A activities are not the main explanation of board composition and performance (ibid. 261). Finally, they analyze whether performance is diminished by complexity, which they measure with the proxy variables 'firm size' and 'number of Tier 1 subsidiaries' (ibid. 263). The impact of the independent variables on complexity suggests that large boards do not support management when dealing with complexity in the banking industry (ibid. 264).

Using a sample of 212 large US bank holding companies (BHC) from 1997 to 2011 Pathan and Faff (2013) develop seven hypotheses to analyze the relationship between bank structure and performance. In particular they investigate the impact of board size, board independence and gender diversity on bank performance, and they also study the market power of banks and other governance mechanisms. Following the argumentation of Fama (1985) that the failure of bank governance creates massive cost for the economy they use the introduction of the Sarbanes-Oxley Act (SOX) of 2002 and the financial crisis as proxy variables for their analysis.[66] For their empirical analysis they use the GMM estimation technique (ibid. 1574).

Based on the GMM regression model, Pathan and Faff establish that board size and board independence have a negative and significant impact on the dependent variable 'pre-tax operating income'. Regarding the proxy variable for gender diversity, which is the percentage of women on the board, they establish a positive and significant impact on performance (ibid. 1581). Looking at the proxy variables 'women on the board after SOX' and 'women on the board during the financial crisis', the regression model shows negative and significant coefficients for both variables. The findings on women on the board might be negative because of the regulatory requirements after SOX. According Pathan and Faff women on the board have a positive impact on performance up to a certain point, however

[66] More precise, Pathan and Faff (2013) use the period between 2007 and 2011 as measure for the financial crisis. Furthermore, the empirical investigation includes a sub-sample for the performance before and after the introduction of the Sarbanes-Oxley Act in 2002, which requires in section 301 that the audit committee have to be completely independent and in section 303A.01 an outsider dominated board for listed companies.

beyond that point performance will decrease rather than further increase. These findings suggest that board size and independence have a negative impact on performance, whereas the percentage of women directors before SOX and the financial crisis has a positive impact on performance.

These authors see a possible association between market power and performance. For this purpose they separate their sample into two groups. The first group covers banks with low market power and the second banks with high market power. They use tow proxies for market power. The first proxy for market power is the Herfindahl Index; the second is weighted market shares across states. They establish that banks with low market power, board size, and independence decrease in performance. The percentage of women on the board increases bank performance before SOX and the financial crisis. The coefficient for the percentage of women on the board after SOX and during the financial crisis is again negative and significant. For banks with high market power they only establish significant results for the percentage of women directors during the financial crisis, which has a negative impact on performance.

As in their approach on market power, Pathan and Faff separate their sample into sub-samples with staggered and non-staggered boards. The findings on non-staggered boards are statistically insignificant; they establish, however, that board size, board independence and the percentage of women directors during the financial crisis have a negative and significant impact on performance. On the other hand, the only positive coefficient in their regression model is the percentage of women directors before SOX. Their finding suggest that bank performance increases with the increase of women directors before the introduction of SOX in 2002 and the financial crisis (ibid. 1582).

Pathan and Faff's paper concludes with estimations for small, medium-sized and large banks. In this context they confirm their findings for small banks. However, the coefficients in the regression models for medium-sized and large banks are not significant. They suggest, therefore, that the governance recommendations on board size, independence and the percentage of women directors is obvious for small banks, but not for large and medium-sized banks. Their empirical analysis concludes with the regression results of bank board structure on the five alternative performance measures; these confirm their earlier findings (ibid. 1586).

In summary, this sub-chapter has reviewed the literature on monitoring and advice by the board of directors. Furthermore, it has discussed board size and the fraction of outside directors, which are two widely used explanatory variables to describe monitoring and advice.

In general, one might assume that larger and more independent boards lead to more efficient monitoring and advice. However, Yermack (1996) suggests that board size has an inverse impact on corporate performance because quality of monitoring decreases in line with the number of board members. In other words, the monitoring effort of single directors decreases with an increase in the number of directors. Coles et al. (2008) also question if the "one size fits all approach" is a reasonable concept to investigate the effectiveness of a board of directors.[67] In particular they observe that firms with greater advisory requirements have larger boards and that these are dominated by outsiders. On the other hand, the authors find that R&D intensive firms require smaller, insider-dominated boards. Bonne et al. (2007) show that board structure changes over time, increasing, for instance, ten years after an IPO as a firm grows into new product lines and markets. In other words, an increase in operational scope will increase board size.

Finally, this sub-chapter states that information costs impact the effectiveness of monitoring and advice by outside directors. Duchin et al. (2010) find that the effectiveness of outside directors decreases with this increase in information costs.

Chapter 4 will discuss the underlying panel data set in detail, and show that most LPE firms launched their public offering between 1997 and 2007. In other words, LPE is a relatively new organizational structure compared to other public corporate structures such as industrial or family firms. Moreover, LPE firms entered the public equity market to collect equity for additional investment activities. This argument is in line with Bonne et al. (2007), who argue that firms initially entering the public equity market use their new funds to grow into new production lines and markets. On the other hand, the private equity industry is known for its incentivized management compensation structure. Although, private equity managers

[67] In particular, Coles et al. (2008) refers to the Sarbanes-Oxley Act, which has been passed by the US government in 2002 after the corporate and accounting scandals of Enron and Worldcom.

receive a management fee of 1–2%, they are incentivized to achieve an agreed hurdle rate to receive a performance fee that is usually 20% of the fund's earnings.[68] Taking this argument into account, it would seem that LPE firms require advice rather than monitoring.

Hypothesis 1: Board size has a positive impact on LPE performance.

Hypothesis 2: Outside directors have a positive impact on the performance of LPE firms.

3.2.2. Number of board committees and board meetings

One of the first papers to examine the relationship between board meetings and company performance was the paper of Vafeas (1999). For his empirical investigation Vafeas used a sample of 307 firms over the period 1990-1994 (ibid. 119). Corporate governance literature suggests an unclear relationship between board meetings and firm performance. On the one hand, scholars like Jensen (1993) argue that board meetings are an important mechanism, because it is useful for outside directors to meet and exchange with other outside directors and management. Jensen mentions that boards usually react to corporate crises. In this context they should meet more frequently, to be able to work proactively on company issues. In contrast, Lipton and Lorsch (1992) argue that directors suffer from lack of time. Moreover, organization theory suggests that larger boards need more time to make decisions. Therefore, board activity will increase with the increase in board size. In this context, Lipton and Lorsch (1992) suggest that the optimal board size is between seven and nine directors. As mentioned above, Yermack (1996) also finds a negative relationship between board size and corporate performance. Focusing on the monitoring function of

[68] The compensation structure of private equity firms is described in sub-chapter 2.2.

outside directors corporate governance literature documents that additional outside directors increase monitoring activity, which demands more time (Vafeas 1999: 116). Finally, in corporate governance theory the separation of the CEO and chairman leads to more efficient monitoring. On the other hand an outside chairman should intensify board activities, because outside directors need to be informed more often than inside directors (ibid. 117). Based on theoretical argumentation, Vafeas investigates the conflicting views on the nature of boards to find empirical evidence on board meetings and company performance.

In the first section of his empirical analysis Vafeas (1999) uses an ordinary least square (OLS) and a 2SLS regression model. Considering both regression models, he finds significant results only for board size, insider ownership, and excess returns of the past 12 months. The results of the OLS and the 2SLS regression model suggest that board size has a positive impact on board meetings. However, insider ownership and excess returns of the past 12 months have a negative impact. Using market to book ratio as dependent variable Vafeas finds that board size has a negative impact on firm performance, whereas insider ownership and excess returns of the past 12 months have a positive impact. The findings on board meetings are, however, unclear. The results of the OLS regression suggest that board meetings have a negative and significant impact on company value. The coefficient 'board meeting' is also negative in the 2SLS model, however statistically insignificant. In light of these findings Vafeas investigates past performance and changes in board activity in the second section of his empirical analysis.

His results show that excess returns in the past 12 months have a negative and significant impact on board meetings. Furthermore, the operating performance measure ROA of the prior 12 months also has a negative and significant impact on boards meetings. These findings suggest that board meetings increase after periods of poor performance and decrease after periods of good performance (ibid. 132). Vafeas concludes that board meetings improve operating performance for poorly performing firms, therefore an increase in frequency of board meetings tends to be an efficient mechanism for firms suffering from operating problems (ibid. 140).

In contrast, Adams (2003) investigates the anecdotal evidence that the work of the board is done in committees. Hence she (ibid. 3) studies the meeting, committee and compensation

structure of boards, which can help to explain their complex nature. For her analysis she uses a sample of 352 Fortune 500 firms publicly listed in 1998 (ibid. 5).

For her empirical analysis Adams distinguishes three types of board function (ibid. 4). She argues first that boards have a monitoring function, which is the classical view in the corporate governance literature. Besides that, boards have an advisory function, which assists the CEO in strategic questions. Finally, she mentions stakeholder interest, which is an important component of corporate value (ibid. 4). According to Jensen (2001) corporate value maximization cannot be achieved if stakeholder interests are ignored. Adams (2003) seeks to express the three functions of the board in terms of committee structure and number of board meetings. Furthermore, she measures board effort in terms of board compensation and argues that board members will increase their effort if compensation is high and decrease their effort if compensation is low.

The first regression model shows that company size and the stock price volatility of the past five years both have a positive and significant impact on compensation. These findings support Adams' hypothesis that board effort is higher in larger firms and in firms in an uncertain environment (ibid. 14). She finds, moreover, that company size and diversification have a positive and significant impact on compensation in the monitoring committee.[69] These findings are in line with Agrawal and Knoeber (2001), who argue that larger firms need more political and legal experts. Moreover, Adams finds that company size and age, and the ratio of capital expenditure divided by sales, have a positive and significant impact on stakeholder compensation (ibid. 15-16). These findings again suggest that larger and older firms need political and legal expertise. Adams also studies the quality and quantity of directors' effort. She measures the quality of effort with the compensation per meeting unit and the quantity with the number of meetings unit. In this context, she finds that an increase in company size increases the frequency of meeting as well as the compensation per meeting unit. This finding suggests that both quantity and the quality of effort increase with company size, which is in line with the labor market literature (ibid. 18). Adams concludes her empirical analysis with robustness checks, which confirm her findings (ibid. 21-22) that, in

[69] In this section of her analysis she uses the Tobin regression model to estimate corporate characteristics on committee compensation.

sum, company size, stock price volatility, and diversification increase board compensation, and company size increases the frequency of board meetings.

In a cross-sectional analysis Hayes et al. (2004) study the structure of committees in S&P500 listed boards of directors (ibid. 2). In particular, they analyze the effect of CEO characteristics on committee structure and performance (ibid. 2004: 4). The data for the empirical analysis includes 5,915 observations for different directorships and 2,264 committees of S&P500 firms for the time period 1997-1998 (ibid. 8). For their empirical investigation these authors use the Poisson and the Ordinary Least Square (OLS) regression models[70]. As mentioned in the first paragraph, they analyze the effect of CEO characteristic on committee structure and performance. Variables for CEO characteristics are for example CEO ownership, founder on the board and the composition of directors.[71] On the other hand, committee structure and performance are measured by the number of committees, the number of committee functions and Tobin's Q.[72]

Hayes et al. find empirical evidence that the number of committees is positively related to the number of directors. Furthermore, company size also has a positive and significant impact on the number of committees. Finally, they conclude from their findings on the number of committees that firms that pay dividends have more committees than firms that do not pay dividends (ibid. 17). Besides the results for the number of committees, they establish that CEO ownership is negatively related to committee function (ibid. 17). This finding implies that firms with high CEO ownership have fewer committee functions. On the other hand, committee functions more often occur in firms with large boards, more assets and more board meetings. Finally, the percentage of shares held by outsiders on the acquisition committee, ethics committee, succession committee and technology committee has a negative significant impact on Tobin's Q. On the other hand, Tobin's Q is positively related to the percentage of shares held by outsiders serving on the finance & investment and

[70] Compare for example page 37 and 38, where Poisson and OLS regressions are used to estimate the effect of CEO characteristics on the number of committees and the number of committee functions.

[71] CEO ownership, founder on the board and the number of directors are all independent variables in the regression models.

[72] The number of committees and committees function, and performance measured by Tobin's Q are all dependent variables in the regression models.

the strategy committees (ibid. 18-19). They conclude that boards with older directors have a negative significant impact on performance (ibid. 19).

Brick and Chidambaran (2010) study the assertion of regulators and shareholder advocates that board activity can generally increase shareholder value. In particular, they investigate whether or not an increase in board monitoring and advice increases company value (ibid. 534). Hence their empirical analysis investigates the relationship between the number of board meetings, committee structure and company value. Using a panel dataset of board and company characteristics from 1999 to 2005 they consider the regulatory change of the Sarbanes Oxley Act (SOX) in 2002.

The corporate governance literature (see Vafeas 1999 and Adams 2005) suggests that both the board and its activities may grow with an increase in investment opportunities. In this context Vafeas (1999) argues that the number of board meetings increases with an increase in company complexity and investment opportunities. These arguments imply that the frequency of meetings and the committee structure are determined by corporate events (Brick and Chidambaran 2010: 535). Besides the meetings and committee structure, the SOX Act requires as a general principle more independent board members and greater committee independence. In consideration of this argumentation Raheja (2005) shows that insiders ensure the information flow and that an increase in the number of independent directors increases information costs. Such an increase may, therefore, decrease shareholder value in information-intensive firms. In corporate governance literature CEO duality, where the CEO is also the chairman of the board, increases CEO entrenchment and decreases board activities. On the other hand CEO duality might improve information coordination between the CEO and the board of directors.

Brick and Chidambaran's initial estimates are based on board meetings and monitoring, CEO ownership, and Tobin's Q as dependent variables.[73] First, the results suggest that CEO ownership, the volatility of the past 60 months and the return of the past 12 months have a negative and significant impact on board meetings and monitoring. On the other hand

[73] The dependent variable for board meetings is the logarithm of the number of meetings. The monitoring variable is the logarithm of the number of meetings multiplied by the number of independent directors. Furthermore, Brick and Chidambaran use the dollar value change in the portfolio of stocks and options held by the CEO for a one percent change in equity value as proxy for CEO ownership. Tobin's Q is defined as the ratio of the total market value of the firm to the book value of the firm's assets.

Tobin's Q, investment activities, and total assets have a positive and significant impact on board meetings and monitoring. Secondly, Tobin's Q, CEO duality, and CEO tenure have a positive and significant impact on CEO ownership. However, CEO age and board independence have a negative and significant impact on CEO ownership (Brick and Chidambaran 2010: 541). Finally, board meetings, monitoring, and the level of shareholder rights[74] have a positive and significant impact on Tobin's Q. The proxy variables 'acquisition activity' and 'restatement accounting figures' have a negative and significant impact on company value (ibid. 543). Brick and Chidambaran extend their empirical analysis to an examination of the relationship of company value and board meetings and monitoring before and after the SOX Act of 2002. Their results show that board meetings had a negative and significant impact on Tobin's Q before the SOX Act. However, the coefficient of board meetings turns positive after the SOX Act, but not significant. Concluding their empirical analysis, these authors show that the SOX Act has a positive and significant impact on audit committee meetings and the proportion of independent directors in the audit committee.

In summary, the corporate governance literature suggests that board committees and meetings provide monitoring and advice for the board of directors. For instance, Jensen (1993) argues that board meetings are a useful mechanism, because outside directors meet and discuss matters with the management. Vafeas (1999) argues in this context that the board and its activities may grow with an increase in investment opportunities. This again suggests that board activities provide advice via board committees and meetings.

On the other hand, Jensen (1993) argues that boards meet more frequently to react to corporate crises. Taking this into account, Vafeas (1999) finds that board meetings increase in frequency after periods of poor performance and decrease after periods of good performance. The arguments of Jensen (1993) and Vafeas (1999) suggest that board committees and meetings provide advice, as discussed above, as well as monitoring for poorly performing firms.

[74] The level of shareholder rights is measured by the Gompers-Ishii-Metric Governance Index.

Finally, Hayes et al. (2004) find empirical evidence that the number of board committees is positively related to board and company size. In other words, board activities may increase because boards have a wider scope and complexity of operations.

In this thesis I follow the argumentation of Jensen (1993) and Vafeas (1999), who point out that the number of board committees and meetings suggest that the boards of LPE firms require advice.

Hypothesis 3: The number of board committees has a positive impact on the performance of LPE firms.

Hypothesis 4: The number of board meetings has a positive impact on the performance of LPE firms.

3.3. Family ownership and founder-managers

The following section will present several papers that investigate the role of company founders on the board of directors. In recent years, corporate governance literature has studied the impact of i) family ownership, ii) family control rights and iii) family management on corporate performance. For example, Anderson and Reeb (2003) study the impact of family ownership and management on performance and establish that family ownership has a positive impact. Villalonga and Amit (2006) investigate the role of families in family firms. Separating family ownership from control rights and management, these authors argue that founder CEOs increase accounting and market performance. Andres (2008) observes a positive relationship between active founder families and performance in Germany.[75]

Researchers like Jayaraman et al. (2000), Adams et al. (2009) and Fahlenbrach (2009) investigate the impact of founder-CEOs on company performance. For instance, Fahlenbrach focuses only on founder-CEO characteristics. He finds that founder-managed firms outperform non-founder-managed firms on the stock market. On investment behavior he observes that founder managed firms spend more on R&D and acquire more targets in their own industry than non-founder-managed firms. Finally, the findings of Li and Srinivasan (2011) suggest that the involvement of founders as board directors has a positive impact on corporate governance.

[75] German company law separates the board of directors into "Vorstand" (Management Board) and "Aufsichtsrat" (Supervisory Board). Andres (2006) argues that founders on either board have a positive impact on corporate value.

3.3.1. Founding family ownership, control rights and management

Anderson and Reeb (2003) investigate the impact of founding family ownership on the performance of U.S. stock market listed companies. Their empirical analysis is based on a sample of S&P 500 firms from 1992 through 1999. They establish that family firms outperform non-family firms. Following prior literature on corporate ownership and performance, they set the threshold between "young" and "old" at 50 years.[76] The evidence for "young" and "old" firms is both positive and significant on ROA and Tobin's Q. These findings support the view that family ownership has a positive and significant impact on company performance.

A further question they address is the role of family members in top management positions (ibid. 1306-1307). In order to determine whether family members in top management positions have a positive or negative impact on performance, the authors investigate the independent variables 'CEO hire', 'CEO founder' and 'CEO descendant'. First, they argue that families might try to maximize their control by appointing a family member as CEO. Secondly, family CEOs might be less capable and talented than hired CEOs. In this context, Gomez-Mejia et al. (2001) argue that professional CEOs are potentially more accountable to shareholders and directors than family CEOs. On the other hand, family CEOs can bring special skills to the company, which hired CEOs might not provide. In this context Morck et al. (1988) argue that family CEOs can bring innovation and expertise to the company, which creates value. Another argument in favor of family CEOs is that family members often act as stewards. In line with the stewardship theory, family CEOs identify strongly with the company and see its performance as their own well-being.

Firms with family ownership perform better, then, than those without. But family firms perform even better with a family member as CEO than with a professional CEO (Anderson

[76] Following the argumentation of Demsetz and Lehn (1985) and Shleifer and Vishny (1997), Anderson and Reeb (2003) set a variable for firms younger than 50 years and a variable for firms older than 50 years.

and Reeb 2003: 1317). Finally, the dummy variable 'founder is CEO' has a positive and significant impact on ROA and Tobin's Q.[77]

Villalonga and Amit (2006) study three family ownership characteristics a) family ownership, b) family control, finally c) family management. Their question is whether these three characteristics create or destroy company value. Applying a sample of all Fortune 500 firms between 1994 and 2000 they find evidence that family ownership creates value under certain circumstances. First, family ownership creates value when the founder is still active in a leading position either as CEO or as chairperson (ibid. 388). This does not, however, diminish the agency problem between owner and manager, or between small and large shareholders. According to the theoretical arguments of Jensen and Meckling (1976), large shareholders reduce agency costs by monitoring management, but create agency costs by expropriating minority shareholders. This finding indicates that the benefits of family-ownership with the founder as CEO or chairman are larger than the costs. Secondly, Villalonga and Amit (2006) find evidence for the hypothesis that descendant-CEOs extract private benefits at the expense of small shareholders. This finding still holds, even with the founder as chairman on the board of directors (ibid. 388). Finally, investigating the control mechanisms, the authors find evidence that a founder increases company value most when no control-enhancing[78] mechanisms are established; descendant-CEOs, however, destroy value both with and without such mechanisms.

In his paper Andres (2008) studies the relationship between founding-family ownership and company performance. In a sample of 275 German exchange-traded companies he defines family firms as firms that have a family blockholding of at least 25% (ibid. 435). He also examines the impact of active founder families sitting on the board of directors in German stock-market-listed firms. In this context he distinguishes between founder CEOs, descendant CEOs and professional CEOs (ibid. 439-440). In his empirical analysis Andres uses Tobin's Q and ROA as performance measures,[79] and employs a random effect GLS

[77] In line with the corporate governance literature, Anderson and Reeb (2003) use ROA and Tobin's for investigating the relationship between family ownership and 'family member is CEO' on company performance.

[78] Villalonga and Amit (2006) control in their empirical analysis for different voting rights, multiple share classes, pyramids, crossholdings, and voting agreements.

[79] In particular Andres (2008: 435) calculates ROA on the basis of EBIT and EBITDA.

regression and a pooled regression model to test the effect of founder families on performance. His findings show that family firms outperform firms with a widely-held ownership structure and also other types of blockholders. In this context he points out that family blockholding is only superior if family members actively sit either on the board of directors as executive managers or on the supervisory board. Turning the focus on founder CEOs, his empirical analysis of Andres shows that founder CEOs have a positive and significant effect on market and accounting performance in German exchange-traded companies (ibid. 439). He concludes that family firms only perform better when family members actively participate as members of the management board (ibid. 439-440).

3.3.2. Founder CEOs and founders on the board of directors

Jayaraman et al. (2000) pursue the research question of the impact founder CEOs have on company performance and if founder management has specific characteristics. The authors study the relationship between founder CEOs and the stock market performance of the past 36 months. Their sample includes 94 U.S. stock-market-listed companies, of which 47 have founder CEOs. They argue that founder CEOs do not in general impact company performance; however, specific conditions could have a positive impact on the performance of founder-CEO managed firms (ibid. 1217-1218). They set up the hypothesis that founder CEOs might have a positive impact on smaller firms (measured by market capitalization), or on firms at the beginning of their life-cycle.

Following the theoretical arguments of the management science and corporate governance literature, Jayaraman et al. present arguments both for and against founder CEOs (ibid. 1216). First, founder CEOs might perform better than non-founders, because they have a certain reputation to lose. So they will invest greater effort in their company to ensure company success. Secondly, founder CEOs invest their time and capital in the company. The personal fortune of the founder is tied to that of their company, which will reduce agency costs. Furthermore, entrepreneurs characteristically set risky goals and have a high need to

achieve them. Finally, founders often start businesses in industries where they have long managerial experience. All these characteristics may well generate superior performance. On the other hand, following the principal-agent theory, there might be a conflict of interest between the founder and other shareholders. In this case founders would tend to increase their own utility rather than company value. Moreover, founders might desire to retain control over corporate decisions and funds. In this context founder CEOs would likely refrain from liberal cash payouts or dividend policies.

Jayaraman et al. (2000: 1220) establish that there is no general relationship between stock market performance and founder CEOs. However, testing the hypothesis that founder CEOs have a positive impact on performance in smaller firms, they find significant evidence for their hypothesis (ibid. 1220-1221). Furthermore, their findings also confirm that founder CEOs have a positive and significant impact on stock market returns in younger firms (ibid. 1221).

Adams et al. (2009: 137) study the relationship between founder CEOs and company performance in Fortune 500 firms. According to these authors, several empirical papers show a positive and significant relationship between founder CEOs and company performance. Their major contribution to the corporate governance literature is their focus on endogeneity problems in founder and performance research. However, they also present unique findings on founder CEO turnover.

Using an OLS regression model in the first section of their empirical study, these authors establish a positive and significant impact of founder CEOs on Tobin's Q and ROA. In their second section they use the proxy 'dead founders' and 'number of founders' as instruments for the variable founder CEO regarding the endogeneity issue (ibid. 142).[80] The results of their probit model show that the proxy 'dead founder' has a negative and significant impact on the 'founder CEO'. The negative and significant result shows that 'dead founders' cannot be 'founder CEOs', which makes the proxy a very good control variable. Secondly, the death of a founder is an exogenous shock and has no direct effect on company performance (ibid. 142). Furthermore, the finding for the proxy 'number of founders' is positive and significant. As mentioned above, 'number of founders' is also an exogenous event and

[80] Adams et al. (2009) use a probit regression model where companies with a founder CEO receive the value 1 and companies with a non-founder CEO the value 0.

therefore a good instrumental variable for 'founder CEO'. According to Adams et al., the effect of the proxy 'number of founders' should be positive and significant. After controlling the variable 'founder CEO' for endogeneity problems, the authors (ibid. 144) use the dummy founder CEO as independent variable to study the effect of founder CEOs on Tobin's Q and ROA. The results of their regression model show that founder CEOs still have a positive and significant effect on performance, which is in line with their earlier results.

Finally, Adams et al. investigate the relationship between company performance and a founder CEO's departure. Surprisingly, they establish a negative and significant relationship between good performance in the past and the retention of the CEO title. In order to answer this question they develop four hypotheses. First, the bad governance hypothesis,[81] which postulates a negative relationship between poor performance and CEO replacement. Secondly, the controlled succession hypothesis, which implies that CEOs are more likely to step down after periods of good performance: following the 'paradox of entrepreneurial success' hypothesis of Wasserman (2003), they expect founders to step down when the company is performing well. According to the arguments of Wasserman (2003) the likelihood for stepping down as CEO increases when projects and critical milestones have been achieved. Finally, the 'wealth effect hypothesis' implies that founders have invested a large stake of their wealth in the company and therefore want to retire when the company is performing well. Employing a probit regression the authors confirm 'controlled succession', the 'paradox of entrepreneurial success', and 'wealth effect'.

Fahlenbrach (2009) studies the characteristics of founder-CEOs and successor-CEOs. In particular he translates the organizational differences of founder firms into differences in company behavior, valuation and performance (ibid. 439). This approach contributes additional findings to the corporate founder literature.

According to Fahlenbrach, founder-CEOs are less likely to be removed from office than other CEOs and consider their company as a life achievement: they have strong intrinsic

[81] Previous studies of Warner et al. 1988, Weisbach 1988 and Goldman et al. 2003 document the relationship between poor performance and CEO turnover in firms with bad governance structure.

motivation and are inspired to pursue an optimal shareholder value strategy rather than concentrating on short-term actions. Furthermore, founder-CEOs have more influence and more power in decision-making due their equity stake and their status as entrepreneurs. Moreover, the equity stakes of founder-CEOs reduce the principal-agent problem. Finally, founder-CEOs make different investment decisions due their different attitude toward risk (ibid. 440).

For his empirical analysis Fahlenbrach uses a data sample with 2,327 large, publicly listed U.S. firms during the period 1992-2002. He constructs a panel dataset with 361 sample firms for 1,468 company-years (ibid. 440). In his empirical analysis he runs multiple regressions to find evidence for his hypothesis. First, he uses a two-stage least squares instrumental variable regression. In the first stage he instruments the variable for the founder-CEO. In the second stage he includes the instrumented variable 'founder-CEO' as an independent variable in his regression model and studies the effect on the dependent variable Tobin's Q (ibid. 448-449). The results of this regression model indicate that founder-CEOs have a sizeable positive and statistically significant impact on company value (ibid. 448). These results are in line with the findings of other empirical studies (Anderson and Reeb 2003, Palia and Ravid 2003, and Adams et al. 2009). Furthermore, Fahlenbrach calculates equal-weighted and value-weighed portfolios which invest in founder-CEO managed firms. Both portfolios outperform the benchmark. His equal-weighted portfolio would yield an average annual excess return of 16.34% and the value weighed portfolio an average annual excess return of 13.87% (ibid. 451). He further studies these portfolio returns in a cross-sectional regression model and points out that the coefficient on the variable founder-CEO dummy has a value of 36 bps and is statistically significant at the 2% level (ibid. 454). Finally, Fahlenbrach studies R&D expenditure and M&A transactions. He finds that founder-CEOs spend up to 5.4% more on R&D and invest more actively in industrial knowledge than successor-CEOs (ibid. 456-461).

Li and Srinivasan (2011) investigate the role of founders on the board of directors. In particular they study the impact of founders on company performance, CEO compensation and retention, M&A decisions, and board meeting attendance.

In light of the arguments between Jensen (1993), Anderson and Reeb (2003), and Villalonga and Amit (2006), they suggest that founder involvement in the board of directors can provide the company with valuable monitoring and advice (Li and Srinivasan 2011: 455). Their empirical analysis includes more than 11,000 company-year observations from 1996 to 2004. Assuming that founder involvement provides value for the company, they apply a fixed-effect regression model with founder variables to the dependent variable Tobin's Q (ibid. 459). The coefficient 'founder on the board' has a positive and significant impact on Tobin's Q. This finding is in line with the results of Villalonga and Amit (2006), who show that company value increases with the founder on the board and a hired CEO. Moreover, the coefficient that the current CEO is a member of the founding family has a negative and significant impact on Tobin's Q. Li and Srinivasan also analyze the pay-for-performance sensitivity of successor CEOs (ibid. 461). In a regression model which controls for company, industry and year fixed effects these authors show that founders on the board have a positive and significant impact on pay-for-performance sensitivity. In contrast, the coefficient for 'former CEO' with an equity stake is negative and significant. This finding underlines the impact and skills of 'founder on the board'. Li and Srinivasan's findings on CEO compensation suggest that CEO pay-for-performance sensitivity increases, whereas overall CEO compensation decreases, in firms where the founder is still actively participating on the board (ibid. 462). Investigating CEO tenure the authors find evidence that the likelihood of a replacement of the CEO increases when the founder is on the board (ibid. 463). Furthermore, estimating the returns of the acquiring company around the M&A event window,[82] they establish that firms with a founder on the board have 1.99% higher returns (ibid. 464). This finding suggests that founders provide valuable advice for investment decisions. Finally, they ask if the presence of the founder has a positive impact on board meeting attendance, and find evidence that directors' attendance is better in founder-director boards than in boards with a former CEO with equity stakes (ibid. 465). The robustness checks confirm the results and do not affect their inference.

In conclusion, founder CEOs have specific characteristics that might have a positive impact on company performance. Following the argumentation of Jayaraman et al. (2000), founders

[82] Li and Srinivasan (2011) apply a three day event window from -1 to +1.

have a reputation to lose. Furthermore, the financial wellbeing of the founder is tied to the wellbeing of the company. Moreover, a specific characteristic of founders is setting risky goals and an intense need to achieve them. Concluding these arguments, founders invest great effort into becoming successful entrepreneurs. Finally, managerial experience supports entrepreneurs in creating value in their industry.

The theoretical arguments and empirical findings of Jayaraman et al. (2000), Anderson and Reeb (2003), Andres (2008), Adams et al (2009), and Fahlenbrach (2009) support the argumentation given above. Moreover, anecdotal evidence suggests that founders of private equity firms have certain skills that create very high value. In particular, the Forbes magazine reports that Stephen Schwarzman, one of the co-founders of The Blackstone Group, is one of the most successful self-made billionaires in the private equity industry. Schwarzman and his co-founders founded Blackstone in 1985 with $ 400,000 assets on the balance sheet, whereas the firm has today $ 290,000,000,000 assets under management.

This thesis follows the argumentation given above and applies the explanatory variables ‘founder on the board’, ‘founder chairperson’ and ‘founder CEO’ to measure the impact of founders on performance of LPE firms.

Hypothesis 5: Founders on the board of directors have a positive impact on performance of LPE firms.

3.4. Leadership structure

This section presents the literature on leadership structure, which considers the question whether the positions of CEO and chairman should be separated or not. Following the principles of corporate finance, company actions are associated with costs and benefits. Considering this principle, researchers and practitioners should ask whether certain actions increase or decrease shareholder wealth. In the context of leadership structure, conventional wisdom among regulators and institutional investors is that separation of the CEO and chairman benefits shareholders (Brickley et al. 1997: 190). For instance, Mary Shapiro, a former SEC Commissioner, recommends separation of the two positions, which will reduce the power of the CEO over outside directors. Michael Jensen also recommends separation, arguing that this increases board effectiveness (ibid. 193).

Nevertheless, separation of the positions of CEO and chairman is also associated with costs. Alchian and Demsetz (1972) argue that monitors can create agency costs by perquisite taking, effort level, and investment preferences. With increasing tenure, CEOs generally gain, and pass on, special knowledge about strategic issues and investment opportunities. One way to reduce information costs is to offer the chairman position to the resigning CEO. Alternatively, firms can create an incentive mechanism by offering an effective CEO the double position of CEO and chairman. Finally, Alexander Hamilton points out that dual role executives might increase agency costs as a result of disputes or the difficulty of assigning blame (Brickley et al. 1997: 194).

Brickley et al. (1994) also investigate the costs and the benefits of separating the positions of CEO and chairman. For their empirical investigation they apply a sample of 737 firms for the fiscal year 1988. First, they investigate the relationship of leadership structure to CEO compensation. The regression models find no relationship here. The results suggest that company size and performance have a positive and significant impact on CEO compensation (ibid. 203). This finding does not support the argument that leadership structure leads to agency costs measured in terms of the increase in CEO compensation. Secondly, these authors show that companies in which CEOs are promoted to the additional position of chairman perform better than those in which the CEO leaves the company without such

promotion (ibid. 205). This result indicates that promotion to both positions represents an incentive mechanism. Thirdly, Brickley et al. show that the CEO's past stock market performance has a positive and significant impact on the promotion in question (ibid. 207-208). Finally, they apply an event study to demonstrate the market reaction to the change in leadership structure (ibid. 213-217). The first event study of a split between CEO and chairman positions shows negative and significant cumulative abnormal returns (CARs). The results for the full sample show a market reaction of -0.71, i.e. -71% (ibid. 215). This finding suggests that market reaction to the announcement of a split position is negative. The second event study examines market reaction to the announcement of joint CEO/chairman positions. The results of this event study are positive but not significant. Brickley et al. conclude that there is no significant announcement effect on combining the two positions; indeed, the findings might be anticipated by market participants (ibid. 217). Another issue that might arise in the event study is the effect of secondary information. In this case the announcement of the change in leadership structure might include private information about investment opportunities and future cash flows.

Adams et al. (2005) study variability of performance as a measure of the power of the CEO. They argue that executives can only impact company outcomes if they have influence over crucial decisions. For their empirical analysis they focus solely on the power of the CEO over the board, investigating the formal position of CEO, the status of founder and the status as the board's only insider (ibid. 1403-1404).

Sah and Stiglitz (1986, 1991) – along with a wide range of management literature on managerial decision-making – argue that in firms where CEOs make decisions that significantly impact outcomes, risk arises from judgment errors. In this context the risk of judgment errors might increase shareholder volatility. In their paper Adams et al. support the hypothesis that firms with powerful CEOs might have more variable firm performance, because (among other reasons) decisions with extreme consequences are more likely to be taken by a powerful CEO (Adams et al. 2005: 1404).

These authors use a sample of 336 firms over the period 1992-1999 for their empirical analysis (ibid. 1410). Their main dependent variables are performance variables and the variability of performance. They measure the performance for their empirical analysis with

Tobin's Q, ROA, and stock returns, whereas variability is measured by the standard deviation of these variables (ibid. 1411). The empirical model of the analysis is the Glejser test, which they first use to estimate the performance of the sample firms and in a second stage to apply controls for the standard performance deviation (ibid.1415-1419).

Adams et al. establish that stock returns are more variable for firms managed by powerful CEOs. By using the empirical approach of Hambrick and Abrahamson, which controls for the industry ratings of managerial discretion, they find significant evidence for all three CEO power proxies (ibid. 1429).

In summary, CEO duality has costs and benefits as discussed in the previous sub-chapter. On the one hand, a benefit of this structure is that it reduces information costs between CEO and chairperson. Moreover, CEOs accumulate specific knowledge and skills with increasing tenure that can be used to create value for shareholders. Finally, CEO duality creates an incentive for CEOs to perform well in order to be promoted to joint CEO and chairperson position.

On the other hand, one of the most negative significant aspects of CEO duality is the increase in the CEO's power. As indicated above, CEO duality reduces monitoring and advice by the board of directors, which may in turn increase judgmental errors of the CEO.

This thesis follows the argument that CEO duality will lead to errors of judgment and thereby has a negative impact on corporate performance.

Hypothesis 6: Duality will lead to judgment errors and decrease the value of LPE firms.

3.5. Ownership literature

The corporate finance literature has been following the *convergence of interest hypothesis* since the work of Jensen and Meckling (1976) on company theory. According to these authors, an increase in managerial ownership decreases agency costs. In this view the manager is at the same time a shareholder, which creates an incentive mechanism to increase shareholder value. Asymmetrical information and opportunistic behavior will also disappear[83] as the interests of manager and shareholders converge, which will lead to shareholder maximization.

In an empirical study, Morck, Shleifer, and Vishny (1988)[84] show, on the other hand, that ownership between 5 and 25 percent has a negative impact on corporate value. In light of their findings and the theoretical argumentation of Berle and Means (1932), managerial ownership can create an entrenchment mechanism. This mechanism is known in the corporate finance literature as the *entrenchment hypothesis*. In firms where managerial ownership is small and the ownership structure is not concentrated, managers will increase their own benefits. These benefits are, for example, consumption on the job, perquisite taking, empire building, and investment projects that destroy shareholder value. Moreover, founders with a small equity stake can misuse their status as founder, and their long tenure, to entrench themselves.

The following section will discuss the literature on managerial ownership, in order to develop a hypothesis on board ownership. Following a discussion of the literature on board ownership, a hypothesis will be developed for this modality. The ownership holding of the chairman will then be discussed and a hypothesis again framed. Finally, the focus will turn to CEO ownership, as the management literature sees CEO decisions as having a significant impact on corporate performance.

[83] In this concept asymmetric information and opportunistic behavior disappear, however the contract to achieve convergence of interests is costly, which makes it from the micro-economic view second-best.

[84] Morck, Shleifer and Vishny (1988) also show that managerial ownership up to 5% and managerial ownership of more than 25% have a positive and significant impact on company performance. This finding supports the convergence of interest hypothesis.

3.5.1. Board ownership

The relationship between managerial ownership and corporate performance is one of the most studied empirical issues in the corporate governance literature. Morck et al. (1988) examine the relationship between managerial ownership and corporate value. For their empirical analysis they test the *convergence of interest hypothesis* and the *entrenchment hypothesis*, using an OLS regression model to establish a relationship between Tobin's Q and the type and scale of management ownership. In order to analyze the impact of different levels of managerial ownership they divide the equity ownership of the board into three groups: 0-5%, 5-25%, and more than 25%. They establish in their study that board ownership of 0-5% and board ownership of more than 25% both have a positive and significant impact on Tobin's Q. These findings imply that board ownership reduces opportunistic behavior and conflict between shareholders and management. Furthermore, board ownership in these two ranges supports the *convergence of interest hypothesis* of Jensen and Meckling (1976). On the other hand, board ownership of 5-25% has a negative and significant impact on corporate value. This finding is in line with the *entrenchment hypothesis*. The findings of Morck et al. are thus U-shaped, where corporate performance increases with the increase of board ownership from zero to five percent. The further increase of the ownership from five to twenty five percent decreases performance, and ownership of more than twenty five percent again increases corporate performance.

Short and Keasey (1999) investigate the relation of managerial ownership to corporate value for UK firms. In fact they use director equity ownership as an independent variable to investigate the *convergence of interest hypothesis* and the *entrenchment hypothesis*. Like Morck et al. (1988), they distinguish three levels of director ownership and use equity ownership, squared, and cubed ownership as proxy variables. The dependent variable in the regression model is a valuation ratio (VAL), which measures market value and is an approximation of Tobin's Q.

These authors establish a significant and positive relationship between director ownership and corporate value. This finding is in line with that of Morck et al. (1988) and with the convergence of interest hypothesis of Jensen Meckling (1976). Their coefficient of squared ownership is negative and significant. The negative relationship implies that increasing ownership leads to entrenchment. This finding is also consistent with the literature. Finally, cubed ownership is again positive and significant, which is consistent with the convergence of interest hypothesis. Finally, their findings for managerial ownership in UK boards is in line with those of Morck et al. (1988).

In a recent study, Bhagat and Bolton (2013) investigate the relationship between managerial director equity ownership and corporate performance, using a panel dataset from 1998-2007 with more than 13,000 observations for their regression analysis, ROA as an operating measure, and Tobin's Q as a market measure. Director ownership is measured by the dollar value of common stock rather than percentage of ownership. In contrast to Morck et al. (1988) and Short and Keasey (1999), these authors support the hypothesis that an increase in director ownership will raise corporate performance, as predicted in the convergence of interest hypothesis. Their findings suggest that director ownership has a positive and significant impact on Tobin's Q as well as on ROA. They argue that director ownership increases directors' efforts, creating an incentive mechanism to increase shareholder wealth. They further establish that director ownership has a positive impact on M&A decisions. Firms with greater director ownership are less likely to be involved in value-destroying acquisitions (ibid. 132).

3.5.2. Chairperson ownership

Minguez-Vera and Martin-Ugedo (2010) use a sample of 68 Spanish exchange-traded firms to investigate the relationship between the risk behavior of the CEO and chairman. The dependent variable in the empirical analysis is corporate performance measured by Tobin's Q, and the main proxy variables are CEO and chairman ownership. These authors seek

evidence for the convergence of interest hypothesis and the entrenchment hypothesis regarding CEO and chairman ownership. Following the approach of Short and Keasey (1999) they square the shareholdings of the CEO and chairman to examine the effect of different ownership levels. In line with the argumentation of Jensen and Meckling (1976) they assume that CEO and chairman ownership will increase the incentives of the board leaders to maximize shareholder value. On the other hand, a specific ownership level might lead to entrenched leadership, which may well become risk-averse. This view follows the argumentation of Morck, Shleifer and Vishny (1988). The authors find evidence for the convergence of interest hypothesis as well as for the entrenchment hypothesis. First, chairman ownership has a positive impact on Tobin's Q, which is in line with the convergence of interest hypothesis. Secondly, the square of chairman ownership has a negative and significant impact on Tobin's Q, which is in line with the entrenchment hypothesis. These findings imply that chairman ownership has a positive impact on Tobin's Q, however this effect changes when ownership reaches a certain level.

A potential shortcoming in the study of Minguez-Vera and Martin-Ugedo is their assumption about the role of the CEO and chairman. Management theory suggests that the role of the CEO is to lead the company and make decisions on investment and strategic questions. On the other hand the role of the chairman is to supervise the management, thus the duty of the chairman is to monitor and advise the CEO.

3.5.3. CEO ownership

Bhagat and Black (2002) study the relationship between independent boards and corporate performance. As well as their research question as to whether board independence affects corporate performance, they analyze the effect of CEO ownership on performance. They assume that CEO stock ownership has a positive impact on performance and that CEO ownership is affected by the past performance of the CEO. In other words stock ownership contains a double incentive mechanism. First, the CEO will be rewarded for the good

performance of the past; secondly, stock ownership creates an incentive for the CEO to perform well in the future. The authors show that past CEO performance has a positive and significant impact on CEO stock ownership. This finding suggests that stock ownership serves as performance-based compensation. However, they find no statistically significant evidence that the CEO will continue to perform well after receiving the reward.

Following the approach of Short and Keasey (1999), and applying the proxy-variables percentage stock ownership and squared percentage stock ownership of the CEO, Kim and Lu (2011) investigate the relationship between CEO ownership and corporate performance. They predict that in general CEO stock ownership will have a positive impact on corporate performance, creating an incentive for the CEO to raise corporate performance. On the other hand, they predict that squared stock ownership will have a negative impact on performance. According to Morck et al. (1988) CEOs will entrench as soon as their stock ownership increases to a certain level. In this context CEOs will become risk averse and will avoid risky investment, which will have a positive effect on the wealth of the CEO but a negative effect on shareholder wealth.

In line with Morck et al. (1988) these authors establish that the proxy-variable 'CEO stock ownership' has a positive and significant impact on Tobin's Q. This finding implies that stock ownership is an incentive mechanism and increases shareholder wealth. However, the proxy-variable 'squared CEO ownership' has a negative and significant impact on Tobin's Q, which suggests that CEOs use their ownership to entrench. Finally, Kim and Lu examine in their analysis whether external governance mechanisms[85] and CEO ownership are substitutes.

In summary, this sub-chapter has described the concept and empirical findings of Jensen and Meckling's convergence of interest hypothesis of 1976, which posits that an increase in managerial ownership increases the incentives of management to act in the interest of shareholders, and consequently decreases agency costs. On the other hand, Berle and Means (1932) and Morck et al. (1988) argue that managers can misuse their ownership stakes to

[85] Kim and Lu (2011) define four external governance variables: the industry concentration ratio, the Herfindahl-Hirschman Index, the Economic Census Herfindahl-Hirschman Index and institutional ownership concentration.

entrench their position. The corporate governance literature describes incentives and ownership as an inverse U-shaped relationship[86], with managerial incentives increasing with increase in ownership and then decreasing from the maximum point of the inverse U with any further increase in ownership. Form this point additional ownership leads to entrenchment rather than incentive. I follow both hypotheses and assume that relatively low ownership stakes will increase the performance of LPE firms as stated by the convergence of interest hypothesis. However, I assume that a relatively high ownership stake might decrease the performance of LPE firms as described by the entrenchment hypothesis.

Hypothesis 7: Ownership increases managerial effort and has a positive impact on the performance of LPE firms.

Hypothesis 8: Ownership might lead to managerial entrenchment and decrease the performance of LPE firms.

[86] The inverse U-shape relationship shows managerial incentives on the Y-axis and managerial ownership on the X-axis.

The following table gives an overview of the hypotheses that will be used in the empirical analysis of Chapter 5. The table also provides a short definition of the variables and indicates the expected result.

Table 3.1: Summary of hypotheses on firm performance

Hypothesis	Variable	Expected sign
H: Board size	Number of directors	"+"
H: Outside directors	Number of outside directors	"+"
	Fraction of outside directors	"+"
H: Committee and meeting structure	Number of board committees	"+"
	Number of board meetings	"+"
H: Founder	Founder on board	"+"
	Founder chairperson	"+"
	Founder CEO	"+"
H: Leadership structure	Founder duality	"-"
	Duality	"-"
H: Ownership	Board ownership	"+/-"
	Chairperson ownership	"+/-"
	CEO ownership	"+/-"

4. Data sample and descriptive statistics

"Truth is ever to be found in simplicity, and not in the multiplicity and confusion of things."

Isaac Newton

This thesis uses a unique panel data set with over 600 firm-year observations on corporate and board characteristics of listed private equity (LPE) firms. The purpose of the chapter is to show the differences and similarities between the characteristics of industrial, family, and LPE firms. As far as I know there is no literature investigating the board structure of private equity firms on a large empirical scale; therefore this dissertation contributes in several ways to the existing literature on private equity.

First, sub-chapter 4.1 will present the panel data set and provide initial descriptive findings on the board data of LPE firms. I apply a unique panel data set covering 71 LPE firms with 661 company-year observations to investigate the role of board of directors in LPE firms. The purpose of this section is to provide an overview of the panel data set, which will be used in the multivariate analysis of Chapter 5.

Second, the thesis describes empirically the main characteristic differences between industrial, family, and LPE firms. In particular, section 4.2 shows the main differences and similarities in total assets, leverage, company age, and performance, using performance measures such as Tobin's Q and ROA.

Third, I investigate the role of the board of directors in LPE firms and its impact on performance, again comparing the findings on the board structure of industrial, family, and LPE firms. This sub-chapter provides all the findings on firm and board characteristics mentioned above as literature overviews.

Finally, section 4.2 will present descriptive findings on the performance of LPE firms, and indicate the behavior of board meetings and committees around the financial crisis of 2008.

In particular, it will show the difference in performance between LPE firms with founder managers on the board and those without.

4.1. Data description and descriptive statistics

The main research question of this thesis is how the board structure of private equity firms impacts economic performance. For this purpose I apply a unique panel data set covering 71 LPE firms from 1998 to 2012 with 661 company-year observations. As most LPE firms launched their IPO between 1999 and 2007, as shown in Figure 4.1, the present panel data set is unbalanced.[87] For instance, between 2007 and 2012 large private equity houses such as Blackstone, KKR and Carlyle headed toward the public equity market.[88]

The underlying data set here is a panel data set, which means that it includes information across LPE firms over time. The firms in the present data set are characterized as private equity companies.[89] The issue identifying private equity firms is that there is no legal definition for private equity and no publicly available data source where private equity firms are registered. Therefore, the underlying sample was collected through a Bloomberg database. The procedure was as follows:

First, all private equity transactions available on Bloomberg from 1980 to 2013 were extracted. This request yielded transaction results of over 8,000 private equity transactions with more than 500 acquiring firms. Using the result of the private equity transactions the list of acquiring firms was reviewed to identify private equity firms. For this purpose, I first verified if the acquiring firm was clearly defined as a private equity firm on Bloomberg.

[87] See Figure 4.1 "IPOs of LPE firms between 1992 and 2012" in section 4.1.

[88] We use Bloomberg data base to collect information on the initial public offering (IPO) data. The table on the following page shows the date of the sample firms' IPO.

[89] There are also other types of private equity companies, for instance fund of funds or management companies which solely act as intermediaries between investors and private equity investment companies.

Firms are defined as private equity firms if their core business is private equity. Consequently, all non-private-equity firms, such as strategic acquirers, banks, or insurance companies were eliminated. All the private equity firms yielded by Bloomberg were then scrutinized on the basis of the information on the firm's homepage, to verify that they were in fact engaged in the private equity industry, and the filing date of the IPO was checked to ensure the public market listing. Finally, the LPE firms of the sample were compared with LPX, which is an index of LPE firms. Three LPE firms were consequently to the sample from the list constructed with the Bloomberg data.

In general, private equity firms are limited partnerships with restricted disclosure requirements. However, when former limited partnerships go public they have to implement disclosure requirements. This allows data on firm and board characteristics to be generated from annual reports and other filings.

Table 4.8: Stock market listed private equity firms

#	Company Name	Country	IPO Date	Investment Focus
1.	3i Group plc	UK	1994	Diversified
2.	AB Novestra	SE	2000	Diversified
3.	Altamir Amboise SCR	FR	1998	Diversified
4.	American Capital, Ltd.	US	1997	Diversified
5.	Amphion Innovations PLC	UK	2005	IT/Health Care
6.	APEN AG	CH	1999	Diversified
7.	Apollo Investment Corporation	US	2004	Diversified
8.	Ares Capital Corporation	US	2004	Diversified
9.	Aurelius AG	DE	2006	Diversified
10.	Avanti Capital PLC	UK	1997	Diversified
11.	BlackRock Kelso Capital Corporation	US	2007	Diversified
12.	Blackstar Group SE	MT	2000	Diversified
13.	Blackstone Group LP	US	2007	Diversified
14.	bmp media investors AG	DE	1999	Diversified
15.	Bure Equity AB	SE	1993	Diversified
16.	CapMan Oyj	FI	2001	Diversified
17.	China Merchants China Direct Investments Limited	CN	1993	Financials
18.	Citadel Capital	EG	2009	Diversified
19.	Clairvest Group Inc.	CA	1987	Diversified
20.	Compass Diversified Holdings	US	2007	Diversified
21.	DeA Capital S.p.A.	IT	2000	Financials/Health Care
22.	Deutsche Balaton AG	DE	1997	Diversified
23.	Deutsche Beteiligungs AG	DE	1985	Industrials

24.	DEWB AG	DE	1998	Technologies
25.	Dinamia Capital Privado	ES	1997	Diversified
26.	East Capital Explorer AB	SE	2007	Diversified
27.	EIH PLC	UK	2007	Diversified
28.	Eurazeo	FR	2001	Industrials/Consumer Discretionary
29.	Fifth Street Finance Corp.	US	2008	Diversified
30.	Fortress Investment Group LLC	US	2007	Diversified
31.	GIMV N.V.	BE	1997	Diversified
32.	Gladstone Capital Corporation	US	2001	Diversified
33.	GP Investments	BR	2006	Diversified
34.	Harris & Harris Group, Inc.	US	1992	Nanotechnology
35.	Heliad Equity Partners GmbH & Co. KGaA	DE	2004	Diversified
36.	Hercules Technology Growth Capital, Inc.	US	2005	Diversified
37.	ICG Group, Inc. / Internet Capital Group, Inc.	US	1999	IT
38.	Imperial Innovations Group plc	UK	2006	Diversified
39.	Ingenious Media Active Capital Limited	UK	2006	Media
40.	Intermediate Capital Group PLC	UK	1994	Diversified
41.	IP Group PLC	UK	2003	Health Care
42.	JAFCO Co., Ltd.	JP	1987	Diversified
43.	Japan Asia Investment Co. Ltd.	JP	1996	Diversified
44.	K1 Ventures Limited	SG	1987	Diversified
45.	KKR	US	2010	Diversified
46.	Main Street Capital Corporation	US	2007	Diversified
47.	Management & Capitali / M&C SpA	IT	2006	Diversified
48.	Marfin Investment Group Holdings S.A.	GR	1994	Diversified
49.	MCG Capital Corporation	US	2001	Diversified
50.	MVC Capital, Inc.	US	2000	Diversified
51.	NAXS Nordic Access Buyout Fund AB	SE	2007	Diversified
52.	New Value AG	CH	2006	Cleantech/Health Care
53.	NGP Capital Resources Company	US	2004	Energy
54.	Onex Corporation	CA	1987	Diversified
55.	Origo Partners PLC	UK	2006	Diversified
56.	Partners Group Holding AG	CH	2006	Diversified
57.	PennantPark Investment Corporation	US	2007	Diversified
58.	Promethean PLC	UK	2005	Diversified
59.	Prospect Capital Corporation	UK	2006	Diversified
60.	Ratos AB	SE	1954	Diversified
61.	Safeguard Scientifics	US	1993	Health Care/Technology
62.	Scandinavian Private Equity A/S	DK	2007	Diversified
63.	SPARK Ventures PLC	UK	1999	Diversified
64.	SVG Capital PLC	UK	1996	Diversified
65.	Symphony International Holdings Limited	BM	1995	Diversified
66.	The Carlyle Group LP	US	2012	Diversified
67.	TICC Capital Corp.	US	2003	Diversified
68.	Triangle Capital Corporation	US	2007	Diversified
69.	TVC Holdings PLC	IE	2007	Diversified

70.	Unternehmens Invest AG	AT	1992	Diversified
71.	Wendel	FR	1980	Industrials

All board characteristics related to these companies were hand collected from annual reports and other filings.[90] Table 1 shows the final sample of 71 LPE firms, with names, country of incorporation, IPO date, and investment focus.

The underlying sample includes 71 LPE firms from 24 different countries. Most of the LPE firms on this list are incorporated in the US (23 out of 71, which is almost 32% of the total sample); 13 are incorporated in the UK and 6 in Germany (18% and 8% respectively). These top three countries contain 42 private equity firms, which is 60% of the whole sample.

After creating a list with stock market private equity firms, I used the annual reports, 10-K fillings and proxy filings to hand collect data on private equity board characteristics, including board ownership, chairperson ownership and CEO ownership. Table 2 gives an overview of the dependent, independent and control variables of LPE firms, as well as company and board characteristics, that will be used later for empirical analysis. Thus the multivariate analysis in Chapter 5 will use two performance variables[91]. First, Tobin's Q will be measured as a ratio of the market value of the firm divided by its replacement costs. Second, ROA will be defined as the ratio of net income divided by total company assets. The ROA used in this sample is calculated as that of the 12 months trailing average income divided by total assets.[92]

Besides performance several explanatory and control variables are used to explain economic performance. The first explanatory variables are the number of board committees and board meetings. 'Board committees' is defined as the total number of board committees, and 'board meetings' as the total number of board meetings, in a fiscal year. 'Board size' measures the number of directors appointed for each fiscal year as given in the annual report. 'Number of outside directors' is computed as the number of non-management

[90] In the case of US-based LPE firms, the board characteristics were hand collected from 10-K filings.

[91] The two performance variables Tobin's Q and ROA will be the depending variables in the multivariate regression analysis.

[92] The ROA used in this dissertation is calculated by the standard approach of Bloomberg.

directors on the board. 'Fraction of outside directors' is defined as the number of outside directors divided by the total number of directors.

The present thesis uses four founder variables to describe the behavior of founders in LPE firms. All founder variables are dummy variables and set between 0 and 1. 'Founder on the board' is 1 if the founder of the private equity firm actively participates on the board of directors; otherwise it is 0. 'Founder CEO' is set as 1 if the founder of the private equity firm is the CEO of the firm; otherwise as 0. 'Founder chairperson' is 1 if the founder holds the position of the chairperson; otherwise 0. 'Founder duality' is 1 if the founder is CEO and chairperson of the firm; otherwise 0. Variable duality is 1 if the CEO at the same time holds the position of chairperson.

Table 4.9: Summary statistics of private equity board variables

Variables	Obs.	Mean	Std. Dev.	Min	Max
Performance					
Tobin's Q	607	1.207	1.220	0.259	22.161
ROA	554	0.016	0.174	-1.172	0.818
Board characteristics					
Board committees	529	2.505	1.550	0	7
Board meetings	439	9.169	6.149	0	48
Board size	661	7.457	3.060	2	22
No. outside directors	661	5.516	2.571	0	17
Fraction outside directors	661	0.763	0.227	0	1
Founder on the board	661	0.254	0.436	0	1
Founder CEO	661	0.166	0.373	0	1
Founder chairperson	661	0.209	0.407	0	1
Founder duality	661	0.139	0.346	0	1
Duality	661	0.280	0.449	0	1
Board ownership	409	0.065	0.085	0	0.460
CEO ownership	387	0.036	0.064	0	0.359
Chairperson ownership	397	0.027	0.043	0	0.250
Founder chairperson ownership	109	0.039	0.040	0	0.153
Founder CEO ownership	87	0.045	0.059	0	0.255
Founder director ownership	24	0.100	0.114	0.008	0.307
Firm characteristics					
Stock price return	578	0.026	0.410	-0.959	3.085
Tobin's Q t-1	545	1.225	1.262	0.259	22.161
ROA t-1	512	0.017	0.173	-1.172	0.818
Stock price return t-1	509	0.035	0.424	-0.959	3.085
Total assets [in bn.]	585	6.750	27.400	0.015	341.000

LN total assets	585	20.261	1.957	16.532	26.554
Total debt ratio	611	0.298	0.234	0.000	1.122
FYs since IPO	596	9.836	9.409	0	58

The present thesis also provides data on managerial ownership in LPE firms. 'Board ownership' computes the total equity stakes in percentage held by the board of directors. 'CEO ownership' measures the equity stakes in percentage held by the CEO. 'Chairperson ownership' is defined as the percentage of equity owned by the chairperson. Finally, the following data set includes three founder ownership variables. 'Founder chairperson ownership' measures the equity ownership of the founder chairperson. 'Founder CEO ownership' measures the equity stakes of the founder CEO. 'Founder director ownership' computes the equity ownership of the founder if the founder is only a director on the board.[93]

Finally, the underlying data set includes company characteristics such as lagged performance variables, total assets or total debt ratio. Stock price return is calculated as percentage stock returns over the past 12 months. For this purpose, the daily stock price data are used to calculate the annual stock price return. Moreover, the present sample includes three lagged variables that measure the past performance of the sample firms. Tobin's Q_{t-1}, ROA_{t-1} and stock price return $_{t-1}$ are defined time lagged variables. These variables measure the performance over the past fiscal year. Total assets are defined as the total value of assets on the balance sheet in each fiscal year. 'LN total assets' refers to the logarithmized total assets in each fiscal year. The total debt ratio is the total value of debt divided by the total assets in each fiscal year. Finally, FYs since IPO computes the fiscal years since the initial public offering.

The following table shows the Spearman rank correlation and includes 23 variables. The Spearman correlation table shows the correlation between the variables and labels the variables on their significance level, defined as *** 0.01 level, ** 0.05 level and * 0.1 level.

[93] Here again, founder ownership variables are measured as percentage equity ownership.

Table 4.10: Spearman correlation

#	Variables	1	2	3	4	5	6	7	8	9	10	11	12
1	**Tobin's Q**	1											
2	**ROA**	0.266***	1										
3	**Board committees**	0.022	0.060	1									
4	**Board meetings**	0.004	-0.007	0.049	1								
5	**Board size**	0.060	0.023	0.403***	-0.042	1							
6	**No. outside directors**	-0.034	0.031	0.295***	0.040	0.742***	1						
7	**Fraction outside directors**	-0.137***	0.006	-0.257***	0.061	-0.245***	0.422***	1					
8	**Founder on the board**	0.155***	-0.080*	-0.055	0.205***	-0.081**	-0.125***	-0.119***	1				
9	**Founder CEO**	0.077*	-0.104**	-0.006	0.184***	0.000	-0.058	-0.091**	0.765***	1			
10	**Founder chairperson**	0.158***	-0.077*	-0.064	0.200***	-0.044	-0.080**	-0.077**	0.880***	0.690***	1		
11	**Founder duality**	0.063	-0.124***	0.034	0.223***	0.039	-0.038	-0.113***	0.689***	0.900***	0.783***	1	
12	**Duality**	0.054	-0.092**	0.295***	0.127***	0.036	-0.079**	-0.227***	0.334***	0.364***	0.385***	0.441***	1
13	**Board ownership**	0.276***	0.081	-0.131**	-0.169***	-0.131***	-0.136***	-0.112**	0.206***	0.036	0.193***	0.009	0.127**
14	**CEO ownership**	0.039	0.039	-0.184***	-0.185***	-0.203***	-0.135***	0.121**	0.045	0.103**	0.000	0.039	0.069
15	**Chairperson ownership**	0.181***	0.074	0.103**	-0.150***	-0.171***	-0.171***	-0.092*	0.136***	0.046	0.170***	0.060	0.290***
16	**Stock price return**	0.234***	0.445***	0.069	-0.062	0.051	0.037	-0.003	-0.066	-0.053	-0.051	-0.052	0.020
17	**Tobin's Q t-1**	0.497***	0.088**	0.037	-0.020	0.071*	-0.026	-0.135***	0.154***	0.075*	0.164***	0.068	0.057
18	**ROA t-1**	0.165***	0.184***	0.040	0.000	-0.010	-0.004	0.010	-0.089**	-0.133***	-0.0869**	-0.149***	-0.103**
19	**Stock price return t-1**	0.064	0.067	0.106**	-0.017	0.049	0.032	-0.004	-0.0733*	-0.072	-0.060	-0.073*	0.031
20	**Total assets [in bn.]**	0.043	-0.018	0.072	0.194***	0.053	-0.203***	-0.391***	-0.069*	-0.060	-0.078*	-0.049	0.168***
21	**LN total assets**	0.026	0.076*	0.280***	0.301***	0.318***	0.132***	-0.254***	0.021	0.001	0.032	0.048	0.166***
22	**Total debt ratio**	0.038	-0.157***	0.139***	0.063	0.114***	0.004	-0.137***	0.097**	0.0766*	0.059	0.0892**	0.059
23	**FYs since IPO**	-0.074*	0.108**	0.002	0.049	0.170***	0.316***	0.197***	-0.283***	-0.229***	-0.281***	-0.220***	-0.150***

Tobin’s Q is measured as the ratio of the market value of the firm divided by its replacement costs. ROA is defined as the ratio of net income divided by the total assets of the firm. Board committees is defined as total number of board committees in a fiscal year. Board meetings is defined as the total number of board meetings in a fiscal year. Board size measures the number of directors on the board for each fiscal year as mentioned in the annual report. The Number of outside directors is computed as the number of non-management directors on the board.

#	Variables	13	14	15	16	17	18	19	20	21	22	23
13	**Board ownership**	1										
14	**CEO ownership**	0.355***	1									
15	**Chairperson ownership**	0.765***	0.496***	1								
16	**Stock price return**	-0.019	0.150***	-0.0168	1							
17	**Tobin's Q t-1**	0.230***	0.019	0.159***	0.093**	1						
18	**ROA t-1**	0.021	-0.003	0.045	0.350***	0.266***	1					
19	**Stock price return t-1**	-0.039	0.101*	-0.020	0.168***	0.240***	0.452***	1				
20	**Total assets [in bn.]**	-0.094*	-0.138***	-0.157***	-0.067	0.060	-0.011	-0.059	1			
21	**LN total assets**	-0.307***	-0.218***	-0.335***	0.016	0.051	0.089*	0.046	0.569***	1		
22	**Total debt ratio**	-0.080	0.039	-0.105**	-0.090**	0.024	-0.145***	-0.029	0.081*	0.427***	1	
23	**FYs since IPO**	-0.001	-0.128**	-0.136***	0.068	-0.068	0.118***	0.090*	0.228***	0.357***	0.084**	1

‘Fraction of outside directors’ is defined as the number of outside directors divided by the total number of directors. ‘Founder on the board’ is 1 if the founder of the private equity firm actively participates on the board of directors; otherwise 0. ‘Founder CEO’ is set as 1 if the founder of the private equity firm is the CEO of the firm; otherwise 0. ‘Founder chairperson’ equals 1 when the founder holds the position of chairperson; otherwise 0. ‘Founder duality’ equals 1 when the founder is CEO and chairperson of the firm; otherwise 0. ‘Variable duality’ equals 1 if the CEO at the same time holds the position of chairperson. ‘Board ownership’ computes the total equity stakes in%age held by the board of directors. ‘CEO ownership’ measures the equity stakes in%age held by the CEO. ‘Chairperson ownership’ is defined as the%age equity ownership of the chairperson. ‘Stock price return’ is calculated as%age stock returns over the past 12 months. Daily stock price data are used to calculate the stock price returns, and monthly data to compute the growth rate of sales revenues. Tobin’s Q_{t-1}, ROA_{t-1} and stock price $return_{t-1}$ are defined as above and measure the performance of the past fiscal year. ‘Total asset’ is defined as the total value of assets on the balance sheet in each fiscal year. ‘LN total assets’ is the logarithmized total assets in each fiscal year. ‘Total debt ratio’ is the total value of debt divided by the total assets in each fiscal year. Finally, ‘FYs since IPO’ computes the fiscal years since the initial public offering.

4.2. Differences and similarities between industrial, family and LPE firms

4.2.1. Company characteristics

The first research question of this thesis is whether company characteristics differ between industrial, family and LPE firms. For this purpose the present section compares the findings on total assets, debt ratio and company age for these three categories. A second question posed by the thesis is the impact of board structure on the performance of LPE firms. For this purpose I use two performance measures that are widely applied in the corporate governance literature to investigate the impact of the cited characteristics on performance.

The corporate governance literature widely uses total assets as a control measure for company size. On the size of industrial firms Adams (2003) reports that Fortune 500 firms have mean total assets of $12,701 million. Hayes et al. (2004) further report for S&P 500 firms that the US industrial firms in their sample have mean total assets of $19,579 million. In contrast, Bhagat and Bolton (2008) find in their CRSP sample with more than 11,000 observations that US industrial firms have only mean total assets of $1,341 million. Finally, Duchin et al. (2010) report for their CRSP sample with more than 15,000 observations that mean total assets are $11,923 million.[94] In contrast, Pathan and Faff (2013) find for their sample, which includes the top 300 banks listed in the US, that banks have mean total assets of $38,160 million.[95]

The corporate governance literature on family firms shows that on average family firms have less total assets than their benchmark. For instance, Anderson and Reeb (2003) show that family firms listed in the S&P 500 have mean total assets of $9,617 million, whereas non-family firms in the S&P 500 have $14,999 million. Andres (2008) shows a similar relation between family and non-family firms as that reported by Anderson and Reeb (2003) for German companies. German family firms listed on the Frankfurt Stock Exchange[96] have

[94] Linck et al. (2008) and Brick and Chidambaran (2010) quote similar findings for the total assets of US industrial firms of $1,580 million and $6,352 million.

[95] Pathan and Faff (2013) start with a sample of the top 300 banks in the US. For comparability reasons the authors reduce their sample size from 300 banks to 212 with 2640 firm-year observations.

[96] Andres (2008) uses a sample with 275 listed firms on the official market (Amtlicher Handel) of the Frankfurt Stock Exchange.

in mean €2,830 million total assets whereas non-family firms have €5,408 million. Moreover, Fahlenbrach (2009) finds for his sample of S&P 500 firms that founder firms have a mean $2,155 million total assets and non-founder firms $8,257 million. Finally, Bergmann et al. (2009) find for 122 globally listed private equity firms that LPEs have a mean $94,840 million total assets – this represents an aggregate figure of direct and indirect investment portfolios. As well as LPE firms and LPE companies investing directly in private equity investments, these portfolios include LPE funds and LPE fund of funds, which only transmit capital from investors to private equity firms. In my sample LPE firms have mean total assets of $6,755 million. The significant difference between my own findings and those of Bergmann et al. (2009) is that Bergmann et al. apply a data set with LPE management firms, LPE investment firms, LPE funds and LPE funds of funds. In contrast, I only include in my sample LPE firms that have been actively involved in the acquisition of portfolio firms.

One of the key governance mechanisms of private equity transactions is the use of debt in portfolio firms to create an incentive for the management to perform well. There is a lot of literature on the average use of debt in portfolio firms. For instance, Achleitner et al. (2008) establish for leveraged buyout transactions on the German stock market that abnormal returns are higher for firms with lower debt to total asset ratio. This supports the hypothesis that private equity firms use debt as a restructuring mechanism. Like Achleitner et al. (2008), Renneboog et al. (2005) conclude that debt is a governance mechanism for private equity transactions in the UK. As far as I know there is no literature on the use of debt in private equity firms themselves. In this section I will compare the indebtedness of industrial, family and LPE firms, using the ratio of long term debt to total assets as a proxy for leverage.

Hayes et al. (2004) report that US industrial firms listed on the S&P 500 have a mean debt ratio of 0.190. Coles et al. (2008), Brick and Chidambaran (2010), and Kim and Lu (2011) have similar findings on the debt ratio for their Execucomp samples for US industrial firms. For their sample with over 8,000 firm-year observations from Execucomp, Coles et al. (2008) report a mean debt ratio of 0.246; Brick and Chidambaran (2010) report a debt ratio of 0.216 for their Execucomp sample with over 5,000 firm-year observations; and Kim and Lu (2011) report a debt ratio of 0.185 for their sample with over 22,000 firm-year observations. In contrast, Bhagat and Bolton (2008), Linck et al. (2008) and Duchin et al.

(2010) quote even higher figures for the debt ratio. For instance, Bhagat and Bolton (2008) report a debt ratio of 0.427 for their CRSP sample with over 11,000 observations; Linck et al. (2008) report a mean debt ratio of 0.438 for their CRSP sample with over 53,000 firm-year observations; and Duchin et al. (2010) record a debt ratio of 0.391 for their CRSP sample with over 15,000 firm-year observations.

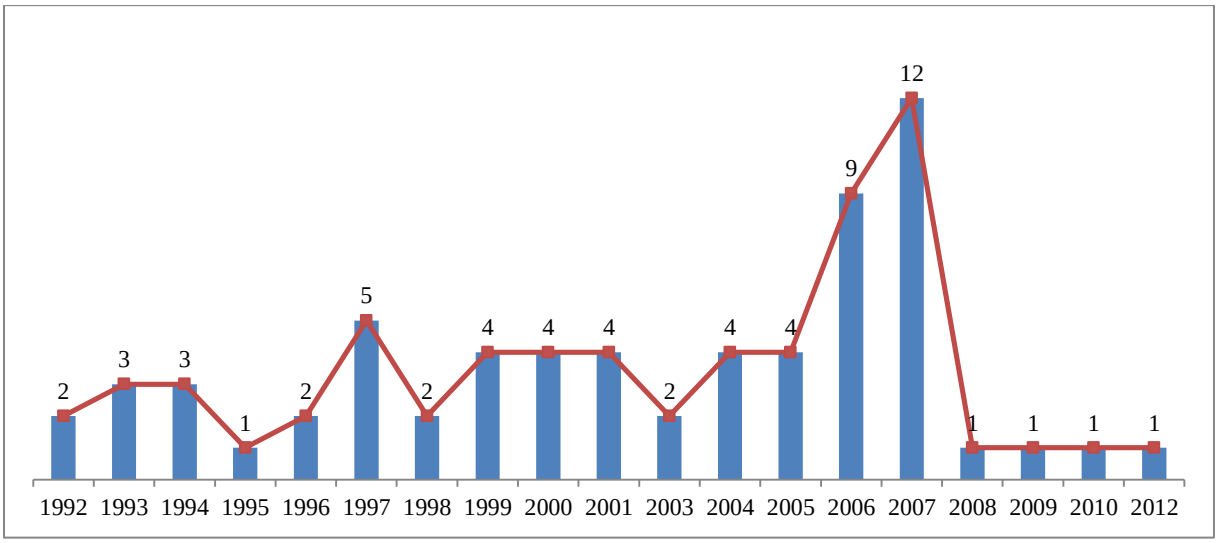
On the debt ratio of family in comparison with non-family firms, Anderson and Reeb (2003) determine that family firms listed on the S&P 500 have a debt ratio of 0.186 and non-family firms listed on the S&P500 have a debt ratio of 0.192. In contrast, Andres (2008) reports that German family firms listed on the Frankfurt Stock Exchange have a higher debt ratio than their benchmark: family firms have a debt ratio of 0.430 and non-family firms a debt ratio of 0.402. Like Anderson and Reeb (2003), Fahlenbrach (2009), and Li and Srinivasan (2011) find that founder-managed firms have a lower debt ratio than their benchmark. Fahlenbrach (2009) reports a debt ratio of 0.190 for founder firms listed on the S&P 500, whereas non-founder firms listed on the S&P500 have a debt ratio of 0.220. Li and Srinivasan (2011) show an even higher mean debt ratio for the Execucomp sample with over 11,000 firm-year observations mentioned above: here non-founder firms have a debt ratio of 0.600, whereas in firms where the CEO is the founder the debt ratio decreases to 0.510. In firms where the founder is a member of the board the debt ratio decreases even further to 0.480. Finally, for their sample of 122 global LPEs Bergmann et al. (2009) report a mean debt ratio of 0.310, which is again an aggregate figure of directly and indirectly managed LPEs.

For the present LPE sample I record a sample debt ratio of 0.137 – quite a small figure. The descriptive statistics of my sample show that the debt ratio is between 0 and 0.730 – a significant span – and that the median is 0.281, which is relatively low. This implies that some LPE firms do not consolidate their portfolio companies on their balance sheet, thus reducing their overall indebtedness. Other LPE firms, however, do consolidate their portfolio companies on balance sheet, thereby increasing their own formal debt level. As a result, the indebtedness of both portfolio and LPE firm increases. But as debt level increases, the risk to the LPE firm increases, which allows LPE firms that consolidate their portfolio holdings in this area only a limited frequency and scale of debt usage in their transactions.

Another factor investigated here is the age of LPE firms since their initial public offerings (IPO), as two of the biggest private equity players, Blackstone and KKR, filed their IPOs as

recently as 2007 and 2010. Figure 1 shows the IPOs of private equity firms from 1992 through 2012. The bar and line chart shows the number of IPOs in the respective years. As illustrated in Figure 4.1, the IPOs of private equity firms reached their peak in 2007 and decreased significantly from 2007 to 2008 with the beginning of the financial crisis.

Figure 4.1: IPOs of LPE firms between 1992 and 2012[97]



For their CRSP sample with over 53,000 firm-year observations Linck et al. (2008) report in the corporate governance literature that the mean age since IPO for US industrial firms is 12.9 years. In contrast, Kim and Lu (2011) report a mean age since IPO for their Execucomp sample of 23.4 years. On the age of LPE firms, Lahr and Kaserer's (2010) sample, which includes 97 LPE funds, records a mean age of 6.8 years since IPO. My own sample has a mean age since IPO of 9.8 years, which is higher that reported by Lahr and Kaserer (2010) for LPE funds, but lower than the findings of Linck et al. (2008) and Kim and Lu (2010) for US industrial firms.

[97] The bar chart as well as the trend line shows the number of IPOs in the given year. I choose both graphs to demonstrate the number and trend of IPOs.

Table 4.1: Firm characteristics of industrial, family and LPE firms

Author	Year	Sample	Sub-samples	Findings
Total assets [c)]				
Industrial firms				
Adams	2003	Fortune500 firms		12,701.000
Hayes et al.	2004	S&P500 firms		19,579.000
Bhagat and Bolton	2008	IRRC & CRSP		1,341.000
Linck et al.	2008	All firms from Disclosure database, CRSP and Compustat		1,580.600
Brick and Chidambaran	2010	Execucomp		6,352.986
Duchin et al.	2010	IRRC & CRSP		11,923.000
Banks				
Pathan and Faff	2013	Top 300 US banks		38,160.000
Family & founder firms				
Jayaraman et al.	2000	Forbes 800 most highly paid executives		559.000
Anderson and Reeb	2003	S&P500 firms	Family firms	9,617.000
			Non-family firms	14,999.000
Andres[d)]	2008	All firms listed on Frankfurt Stock Exchange	Family firms	2,830.000
			Non-family firms	5,408.000
Fahlenbrach	2009	S&P500 firms	Other firms	8,257.430
			Founder Firms	2,154.790
LPEs				
Bergmann et al.	2009	122 globally LPE firms	LPE companies	94,840.000
Long term debt / total assets				
Industrial firms				
Hayes et al.	2004	S&P500 firms		0.190
Bhagat and Bolton	2008	IRRC & CRSP		0.427
Coles et al.	2008	Execucomp		0.246
Linck et al.	2008	All firms from Disclosure database, CRSP and Compustat		0.438
Brick and Chidambaran	2010	Execucomp		0.216
Duchin et al.	2010	IRRC & CRSP		0.391
Kim and Lu	2011	Execucomp		0.185
Family & founder firms				
Anderson and Reeb	2003	S&P500 firms	Family firms	0.185
			Non-family firms	0.192
Andres[d)]	2008	All firms listed on Frankfurt Stock Exchange	Family firms	0.430
			Non-family firms	0.402
Fahlenbrach	2009	S&P500 firms	Other firms	0.220
			Founder Firms	0.190
Li and Srinivasan	2011	Execucomp, Compustat and CRSP	full sample	0.570
			Non-founder firms	0.600
			founder director firms	0.480
			founder CEO firms	0.510
LPEs				
Bergmann et al.	2009	122 globally LPE firms	LPE companies	0.310

Firm age since founding				
Industrial firms				
Adams	2003	Fortune500 firms		54.969
Hayes et al.	2004	S&P500 firms		29.500
Coles et al.	2008	Execucomp		28.100
Duchin et al.	2010	IRRC & CRSP		25.540
Family & founder firms				
Jayaraman et al.	2000	Forbes 800 most highly paid executives		15.400
Anderson and Reeb	2003	S&P500 firms	Full sample	84.500
			Family firms	76.000
			Non-family firms	88.610
Andres[d)]	2008	All firms listed on Frankfurt Stock Exchange	Family firms	82.270
			Non-family firms	92.130
Fahlenbrach	2009	S&P500 firms	Other firms	53.600
			Founder Firms	22.140
Li and Srinivasan	2011	Execucomp, Compustat and CRSP	full sample	56.450
			Non-founder firms	66.220
			founder director firms	30.570
			founder CEO firms	23.350
Firm age since IPO				
Industrial firms				
Linck et al.	2008	All firms from Disclosure database, CRSP and Compustat		12.900
Kim and Lu	2011	Execucomp		23.377
Lahr and Kaserer	2010	97 LPE funds		6.751

Note: a) ROA calculated with net income, b) yearly stock returns, c) in million USD, d) in million EUR and e) excess returns

As well as the differences and similarities in corporate characteristics discussed above, this dissertation is concerned with the impact of board structure on performance. The following section will focus on this issue for industrial, family and LPE firms, with particular reference to Tobin's Q and ROA.

Tobin's Q is a market-based performance measure that reflects the relation between the market value of a firm and its replacement costs. The corporate governance literature reports different mean values for the Tobin's Q of industrial firms. For their Execucomp sample of over 8,000 firm-year observations, for instance, Coles et al. (2008) calculate a mean Tobin's Q of 1.79 for US firms. Other studies such as Duchin et al. (2010), with a CRSP sample of over 15,000 firm-year observations, record a mean Tobin's Q of 1.93. Similar findings (mean Tobin's of 1.95) are reported by Brick and Chidambaran (2010) for their Execucomp sample with over 5,000 firm-year observations. In contrast, Kim and Lu (2011) record a

figure of 2.04 for their Execucomp sample with over 22,000 firm-year observations.[98] A recent study by Pathan and Faff (2013) on the structure of US bank boards reports that the top 300 banks in the US have a mean Tobin's Q of 1.07.

Anderson and Reeb (2003) and Andres (2008) investigate the impact of family blockholders on corporate performance. Both papers conclude that family firms outperform non-family firms. For their S&P500 sample Anderson and Reeb (2003) record a Tobin's Q of 1.59 for US family firms and 1.32 for non-family firms[99]. Analyzing performance differences between family and non-family firms listed on the Frankfurt Stock Exchange, Andres (2008) concludes that family firms have a mean Tobin's Q of 2.73 and non-family firms of 2.46.

In contrast to the literature on family blockholdings, Fahlenbrach (2009) and Adams et al. (2009) investigate the role of founder-CEOs. Fahlenbrach (2009) employs a sample with S&P500 firms and records a mean Tobin's Q of 2.50 for founder firms[100] and 1.76 for non-founder firms. Using a sample with Fortune 500 firms, Adams et al. (2009) report findings similar to Fahlenbrach's (2009), with a Tobin's Q of 2.58 for founder-CEO firms and 1.94 for non-founder-CEO firms. For their entire sample the mean Tobin's Q is 2.04

For my entire sample the mean Tobin's Q for LPE firms is 1.21, which is comparable with the findings of Pathan and Faff (2013) on the performance of US banks. The corporate and board characteristics of banks and private equity firms are comparable, as both are financial intermediaries. However, Anglo-American and continental European governance systems set stricter rules for banks than for private equity firms, so comparing the mean Tobin's of LPE firms with that of banks may not be fully relevant.

Besides market performance, ROA is a widely used accounting measure in the corporate governance literature. For instance, for their CRSP sample with over 11,000 observations Bhagat and Bolton (2008) record a mean ROA of 0.138. Likewise Coles et al. (2008) cite a mean ROA of 0.138 for their Execucomp sample with over 8,000 firm-year observations. For their Execucomp sample Brick and Chidambaran (2010) give a figure of 0.140, and for

[98] Like Kim and Lu (2011), Bhagat and Bolton (2008) report a mean Tobin's Q of 2.07.

[99] Anderson and Reeb (2003) study a sample of US industrial firms and identify family firms by the blockholdings of family investors.

[100] Fahlenbrach (2009) defines founder firms as firms in which the founder held the position of CEO.

their CRSP sample Duchin et al. (2010) report 0.126. In contrast, for their Execucomp sample of more than 22,000 firm-year observations, Kim and Lu (2011) record a mean ROA of 0.027, which is significantly lower than the findings of the other papers mentioned above. On the account performance of SMEs in Denmark Bennedsen et al. (2006) record a mean ROA of 0.064. Finally, Pathan and Faff (2013) report a mean ROA of 0.047 for the top 300 publicly traded US banks.

ROA is also used in the family governance literature. For S&P 500 firms, for example, Anderson and Reeb (2003) report that family firms have a higher accounting performance than their benchmark. More precisely, family firms have a mean ROA of 0.061 whereas non-family firms achieve only 0.047. Also for S&P 500 firms, Fahlenbrach (2009) reports an ROA of 0.034 for non-founder firms and 0.037 for founder-CEO firms. However, Li and Srinivasan (2011) do not confirm the findings of the family and founder literature, reporting (for their Execucomp sample with over 11,000 firm-year observations) a mean ROA of 0.09 for non-founder firms and 0.08 for founder-CEO firms. Finally, Bennedsen et al. (2006) show that family SMEs in Denmark have a mean ROA of 0.065, which is slightly higher than the ROA of non-family firms in that country. My own sample shows that LPE firms have a mean ROA of 0.016. However, ROA changes with the definition of earnings: using EBITDA to calculate ROA increases its value from 0.016 to 0.051.

The corporate governance literature widely uses annual stock price returns to measure performance. Thus for their CRSP sample (more than 11,000 observations) Bhagat and Bolton (2008) cite a yearly stock price return of 0.171, and Duchin et al. (2010), using a CRSP sample with more than 15,000 firm-year observations, report a return of 0.145. Both Fahlenbrach (2009) and Li and Srinivasan (2011) analyze the difference in stock market returns between founder and non-founder firms, Fahlenbrach (2009) citing a yearly stock return of 0.132 for his S&P 500 sample of US founder-firms, whereas non-founder firms yield a return of only 0.086. For their Execucomp sample (more than 11,000 firm-year observations) Li and Srinivasan (2011) report an annual stock price return of 0.160 for non-founder firms and 0.200 for firms with founder-CEOs.

There is also an increasing body of literature on the risk and return characteristics of LPE. For instance Bilo et al. (2005) investigate the risk and return characteristics of 122 LPEs from 1986 to 2002 and report (depending on portfolio strategy and time period) annual

portfolio returns of between -0.584 and 0.054. Bergmann et al. (2009) record annual returns of between -0.560 and 0.345 for LPX50[101] firms, depending on the time period, with the highest returns in 2004 and 2007. They call this period the buyout boom.

My own sample shows a mean yearly return of 0.022 with a standard deviation of 0.385. The lowest and highest values are -0.959 and 3.085, which indicates a large spread between individual returns.

The following dataset investigates the characteristics of LPE firms from 1998 to 2012. This time period includes the financial crisis, which had a significant impact on the whole economy and especially on the financial industry. A report published by the US Treasury Department in April 2012 estimated that the financial crisis had destroyed $19.2 trillion of household wealth, and the *Washington Post* reported that private equity firms had to write down acquisitions during the financial crisis, with Blackstone announcing its intention to sell several portfolio companies in the wake of one of the worst recessions in history, whose impact on the private equity industry was evidently significant. Investigating the risk and return characteristics of LPEs, Bergmann et al. (2009) report annual stock returns of -0.56 for LPEs during the financial crisis. To investigate the impact of the financial crisis on the performance of my own sample firms, I have analyzed the mean differences between the periods before, during and after the financial crisis.

Table 4.2 shows the mean difference for the entire sample period and the period before the financial crisis. The entire sample shows a Tobin's Q of 1.21 whereas the Tobin's Q for the sub-sample before the financial crisis is 1.43. Tobin's Q before the crisis is 0.23 higher than for the sample period as a whole.

Table 4.2 also shows the difference in Tobin's Q for the entire sample and the sub-sample during the financial crisis (the sub-sample for the financial crisis covers the fiscal years 2008 and 2009). The approach seeks to cover the impact of the financial crisis on the performance of LPE firms. The findings in Table 3 show that the mean difference is 0.27, which indicates that Tobin's Q during the financial crisis is 0.27 smaller than over the entire sample period – a significant variance of c. 1%. The findings for the financial crisis sub-sample also show

[101] The LPX50 is an index of the 50 largest listed private equity stocks.

significant variance for ROA, which decreases from 0.02 for the entire sample to -0.03 during the financial crisis. This finding is again significant on the 1% level.

Table 4.2: Performance of LPE firms before, during and after the financial crisis

Performance differences in the financial crisis						
1998-2012						
Entire Sample	**Obs**	**Mean**	**Std. Dev.**			
Tobin's Q	607	1.21	1.22			
ROA	554	0.02	0.17			
ROA (EBITDA)	506	0.05	0.47			
ROA (EBIT)	166	0.02	0.61			
Sub-sample 1998-2007						
Before the financial crisis	**Obs**	**Mean**	**Std. Dev.**	**Mean diff.**	**t-value**	
Tobin's Q	294	1.43	1.58	-0.23	-2.17	**
ROA	265	0.03	0.19	-0.02	-1.26	
ROA (EBITDA)	244	0.07	0.65	-0.02	-0.48	
ROA (EBIT)	78	0.05	0.88	-0.02	-0.23	
Sub-sample 2008-2009						
Financial crisis	**Obs**	**Mean**	**Std. Dev.**	**Mean diff.**	**t-value**	
Tobin's Q	120	0.94	0.58	0.27	3.75	***
ROA	115	-0.03	0.17	0.05	2.60	***
ROA (EBITDA)	105	0.01	0.29	0.04	1.10	
ROA (EBIT)	32	0.02	0.27	0.00	-0.03	
Sub-sample 2010-2012						
After the crisis	**Obs**	**Mean**	**Std. Dev.**	**Mean diff.**	**t-value**	
Tobin's Q	193	1.03	0.73	0.18	2.46	***
ROA	174	0.02	0.15	0.00	-0.28	
ROA (EBITDA)	157	0.04	0.10	0.01	0.38	
ROA (EBIT)	56	-0.01	0.05	0.04	0.75	

Finally, Table 4.2 again reports clear findings on Tobin's Q after the financial crisis. The mean Tobin's Q decreases from 1.21 for the entire sample period to 1.03 after the financial crisis. This finding is again significant on the 1% level. Taking all these data together, it may be concluded that there is a significant relation between the financial crisis and the performance of LPE firms.

The corporate governance literature on family firms and founder-CEOs shows that family blockholdings and founder-managers outperform their benchmark. Anderson and Reeb (2003), Andres (2008), Fahlenbrach (2009), and Adams et al. (2009) all find significant results on founder performance. According to *Forbes Magazine*, Stephen Schwarzman, the co-founder of Blackstone, is one of the most successful self-made billionaires in the private equity industry. Blackstone was founded in 1985 with only $400,000 assets on the balance sheet. Today the company has $290 billion assets under management. This incredible success story certainly shows that founders in the private equity industry possess value-creating skills.

Table 4.3 shows the performance of LPE firms with and without founder-managers. Overall the table indicates that founder-managers increase the market performance of LPE firms. Compared to non-founder-managed LPE firms, these demonstrate a 0.43 higher Tobin's Q if a founder is on the board. However, the table also shows that ROA is higher for non-founder-managed LPE firms than for those where the founder is on the board. The findings on founder-CEOs again show that founder-CEOs increase Tobin's Q by 0.32, but decrease ROA by at least 0.05 compared to LPE firms with non-founder-CEOs. However, Tobin's Q is not significant here. Finally, founder-chairpersons also have a positive impact on Tobin's Q and a negative impact on the ROA. Table 4 shows that they have the highest positive impact on Tobin's Q by 0.47. Again there is a negative impact on ROA, however this is less than in the case of founder-CEOs. Taking all these findings together, there is mixed evidence on the impact of founders on the performance of LPE firms.

In Chapter 5 I will use founder proxies in multivariate analyses to show the impact of founders on the performance of LPE firms. In particular, the multivariate analyses will control for the proxies 'founder on the board', 'founder CEO' and 'founder chairperson'.

Table 4.3: Performance of founder and non-founder firms

Performance of founder and non-founder firms								
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**			
Non-founder LPEs								
Tobin's Q	445	1.09	0.64	0.26	8.43			
ROA	406	0.02	0.16	-1.01	0.82			
ROA(EBITDA)	360	0.07	0.55	-1.04	9.65			
ROA(EBIT)	119	0.07	0.71	-0.40	7.46			
Founder on board	493	0	0	0	0			
Founder-CEO	493	0	0	0	0			
Founder chairperson	493	0	0	0	0			
Variable	**Obs**	**Mean**	**Std. Dev.**	**Min**	**Max**	**Diff. in mean**	**t-value**	
LPEs with founder on the board								
Tobin's Q	162	1.52	2.08	0.38	22.16	-0.43	-2.56	**
ROA	148	-0.01	0.20	-1.17	0.59	0.03	1.69	*
ROA(EBITDA)	146	0.00	0.20	-1.05	0.43	0.07	2.01	**
ROA(EBIT)	47	-0.10	0.18	-1.05	0.12	0.17	2.43	**
Founder on board	168	1	0	1	1			
Founder-CEO	168	0.65	0.48	0	1			
Founder chairperson	168	0.82	0.38	0	1			
LPEs with founder-CEO								
Tobin's Q	105	1.41	2.14	0.38	22.16	-0.32	-1.51	
ROA	95	-0.02	0.20	-1.17	0.43	0.05	2.20	**
ROA(EBITDA)	94	-0.02	0.17	-0.57	0.23	0.09	2.79	***
ROA(EBIT)	35	-0.09	0.11	-0.58	0.00	0.16	2.40	**
Founder on board	110	1	0	1	1			
Founder-CEO	110	1	0	1	1			
Founder chairperson	110	0.84	0.37	0	1			
LPEs with founder-chairperson								
Tobin's Q	136	1.57	2.24	0.38	22.16	-0.47	-2.43	**
ROA	126	-0.01	0.21	-1.17	0.59	0.03	1.62	
ROA(EBITDA)	122	0.01	0.19	-1.05	0.43	0.06	1.73	*
ROA(EBIT)	41	-0.11	0.20	-1.05	0.12	0.18	2.45	**
Founder on board	138	1	0	1	1			
Founder-CEO	138	0.67	0.47	0	1			
Founder chairperson	138	1	0	1	1			

Table 4.4: Performance characteristic of industrial, family and LPE firms

Author	Year	Sample	Sub-samples	Findings
Tobin's Q				
Industrial firms				
Bhagat and Bolton	2008	IRRC & CRSP		2.072
Coles et al.	2008	Execucomp		1.790
Brick and Chidambaran	2010	Execucomp		1.952
Duchin et al.	2010	IRRC & CRSP		1.930
Kim and Lu	2011	Execucomp		2.039
Banks				
Pathan and Faff	2013	Top 300 US banks		1.070
Family & founder firms				
Anderson and Reeb	2003	S&P500 firms	Full sample	1.410
			Family firms	1.590
			Non-family firms	1.320
Andres[d)]	2008	German stock market	Family firms	2.730
			Non-family firms	2.460
Fahlenbrach	2009	S&P500 firms	Other firms	1.760
			Founder Firms	2.500
Adams et al.	2009	Fortune500 firms	Entire sample	2.040
			Founder-CEO firms	2.580
			non-founder-CEO firms	1.940
ROA [a)]				
Industrial firms				
Bhagat and Bolton	2008	IRRC & CRSP		0.138
Coles et al.	2008	Execucomp		0.138
Brick and Chidambaran	2010	Execucomp		0.140
Duchin et al.	2010	IRRC & CRSP		0.126
Kim and Lu	2011	Execucomp		0.027
Banks				
Pathan and Faff	2013	Top 300 US banks		0.047
Family & founder firms				
Anderson and Reeb	2003	S&P500 firms	Full sample	0.052
			Family firms	0.061
			Non-family firms	0.047
Fahlenbrach	2009	S&P500 firms	Other firms	0.034
			Founder Firms	0.037
Adams et al.	2009	Fortune500 firms	Entire sample	5.520
Li and Srinivasan	2011	Execucomp, Compustat and CRSP	full sample	0.090
			Non-founder firms	0.090
			founder director firms	0.090
			founder CEO firms	0.080

Stock returns [b]				
Industrial firms				
Bhagat and Bolton	2008	IRRC & CRSP		0.171
Duchin et al.	2010	IRRC & CRSP		0.145
Fahlenbrach	2009	S&P500 firms	Other firms	0.086
			Founder Firms	0.132
Li and Srinivasan	2011	Execucomp, Compustat and CRSP	full sample	0.160
			Non-founder firms	0.160
			founder director firms	0.170
			founder CEO firms	0.200
LPEs				
Bilo et al.	2005	122 LPE instruments	LPE instruments	[-0.584 / +0.054]
Bergmann et al.	2009	122 globally LPE firms	LPE companies	[-0.560 / +0.345]
Lahr and Kaserer	2010	97 LPE funds	LPEs funds	0.005[e]

Note: a) ROA calculated with net income, b) Annual stock returns, c) In million USD, d) In million EUR, and e) Excess returns.

4.2.2. Board characteristics

Size and outside directors

One of the first publications on the governance of the board of directors was the analysis by Yermack (1996). For his paper Yermack used a sample with the 500 largest US corporations and established that mean board size was 12.25 and fraction of outside directors 54%. Coles et al. (2008) used an Execucomp dataset for their investigation, which allowed them to determine the board and CEO characteristics of US industrial firms. They record mean board size as 10.4, mean number of outside directors as 8.1, and fraction of outsider directors as 78%. In contrast, Bonne et al. (2007) report board size as 6.21 during IPO, increasing to 7.52 ten years after IPO, and fraction of outside directors as 62% during IPO, increasing to 74% ten years after IPO. Bonne et al. (2007) employ a CRSP sample with US industrial firms that went public from 1988 to 1991. Using a sample including all the firms listed on the Disclosure, CRSP, and Compustat databases, Linck et al. (2008) report that small firms have an average board size of 5.9, medium firms of 7.2, and large firms of 10.0. On the fraction of outsiders the authors find that small firms have 58.2%, medium firms 65.7%, and

large firms 73.3%. Using a sample with IRRC and CRSP data, Duchin et al. (2010) report an average board size of 9.55 and a fraction of independent directors of 60%. Finally, for a sample comprising the top 300 US banks, Pathan and Faff (2013) record a mean board size of 12.68 and a mean fraction of outside directors of 85%.[102]

The literature on family firms provides few findings on the structure of the board of directors. For instance, Anderson and Reeb (2003) determine the fraction of outside directors in family firms as 43.59% whereas the fraction of outside directors in non-family firms is 61.16% for S&P 500 firms. Jaskiewicz and Klein (2007) quote only 12.21% outside directors for German family firms.[103] Investigating the board structure of small and medium firms in Denmark, Bennedsen et al. (2006) report a mean board size of 3.67 for small and medium family firms, compared with 3.69 for non-family firms. Goergen et al. (2015) investigate the impact of age difference between chairperson and CEO for the largest German stock market listed companies. For a sample including firms listed on DAX, MDAX and SDAX they find that family status has a positive effect on the age difference between chairperson and CEO, which they explain in terms of the succession structure and founder chairman status in family firms.

The sample of this dissertation reveals a mean board size of 7.46 for LPE firms, which is comparable with the findings of Bonne et al. (2007) for firms that have been on the stock market for ten years. Here the mean number of outside directors is 5.52 and the fraction of outsiders is 76%, which is again similar to the findings of Bonne et al. (2007). Comparing this fraction for LPE firms with the findings of Anderson and Reeb (2003) of 43.59% for family firms listed on the S&P 500, it would seem that LPE firms have a significantly larger fraction of outside directors.

Bonne et al. (2007) argue that the primary function of the board of directors is monitoring, and that board size and composition is determined by the firm's business and information environment. Adams et al. (2008) point out that the board provides monitoring, but also advice. Larcker and Tayan (2011) discuss the costs and benefits of board size: large boards

[102] Pathan and Faff start their analysis with the top 300 publicly traded US banks. For comparability reasons the authors exclude 88 banks, which reduces their sample size to 212 publicly traded bank holdings with 2640 firm-year observations.

[103] For their analysis Jaskiewicz and Klein (2007) use a random sample with all listed companies in Germany. In particular, the authors apply a sample with firms which had sales of more than €1 million in 2000.

have wider competencies and can therefore fulfill their monitoring and advice functions on a higher level than small boards; on the other hand, they are more costly than small boards, have coordination and decision-making problems, and suffer from responsibility and risk aversion. Taking these arguments together, there might be a tradeoff between the costs and benefits of large boards, and scholars such as Lipton and Lorsch (1992) and Larcker and Tayan (2011) conclude, in fact, that there is an optimal board size.

In light of these findings and the theoretical framework of the board of directors, it seems that private equity firms have a similar structure in board size and fraction of outside directors as industrial firms after ten years listing, as reported by Bonne et al. (2007).

Meetings and committees

On the number of board meetings and board committees, Vafeas (1999) investigates a sample with the 300 largest US firms listed in *Forbes* and finds that the mean number of board meetings is 7.45 and the mean number of board committees is 4.29. Adams (2003) reports similar findings for her sample based on Fortune 500 companies. She reports that the average number of board meetings is 7.6 and the average number of board committees 4.4. For their sample with S&P 500 firms, Hayes et al. (2004) establish the mean number of board meetings as 7.26 and of board committees as 4.45. Finally, for their Execucomp sample Brick and Chidambaran (2010) report the mean number board meetings as 7.26. On the meeting and committee structure of family and non-family firms, Ali et al. (2007) report, for their S&P 500 sample, that family firms disclose less information on their meetings and committees actions than non-family firms.

The private equity sample of the present dissertation has a mean number of board meetings of 9.17, which is relatively high compared with the reported findings in the corporate governance literature. This finding might suggest that the boards of LPE firms require more advice, as argued above. However, LPE firms have on average 2.5 board committees, which is a relatively small figure compared with the findings of Vafeas (1999), Adams (2003) and Hayes et al. (2004). In contrast to board meetings, board committees seem not to have an important function in private equity companies.

There is anecdotal evidence that during the financial crisis of 2008 executives of Lehman Brothers negotiated with different institutions to rescue the bank from Chapter 11. The *Guardian* reports negotiations with Barclays Bank, the Bank of America and the Federal Reserve Bank, and adds that Richard Fuld, Lehman's former CEO, also contacted the Oval Office to persuade the President to bail out the bank. This suggests that the board of a financial firm will meet frequently to bring their firm to a safe haven during a financial crisis. Moreover, private equity firms are engaged in the real estate business, and the *Financial Times* reports that Blackstone sold a highly leveraged business tower for $36 bn. a few months before the crisis started. This anecdotal evidence suggests that private equity firms, as part of the financial industry, are especially active during a financial crisis.

Table 4.5: Board committees and board meetings from 2005-2012

Fiscal Year	# of firm obs.	# board comm.	Mean	Standard Div.	Mean diff.	t-value	
2005	40	88	2.200	1.601	0.111	1.146	
2006	49	100	2.041	1.613	-0.049	-0.519	
2007	64	117	1.828	1.694	-0.261	-2.839	***
2008	67	134	2.000	1.474	-0.089	-1.068	
2009	68	137	2.015	1.438	-0.075	-0.904	
2010	69	141	2.043	1.379	-0.046	-0.567	
2011	70	151	2.157	1.356	0.068	0.851	
2012	72	175	2.431	1.346	0.341	4.384	***
Entire sample	62.375	130.375	2.089	1.476			

Fiscal Year	# of firm obs.	# board meetings	Mean	Standard Div.	Mean diff.	t-value	
2005	40	270	6.750	7.197	0.444	0.552	
2006	49	329	6.714	7.768	0.409	0.513	
2007	64	373	5.828	5.188	-0.477	-0.697	
2008	67	455	6.791	5.682	0.485	0.710	
2009	68	441	6.485	5.525	0.180	0.264	
2010	69	427	6.188	4.540	-0.117	-0.177	
2011	70	473	6.757	6.669	0.452	0.639	
2012	72	355	4.931	4.154	-1.375	-2.079	**
Entire sample	62.375	390.375	6.306	5.851			

Table 4.5 and Figure 4.2 illustrate the number of board committees and board meetings in the private equity industry before, during and after the financial crisis. Board committees show a significant decrease in 2007, with a mean of 2.089 for the period 2005 to 2012,

decreasing to 1.828 in 2007, which is significant on the 1% level. In 2012 the number increased to 2.431, which is again highly significant.

Figure 4.2: Number of board committees and meetings from 2005 to 2012

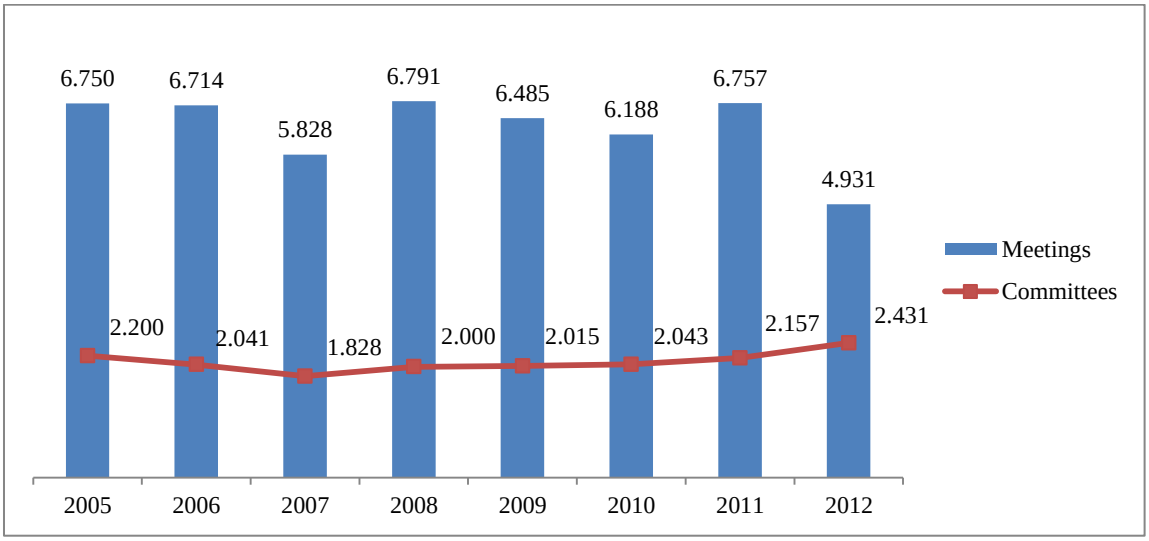


Table 4.5 also shows that the number of board meetings, like the number of board committees, decreased in 2007. That the number of board meetings increased in 2008 and 2009 indicates that private equity boards reacted to the financial crisis. The mean number of board meetings increased in 2008 to 6.791, its highest level during the whole period. Table 4.5 and Figure 4.2 also show that the number of board meetings decreased in 2009 and 2010, increased again in 2011, before significantly decreasing once more in 2012.

Table 4.6: Overview of the literature on board size, fraction of outside directors, board meetings and board committees

Authors	Year	Sample	Sub-sample	Findings
Board size				
Industrial firms				
Yermack	1996	500 largest public US corporations		12.250
Vafeas	1999	300 largest firms listed in Forbes		11.770
Adams	2003	Fortune500 firms		11.301
Hayes et al.	2004	S&P500 firms		11.680
Bonne et al.	2007	CRSP US industrial firms went public from 1988 to 1992	IPO	6.210
			t10	7.520
Coles et al.	2008	Execucomp		10.400
Linck et al.	2008	All firms from Disclosure database, CRSP and Compustat	Total sample	7.500
			Small firms	5.900
			Medium firms	7.200
			Large firms	10.000
Brick and Chidambaran	2010	Execucomp		9.297
Duchin et al.	2010	IRRC & CRSP		9.550
Banks				
Pathan and Faff	2013	Top 300 US banks		12.680
Family firms				
Li and Srinivasan	2011	Execucomp, Compustat and CRSP	Full sample	9.660
			Non-founder firms	9.880
			Founder director firms	8.820
			Founder CEO firms	8.220
Fraction of outside directors				
Industry firms				
Yermack	1996	500 largest public US corporations		0.540
Vafeas	1999	300 largest firms listed in Forbes		0.527
Bonne et al.	2007	CRSP US industry firms went public from 1988 to 1992	IPO	0.620
			t10	0.740
Bhagat and Bolton	2008	IRRC & CRSP		0.637
Coles et al.	2008	Execucomp		0.780
Linck et al.	2008	All firms from Disclosure database, CRSP and Compustat	Total sample	0.343
			Small firms	0.418
			Medium firms	0.343
			Large firms	0.267
Brick and Chidambaran	2010	Execucomp		0.678
Banks				
Pathan and Faff	2013	Top 300 US banks		0.853
Family firms				
Anderson and Reeb	2003	S&P500 firms	Full sample	0.554
			Family firms	0.436
			Non-family firms	0.612

Li and Srinivasan	2011	Execucomp, Compustat and CRSP	Full sample Non-founder firms Founder director firms Founder CEO firms	0.640 0.670 0.530 0.580
Number of board committees				
Vafeas	1999	300 largest firms listed in Forbes		4.290
Adams	2003	Fortune500 firms		4.369
Hayes et al.	2004	S&P500 firms		4.370
Number of board meetings				
Vafeas	1999	300 largest firms listed in Forbes		7.450
Adams	2003	Fortune500 firms		7.574
Hayes et al.	2004	S&P500 firms		7.260
Brick and Chidambaran	2010	Execucomp		7.265

Founder on board of directors

The corporate governance literature on family ownership and founder management investigates mostly how founder families and founders affect economic performance. For instance, Anderson and Reeb (2003) investigate the impact of founding families on the performance of companies listed on the S&P 500. They establish that 14.54% of family firms are managed by founder CEOs and 30.43% by descendant CEOs. A similar study by Andres (2008) investigates the impact of founding families on the German stock market, reporting for a sample with 275 firms listed on the Frankfurt Stock Exchange that 18.37% of family firms are managed by founder CEOs and 19.65% by descendant CEOs.

Besides the impact of founding families, there are studies showing the impact of founder-CEOs on firm performance. For instance, Jayaraman et al. (2000) quote an overall sample from *Forbes* with the 800 most highly paid executives in the US; this includes 5.88% firms managed by their founders.[104] Two other studies on the impact of founder-CEOs show that the%age of founder-CEOs is between 10 and 13. Fahlenbrach (2009) records 10.6% of S&P

[104] In contrast to the studies of Anderson and Reeb (2003), Villalonga and Amit (2006), and Andres (2008) on the impact of family firms, more recent studies like those of Fahlenbrach (2009) or Li and Srinivasan (2011) only analyze the impact of founder-CEOs. These studies do not differentiate between family and non-family firms.

500 firms, and Adams et al. (2009) record 13% of Fortune 500 firms, as managed by founder-CEOs. Finally, using a sample derived from Execucomp, Compustat and CRSP, Li and Srinivasan (2011) analyze the role of founders on the board of directors and conclude that 13% of CEOs, as well as 12% of board members, are founders.

In the present sample of LPE firms I find that 25% of board members, 21% of chairpersons and 17% of CEOs are founders. Compared to the figures quoted in the general founder-CEO literature, the incidence of founders on the board of directors of LPE firms is relatively high. For instance, Fahlenbrach (2009) and Adams et al. (2009) report 10.6–13% founder-CEOs in industrial firms, which is relatively low compared to 17% founder-CEOs in private equity firms. In contrast, the family ownership literature reports 18.37% founder-CEOs in family firms, which is comparable with my findings. However, I investigate LPE firms in general and do not differentiate between family-owned and non-family-owned LPE firms. For a meaningful comparison, the findings of the present sample should be compared with those of Fahlenbrach (2009), Adams et al. (2009), and Li and Srinivasan (2011). Together with the present sample on LPE firms, these findings suggest an overall relatively high number of founders and founder-CEOs on the boards of private equity firms.

Ownership in the board of directors

Since the publication of Jensen and Meckling (1976), several papers have investigated the impact of managerial ownership on company performance. One of the first publications on ownership structure is the paper of Morck et al. (1988), which investigated the ownership structure of Fortune 500 firms and established that mean board ownership is 10.6%. Short and Keasey (1999) investigated the managerial ownership for all UK firms listed on the London Stock Exchange (LSE) from 1988 to 1992 and determined a mean board ownership of 13.34%. According to Adams et al. (2009), mean CEO ownership in Fortune 500 firms stands at 2%. Applying a sample based on the IRRC and CRSP database, Bhagat and Bolton (2013) quote a mean director ownership of 13.70% and CEO ownership of 1.78%. With a sample based on Execucomp, Kim and Lu (2011) find CEO ownership of 2.9–3.2%

(depending on the approach of their equity stake calculation[105]); in the same sample mean ownership of board members is 9.6%.

The founder literature also reports on the ownership structure of board members and CEOs. For S&P 500 firms, for example, Anderson and Reeb (2003) report a mean ownership of 1.35% for board officers and directors in family firms, whereas officers and directors in non-family firms have 1.45% ownership.[106] Examining differences in ownership structure between founder-CEOs and non-founder-CEOs for S&P 500 firms, Fahlenbrach (2009) reports that founder-CEOs own on average 11.1% equity stakes, whereas non-founder-CEOs hold only 2.1% equity stakes.

The sample of the present dissertation indicates that in general board ownership is 6.5%, chairperson ownership is 2.7% and CEO ownership is 3.6% for LPE firms. Ownership in founder-managed LPE firms is between 3.9 and 10.0%. Founder chairpersons have a mean ownership of 3.9%, founder-CEOs 4.5% and founders on the board 10.0%.[107]

These figures are relatively small compared to the findings of Short and Keasey (1999) for all UK firms listed on the LSE, as well as of Bhagat and Bolton (2013) and Kim and Lu (2011) for US firms.[108] CEO ownership in LPE firms is comparable with the findings of Kim and Lu (2011), who determine a CEO ownership of 3.2% for US industrial firms. However, founder-CEO ownership in LPE firms is only 4.5%, which is again smaller than the 11.1% founder-CEOs reported by Fahlenbrach (2009) for S&P 500 firms. Comparing the managerial ownership structure of industrial and family firms with private equity firms might fall short. Industrial and family firms tend to incentivize their board members with equity stakes, as reported by Anderson and Reeb (2003) and Fahlenbrach (2009). In contrast, the private equity industry triggers the incentive mechanism with a compensation structure for their managers in the private equity funds. For instance, general partners receive an

[105] Kim and Lu (2011) calculate CEO ownership with and without stock options: ownership increases from 2.8% without stock options to 3.2% with stock options.

[106] Additionally to the ownership in family and nonfamily firms, Anderson and Reeb (2003) report an average officers and directors ownership of 1.42% for their entire sample.

[107] The number of observations is limited and is between 24 and 108.

[108] Bhagat and Bolton (2013) and Kim and Lu (2011) both use samples for US industrial firms. Bhagat and Bolton (2013) use a sample based on IRRC and CRSP. The analysis of Kim and Lu (2011) is based on a sample from Execucomp.

annual management fee of approximately 2% of the assets under management and a carry fee of approximately 20% after a declared hurdle rate has been achieved.

Table 4.7: literature overview on founder CEOs, ownership and duality

Authors	Year	Sample	Sub-sample	Founder CEO
Founder CEO				
Industrial firms				
Bonne et al.	2007	CRSP US industrial firms went public from 1988 to 1992	IPO	0.430
			t10	0.210
Family firms				
Anderson and Reeb	2003	S&P500 firms	Family firms	0.145
			Non-family firms	0
Andres	2008	All firms listed on Frankfurt Stock Exchange	Family firms	0.184
			Non-family firms	0
Fahlenbrach	2009	S&P500 firms	Founder Firms	0
			Other firms	0.102
Adams et al.	2009	Fortune500 firms	Entire sample	0.130
Li and Srinivasan	2011	Execucomp, Compustat and CRSP	Full sample	0.130
Board ownership				
Industrial firms				
Bonne et al.	2007	CRSP US industrial firms went public from 1988 to 1992	IPO	0.520
			t10	0.250
Linck et al.	2008	All firms from Disclosure database, CRSP and Compustat	Total sample	0.195
Family firms				
Anderson and Reeb	2003	S&P500 firms	Full sample	0.014
			Family firms	0.014
			Non-family firms	0.015
Li and Srinivasan	2011	Execucomp, Compustat and CRSP	Full sample	0.096
CEO ownership				
Industrial firms				
Bonne et al.	2007	CRSP US industrial firms went public from 1988 to 1992	IPO	0.160
			t10	0.070
Bhagat and Bolton	2008	IRRC & CRSP		0.029
Coles et al.	2008	Execucomp		0.019
Linck et al.	2008	All firms from Disclosure database, CRSP and Compustat	Total sample	0.061
Kim and Lu	2011	Execucomp		0.032
Family firms				
Fahlenbrach	2009	S&P500 firms	Other firms	0.021
			Founder Firms	0.111
Li and Srinivasan	2011	Execucomp, Compustat and CRSP	Full sample	0.026
			Non-founder firms	0.018

			Founder director firms	0.028
			Founder CEO firms	0.070
Duality				
Industrial firms				
Bonne et al.	2007	CRSP US industrial firms went public from 1988 to 1992	IPO	0.600
			t10	0.600
Bhagat and Bolton	2008	IRRC & CRSP		0.776
Linck et al.	2008	All firms from Disclosure database, CRSP and Compustat	Total sample	0.583
			Small firms	0.514
			Medium firms	0.564
			Large firms	0.710
Brick and Chidambaran	2010	Execucomp		0.653
Kim and Lu	2011	Execucomp		0.634

Summary: Chapter 4 has described the dissertation's unique panel data set covering 71 LPE firms with over 600 firm-year observations. Moreover, sub-chapter 4.1 has presented first descriptive findings on the board data of LPE firms. Finally, sub-chapter 4.2 has compared the findings on the board and firm characteristics of industrial, family, and LPE firms.

Chapter 5 will present the methodology and findings of the multivariate analysis used to investigate the link between LPE performance and the board of directors in LPE firms. For this purpose, sub-chapter 5.1 will discuss the empirical methods that can be applied in order to estimate panel data sets. Sub-chapter 5.2 will then present the empirical findings on LPE performance and the board of directors in LPE firms.

5. Multivariate analysis

"It is not knowledge, but the act of learning, not possession but the act of getting there, which grants the greatest enjoyment. [Wahrlich es ist nicht das Wissen, sondern das Lernen, nicht das Besitzen sondern das Erwerben, nicht das Da-Seyn, sondern das Hinkommen, was den grössten Genuss gewährt.]"

Carl Friedrich Gauss

This chapter will present the methodology and findings of the multivariate analysis used to investigate the link between LPE performance and the board of directors of LPE firms.

First, I will describe the empirical methods which can be applied in order to estimate panel data sets. In particular, sub-chapter 5.1 presents the basic assumptions of the ordinary least square (OLS) estimate method that is the foundation of panel data analysis, before going on to discuss the fixed effects and random effects models. These models represent the state of the art in panel data set estimation as presented in corporate governance literature. A further test presented here is the Hausman test, which provides an efficient and consistent econometrics basis for estimating panel data sets, inasmuch as it supports choice between the fixed effects and random effects models. Sub-chapter 5.1 thus provides the foundations for the multivariate analysis that follows.

Sub-chapter 5.2 presents the empirical findings of my research on the estimates with fixed effects and random effects models. In this sub-chapter I will estimate my advice, founder and ownership proxies for corporate performance. It should be noted that this thesis applies the performance measure Tobin's Q and ROA. In order to answer my hypotheses on LPE firms, I will estimate my explanatory variables for advice, founder status and managerial ownership in terms of corporate performance.

5.1. Methodology

This chapter first introduces the assumptions for a data set with random data over time. Time series data can be pooled data in different time periods or panel data sets with observations over a certain time period (Baum 2006: 45-46). The chapter will then discuss the Gauss-Markov theorems that apply in general to ordinary least square (OLS) regression models and panel data analysis (Wooldridge 2009: 349). This will be followed by a presentation of the fixed and random effects models and their application to panel data sets. The chapter will close with the Hausman test, which allows researchers to decide if the fixed effects or the random effects model is more efficient for estimating their panel data.

Sub-chapter 5.1 first discusses the differences between pooled cross-section and panel data. A specific issue for time series data is the potential problem of fixed effects. The econometric literature provides two common methods for dealing with fixed effects which will be discussed here: the first differences and the fixed effects models. The sub-chapter will also show the differences between the fixed effects and random effects models and their application to panel data sets. The section will close with the Hausman test, which provides a way of choosing between the fixed effects and random effects models based on the explanatory variables in their panel data sets.

5.1.1. Regression analysis with time series data

In general, panel data sets are characterized by random data over a certain time period (Wooldridge 2009: 342). For example, panel data sets can investigate the impact of the interest rates of the European Central Bank over the last 10 years on house prices in Europe over the same time period. In doing so, the model investigates the impact of an independent variable on a dependent variable (Baum 2006: 220). This statistic model can be defined as:

$$y_t = ß_0 + ß_1 z_t + u_t \qquad (5.1)$$

$$t = 1, 2, ..., n$$

The statistic model above postulates that a change in z has an impact on y in period t. Usually, a regression model includes several explanatory variables (Wooldridge 2009: 342).[109] For instance, equation 5.2 explains the impact of board size, fraction of outside directors, and founder-CEO on firm performance Q_t.

$$Q_t = \beta_0 + \beta_1 boardsize_t + \beta_2 fractionOD_t + \beta_3 founderCEO_t + u_t \qquad (5.2)$$

The model can also use lagged time variables to show that an independent variable in $t-1$ has an impact on y_t (Patterson 2000: 42-45). For example, lagged performance variables might explain why the CEO is replaced by a new CEO. The econometrics literature refers to lagged relationships in terms of the finite distributed lag model as described in equation 5.3.

$$gfr_t = \alpha_0 + \delta_0 pe_t + \delta_1 pe_{t-1} + \delta_2 pe_{t-2} + u_t \qquad (5.3)$$

For the regression analysis with time series data the econometrics literature uses the mechanics and inferences of the ordinary least squared (OLS) regression model (Wooldridge 2009: 345). The following paragraphs will present the Gauss-Markov theorem, which defines the assumptions for the OLS regression model (Wooldridge 2009: 349). For a better understanding of time series analysis it is necessary to understand the theorem of unbiasedness of OLS. This theoretical concept contains three assumptions that will be discussed in the following paragraph.

The first assumption of the unbiasedness of OLS postulates that the time series process follows a stochastic model with linear parameters. Under this assumption the stochastic process and the linear model are defined as follows:

[109] The econometric literature also uses the term explanatory or independent variable.

$$y_t = \beta_0 + \beta_1 x_{t1} + ... + \beta_k x_{tk} + u_t \quad (5.4)$$

$$\{(x_{t1}, x_{t2}, ..., x_{tk}, y_t) : t = 1, 2, ..., n\}$$

$$\{u_t : t = 1, 2, ..., n\}$$

Second, the unbiasedness of OLS assumes that no independent variable is constant or a perfect linear combination of other explanatory variables. This assumption is also called 'no perfect collinearity' in the econometrics literature.

Finally, the unbiasedness of OLS assumes the zero conditional mean. This last assumption for the unbiasedness of OLS postulates that the expected value of the error term u_t given any explanatory variable X for all periods is equal to zero (Baltagi 2002: 159).

$$E(u_t | X) = 0 \quad (5.5)$$

$$t = 1, 2, ..., n$$

$$E(u_t | x_{t1}, ..., x_{tk}) = E(u_t | x_t) = 0 \quad (5.6)$$

On the other hand, if the expected value of u_t under the condition of any explanatory variable over all time is not equal to zero, this means that the explanatory variables are biased (Ruud 2000: 189). In this case the estimated parameter β^* would be biased by the population parameter β^P. The zero conditional mean assumption can be also described by the covariance between u_i and x_i. In this case the covariance between u_i and x_i has to be equal to zero, which means that there is no significant relationship between these two variables. The assumption on the covariance between u_i and x_i will be used for the Hausman test to show if the fixed effects or the random effects model is more efficient to estimate certain panel data sets (Brooks 2010: 500).

The assumption of homoskedasticity means that the variance of the error term u_t given the explanatory variables x_t is equal to ∂^2. In other words, the variance of u_t given x_t must be constant over time. Given this assumption, the errors of the chosen model are equal over

time. If the given assumption that the variance of u_t given x_t is not equal to ∂^2, then the conclusion is that the chosen model is heteroskedastic. As consequence, the error term of the chosen model will increase over time (Brooks 2010: 132-133):

$$Var(u_t|X) = Var(u_t) = \sigma^2 \qquad (5.7)$$
$$t = 1, 2, ..., n$$

In the case of heteroskedasticity there are other estimators which have a lower sampling variance. Obviously, estimators with lower sampling variance increase the efficiency of the model (Wooldridge 2009: 349).

The final assumption for the Gauss-Markov theorem is that there is no serial correlation among the error terms. The econometric literature uses the term serial correlation or autocorrelation to describe the correlation among error terms. In this context the literature uses u_t and u_s to label different error terms in time, and assumes that these errors are uncorrelated in the different time periods (Wooldridge 2009: 350). Therefore, the final Gauss-Markov theorem is defined as:

$$Corr(u_t, u_s|X) = 0 \qquad (5.8)$$

for all $t \neq s$.

In general, time series data can increase or decrease over time. However, the common tendency of economic data is that many economic time series increase over time. Two widespread examples for growing time series data in the economic literature is the increase in GDP or the market capitalization of firms over the last six decades. In using a sample with time series data to draw economic conclusions, it is necessary to understand that the time series can underlie an increasing[110] tendency over time, which is also known as a time trend in the econometric literature. Therefore, the econometric model has to recognize that time trends impact the outcome of regression estimates (Wooldridge 2009: 360).

A statistical model that captures the time trend can be defined as follows:

[110] As already mentioned above, most time series data increase over time, however the tendency is also possible in the opposite direction.

$$y_t = \alpha_0 + \alpha_1 t + e_t \quad (5.9)$$
$$t = 1, 2, ..., n$$

In the equation above, y_t is the dependent variable in period and t and α_0 are the constant terms. The parameter e_t is the error term in period t, where e_t is an independent, identically distributed sequence with the expected value of zero and variance of σ^2 (Patterson 2000: 225):

$$E(e_t) = 0 \quad (5.10)$$
$$Var(e_t) = \sigma_e^2 \quad (5.11)$$

The equation above includes on the right hand side α_1 multiplied by t, which represents a linear time trend. The parameter α_t measures the change in the dependent variable y_t from one period to the next (Wooldridge 2009: 361). This causality can be written as:

$$\Delta y_t = y_t - y_{t-1} = \alpha_1 \quad (5.12)$$

The equation above can also be defined as:

$$E(y_t) = \alpha_0 - \alpha_1 t \quad (5.13)$$

The equation (5.9) shows that the dependent variable y_t grows over time if α_1 is > 0. On the other hand, if α_1 is < 0 than the trend in equation (5.9) is downward.

In some cases economic data are exponentially distributed. For instance, the distribution of compound interest is exponentially distributed over time, and characterized by an increasing growth over time. In cases of exponential trend the economic literature suggests capturing

the exponential trend by modeling the natural logarithm of the series as a linear trend (Baum 2006: 177). Such a model can be defined as:

$$\log(y_t) = \beta_0 + \beta_1 t + e_t \qquad (5.14)$$
$$t = 1, 2, ..., n$$

5.1.2. Pooled cross-section and panel data analysis

The following section will discuss econometric models that are state of the art for analyzing cross-sectional data across time. Pooled cross-section analysis is a common method in econometrics to analyze the difference in population characteristics at different points in time. For analyzing pooled cross-section data it is necessary for the data to be characterized as independent over time. This assumption means that the sample of a population is random at different points in time. For instance, one might observe the wages of a particular population in 2005 and the wages of the same population on many occasions in the future, for instance in 2012. These samples have an important feature that they consist of independently sampled observations. In other words, pooled cross-sectional data from a single random sample of a certain population at different points in time might lead to observations that are not distributed identically (Wooldridge 2009: 444).

Generally, pooled cross-sections can be used to evaluate the impact of exogenous shocks such as specific events or policy changes. The method then analyzes cross-sectional data sets before and after the event. For instance, the literature on the board of directors investigates if there is a significant change in board size and composition after the Sarbanes-Oxley Act was introduce in 2002 in the US. The outcome of the analysis with pooled cross-sections can shed light on economic questions (Wooldridge 2009: 445).

Second, panel data sets provide data on population characteristics over a certain time period. Panel data sets obtain data that are distributed both cross-sectionally and across time

(Brooks 2010: 487). Longitudinal data for an individual value across time (e.g. wages or corporate value) are also called panel data in the econometrics literature. For example, a panel data set can observe corporate value over a period of 10 years. In this case the panel data set will contain information on corporate value for every single year from year 1 to year 10. The information on the panel data across time is an important aspect and assumes that the observations are not independently distributed across time (Brooks 2010: 488).

5.1.3. Fixed effects estimation

The fixed effects model uses a transformation to remove unobserved effects. In particular, the fixed effects model removes any time constant variable that the model uses to explain the effect of the independent variables on the dependent variable (Baum 2006: 221).

In general, the econometrics literature provides two methods to deal with fixed effects. On the one hand, the concept of first differences estimates the differences among the characteristics of a certain observation (Wooldridge 2009: 458). This can be first differences in corporate characteristics at different points of time. The first differences can investigate if corporate value increases with an increase in board size. Under this hypothesis the estimate would analyze the impact of differences in board size on differences in corporate value. On the other hand, the fixed effects transformation can be applied to deal with fixed effects, which achieves better results under certain assumptions.

For the fixed effects estimate, the econometrics literature assumes a simple model with a single independent variable over the observed time period i:

$$y_{it} = ß_1 x_{it} + a_i + u_{it} \qquad (5.15)$$
$$t = 1, 2, ..., T$$

In the next step the fixed effects transformation uses the average of the equation 5.15 to deal with the fixed effect illustrated by a_i (Wooldridge 2009: 481-482). The equation of 5.15 is defined as:

$$\bar{y}_{it} = ß_1 \bar{x}_{it} + a_i + \bar{u}_{it} \tag{5.16}$$

In the fixed effects transformation equation 5.16 will be subtracted from equation 5.15 to remove the fixed effects a_i (Brooks 2010: 492). This operation is defined as:

$$y_{it} - \bar{y}_{it} = ß_1 (x_{it} - \bar{x}_{it}) + a_i - a_i + (u_{it} - \bar{u}_{it})$$

The fixed effects transformation is thereby completed. It is also called a 'within' transformation. The result of the transformation is that the unobserved effect a_i has disappeared (Baum 2006: 221). The fixed effects transformation is defined as

$$\ddot{y}_{it} = ß_1 \ddot{x}_{it} + \ddot{u}_{it} \tag{5.17}$$

In general, the fixed effects transformation is also expandable from a model with a single independent variable to a model with more than one independent variable. Equation 5.18 defines a model with additional independent variables (Wooldridge 2009: 482).

$$y_{it} = ß_1 x_{it1} + ß_2 x_{it2} + ... + ß_k x_{itk} + a_i + u_{it} \tag{5.18}$$
$$t = 1, 2, ..., T$$

As described above the fixed effects transformation is obtained by the subtraction of the equation 5.18 subtracted by its time average. As a result equation 5.19 defines the fixed effects transformation for a model with several independent variables.

$$\ddot{y}_{it} = ß_1 \ddot{x}_{it1} + ß_2 \ddot{x}_{it2} + ... + \ddot{u}_{it} \tag{5.19}$$
$$t = 1, 2, ..., T$$

The econometrics literature postulates the exogeneity assumption, which states that the independent variables in the regression model are unbiased by idiosyncratic error. In other words, the model assumes that the error term u_{it} is uncorrelated with each independent variable x_{it} across all time periods. Therefore, the covariance between the independent variables and the error term is equal to zero as defined in equation 5.20 (Wooldridge 2009: 382).

$$Cov(x_{it}, u_{it}) = 0 \tag{5.20}$$

As a consequence, independent variables which are constant over time for all *i* will disappear through the fixed effects transformation. Therefore, variables such as gender or the status of a founder in firms cannot be included in the fixed effects model (Brooks 2010: 492). Finally, the fixed effects model assumes that the error term u_{it} is homoscedastic and that the error terms are uncorrelated over time (Baltagi 2002: 108).

The fixed effects model can be applied on balanced and unbalanced panels. A balanced panel is defined as a dataset that contains both cross-section and cross-time observations. In contrast to unbalanced panels, the number of time periods for the cross-section is equal in balanced panels (Baum 2006: 46). For instance, if a panel contains observations on corporate characteristics over a certain time period (e.g. ten years) then this panel will include all corporate characteristics over ten years. In other words, there is no time lag in a balanced panel. In contrast, an unbalanced panel has missing time periods in its cross-section. There might be data missing in the time period because firms disappeared from the market. For instance, in an analysis on the corporate characteristic of US banks from 2005 to 2015 there will be gaps in the data due the fact that banks merged, were acquired or filed chapter 11 after the financial crisis erupted (Brooks 2010: 488).

Using an unbalanced panel for the fixed effects model is not much more difficult than using a balanced panel. The more difficult part is the question why the unbalanced panel has time gaps. Taking the example above, the question is why certain banks disappeared from the market and others did not. One potential problem is that idiosyncratic error explains why specific firms disappeared from the market. In other words, idiosyncratic error is correlated

with the independent variables in the regression model. In this case idiosyncratic error causes biased estimators (Wooldridge 2009: 456).

5.1.4. Random effects estimation

The random effects model considers unobserved effects a_i that are uncorrelated with the independent variables x_{it}. In particular, the random effects model should be applied if heterogeneity only causes serial correlation in the composite error term. As a consequence, the random effects model assumes that unobserved effects cause no correlation between the composite errors and the independent variables (Brooks 2010: 498). The equation for the random effects model is:

$$y_{it} = ß_0 + ß_1 x_{it1} + ... + ß_k x_{itk} + a_i + u_{it} \tag{5.21}$$

The random effects model defines that the unobserved effect a_i is uncorrelated with each independent variable x_{it}. According to this model, therefore, the covariance between x_{it} and a_i is zero (Ruud 2000: 619).

$$Cov(x_{it}, a_{it}) = 0 \tag{5.22}$$
$$t = 1, 2, ..., T; \; j = 1, 2, ..., k$$

If the covariance between x_{it} and a_i does not equal zero, then the fixed effects model or the first differences are more appropriate estimators.

As a consequence the random effects model includes all assumptions which are valid for the fixed effects model and adds the assumption that a_i is independent of all independent variables in all time periods. Additionally to the fixed effects and random effects models, the

pooled OLS regression can be used to estimate panel data. Thus, all three models can help to understand the unobserved effects a_i caused entirely or partly by the error term (Wooldridge 2009: 496).

5.1.5. Hausman test

The previous section discussed the fixed effects and random effects models. The question arises, which of these models should be applied to panel data sets. On the one hand, the fixed effects model allows arbitrary correlation between a_i and x_{it}, which the random effects model does not allow. For estimation of ceteris paribus effects the fixed effects model is a more convincing tool. Finally, the fixed effects model allows panel data to be used without controlling for time-constant variables (Baum 2006: 230).

On the other hand, the random effects model can be applied to panel data sets where the key independent variables are constant over time. For instance, investigating the effect of a founder on the board of directors, the independent variable that considers the founder effect is a binary variable equal to zero if there is no founder on the board and equal to one if there is a founder on the board. Obviously, the founder effect estimate would be eliminated by the transformation in the fixed effects model. However, the random effects model requires as many time-constant control variables as possible among all other independent variables (Brooks 2010: 273).

The Hausman test estimates if fixed effects or random effects estimators are more appropriate to estimate a specific panel data set. In general, the assumption for the Hausman test is that $Cov(x_{it}, a_i) = 0$. If the assumption on covariance is satisfied, the fixed effects and random effects model will have consistent estimators. However, the random effects model is more efficient than the fixed effects model, because the standard error of random effects estimators is smaller than that of fixed effects estimators. However, if the covariance

assumption is violated, the fixed effects model will alone be consistent (Wooldridge 2009: 493).

Technically, the Hausman test states a null hypothesis: that the covariance between x_{it} and a_i is equal to zero. The alternative hypothesis is that the covariance between x_{it} and a_i does not equal zero. As stated above, on the assumption that the covariance between x_{it} and a_i is zero, the fixed effects and random effects model can both be applied for the purposes of estimation. But here again, the random effects model is more efficient than the fixed effects model (Baum 2006: 230).

5.2. Empirical findings

This sub-chapter will present the empirical findings on the underlying panel data set of LPE firms as introduced in the previous sub-chapter. The purpose of the following estimates is to show which explanatory variables best describe the performance of LPE firms. I will start with estimates containing all my explanatory variables on corporate performance. I will then apply estimation models with only my advice, founder and ownership proxies, to determine whether or not theses proxies have a positive or negative impact on corporate performance. Finally, this sub-chapter will close with a robustness check on my governance variables in sub-chapter 5.2.2.

The sub-chapter also presents the findings of the fixed effects estimations, then those of the random effects estimations, and finally the findings of the Hausman test. I use this order because the statistics literature describes estimation procedure with the fixed effects model, the random effects model, and the Hausman test in that order.

5.2.1. Empirical findings on selected governance variables

Table 5.1 shows the first empirical findings estimated with the fixed effects model using the dependent variable Tobin's Q. I estimate my proxy variables in seven different models to show the impact of the proxy variables on the performance of LPE firms and to demonstrate the robustness of my findings.

The finding in model (7) shows that the impact of the advice proxy 'board meetings' is positive and significant at the 5% level. In other words, board meetings have a positive impact on the performance of LPE firms. According to Jensen (1993), board meetings are an important advice mechanism, because it is useful for directors to meet and exchange with other directors and the management. Taking Jensen's argumentation into account, board meetings seem to increase the performance of LPE firms in terms of the advice provided by the board members.

Likewise, CEO ownership has a positive impact on Tobin's Q. The coefficient CEO ownership is positive at the 1% level. This finding is in line with the 'alignment of interest hypothesis', which indicates that an increase in CEO ownership increases the incentives of the CEO to perform well.

Turning the focus onto the control variables, the fixed effects regression models show the variable total assets coefficient is positive at the 1% level. On the other hand, the control variables 'total debt ratio' and 'fiscal years since IPO' both have a negative coefficient at the 1% level.

The interpretation of the control variables is difficult, due the fact that the outcome of the coefficients can have different reasons. However, it is interesting to observe that the control proxy 'total debt ratio' has a negative impact on the performance of LPE firms, because debt is described in the private equity literature as an incentive mechanism for portfolio firm managers. In particular, debt is a monitoring instrument, because a firm faces bankruptcy if it does not maintain its principal and interest payments. However, the finding on 'total debt ratio' in Table 5.1 contradicts this view.

The estimates in Table 5.2 show the impact of governance proxies on ROA. The findings in Table 5.2 show no significant outcome for governance proxies. Only three controls show significant coefficients. The coefficient of the control variable Tobin's Q t-1 is positive and significant at the 1% level. The control variable ROA t-1 is negative and significant at the 10% level. Finally, the control variable 'total debt ratio' is again negative and significant at the 1% level.

Table 5.1: Fixed effects regression models on Tobin's Q

	Tobin's Q																				
	(1)			(2)			(3)			(4)			(5)			(6)			(7)		
	Coeff.	t-value		Coeff.	t-value		Coeff.	t-value		Coeff.	t-value		Coeff.	t-value		Coeff.	t-value		Coeff.	t-value	
Board meetings	0.044	2.200	**																0.057	2.120	**
Board size				-0.079	-1.43														-0.070	-0.640	
Fraction outside directors							-0.130	-0.140											-2.090	-1.090	
Founder CEO										0.986	1.570								0.260	0.250	
Duality													0.400	0.870					-0.210	-0.290	
CEO ownership																10.249	3.18	***	13.703	3.070	***
Tobin's Q t-1	-0.018	-0.120		0.102	0.860		0.104	0.870		0.090	0.760		0.095	0.810		0.0952	0.81		-0.178	-1.020	
ROA t-1	0.313	0.550		0.238	0.510		0.258	0.550		0.255	0.540		0.263	0.560		0.263	0.560		0.421	0.550	
Stock return t-1	-0.093	-0.420		-0.067	-0.370		-0.049	-0.270		-0.022	-0.120		-0.043	-0.240		-0.043	-0.240		-0.091	-0.310	
LN total assets	0.570	3.010	***	0.489	3.500	***	0.439	3.210	***	0.459	3.370	***	0.425	3.100	***	0.425	3.100	***	0.921	3.740	***
Total debt ratio	-1.391	-2.460	**	-0.866	-1.900	*	-0.733	-1.630		-0.650	-1.450		-0.706	-1.580		-0.706	-1.580		-2.145	-2.770	***
FYs since IPO	-0.123	-4.310	***	-0.092	-4.490	***	-0.085	-4.230	***	-0.084	-4.220	***	-0.082	-4.040	***	-0.082	-4.040	***	-0.143	-3.520	***
Constant	-1.070	-0.940		-0.226	-0.270		-0.517	-0.470		-0.942	-1.140		-0.670	-0.830		-0.670	-0.830		-1.435	-0.650	
Number of Obs.	308			413			413			413			413			283			232		
Number of Groups	49			63			63			63			63			48			42		
R^2 (within)	0.106			0.072			0.067			0.073			0.069			0.120			0.177		
Rho	0.525			0.480			0.480			0.518			0.461			0.576			0.612		

Tobin's Q is measured as the ratio of the market value of the firm divided by its replacement costs. Board meetings is defined as the total number of board meetings in a fiscal year. Board size measures the number of directors on the board for each fiscal year as mentioned in the annual report. Fraction of outside directors is defined as the number of outside directors divided by the total number of directors. Founder CEO is 1 if the founder of the private equity firm is the CEO of the firm, otherwise 0. Moreover, variable duality equals 1 if the CEO at the same time holds the position of chairperson. CEO ownership measures the equity stakes in % held by the CEO. Stock price return is calculated as % stock returns over the past 12 months. I use daily stock price data to calculate the stock price returns. Tobin's Q $_{t-1}$, ROA $_{t-1}$ and stock price return $_{t-1}$ are defined as mentioned above and measure the performance of the past fiscal year. Total assets is defined as the total value of assets on the balance sheet in each fiscal year. LN total assets is logarithmized total assets in each fiscal year. Total debt ratio is the total value of debt divided by total assets in each fiscal year. Finally, FYs since IPO computes the number of fiscal years since the initial public offering.

Table 5.2: Fixed effects regression models on ROA

	ROA																							
	(8)			(9)			(10)			(11)			(12)			(13)			(14)					
	Coeff.	t-value		Coeff.	t-value		Coeff.	t-value		Coeff.	t-value		Coeff.	t-value		Coeff.	t-value		Coeff.	t-value				
Board meetings	-0.004	-1.680	*																-0.003	-0.930				
Board size				0.003	0.420														0.014	1.170				
Fraction outside directors							-0.011	-0.080											-0.067	-0.320				
Founder CEO										-0.131	-1.170								-0.131	-0.970				
Duality													-0.014	-0.210					0.035	0.450				
CEO ownership																0.674	1.600		0.503	0.950				
Tobin's Q t-1	0.104	6.270	***	0.094	5.780	***	0.094	5.740	***	0.095	5.870	***	0.094	5.780	***	0.090	4.920	***	0.101	5.410	***			
ROA t-1	-0.136	-1.990	**	-0.085	-1.280		-0.087	-1.300		-0.089	-1.340		-0.087	-1.300		-0.090	-1.080		-0.151	-1.770	*			
Stock return t-1	-0.033	-1.270		-0.021	-0.840		-0.022	-0.880		-0.023	-0.920		-0.022	-0.880		-0.040	-1.310		-0.048	-1.550				
LN total assets	0.045	1.950	*	0.051	2.520	**	0.053	2.710	***	0.051	2.660	***	0.053	2.740	***	0.036	1.510		0.028	1.010				
Total debt ratio	-0.382	-5.620	***	-0.386	-5.960	***	-0.393	-6.280	***	-0.404	-6.400	***	-0.394	-6.280	***	-0.463	-5.870	***	-0.407	-4.730	***			
FYs since IPO	0.004	1.210		0.002	0.790		0.002	0.710		0.002	0.620		0.002	0.660		0.003	0.760		0.006	1.350				
Constant	-0.266	-1.960	*	-0.349	-2.920	***	-0.324	-2.110	**	-0.298	-2.540	**	-0.332	-2.920	***	-0.229	-1.620		-0.242	-1.030				
Number of Obs.	294			390			390			390			390			267			223					
Number of Groups	49			63			63			63			63			47			42					
R^2 (within)	0.248			0.189			0.189			0.192			0.189			0.249			0.300					
Rho	0.376			0.409			0.401			0.399			0.398			0.343			0.434					

ROA is defined as ratio of net income divided by the total assets of the firm. Board meetings is defined as the total number of board meetings in a fiscal year. Board size measures the number of directors on the board for each fiscal year as mentioned in the annual report. Fraction of outside directors is defined as the number of outside directors divided by the total number of directors. Founder CEO is 1 if the founder of the private equity firm is the CEO of the firm, otherwise 0. Moreover, variable duality equals 1 if the CEO at the same time holds the position of chairperson. CEO ownership measures the equity stakes in % held by the CEO. Stock price return is calculated as % stock returns over the past 12 months. I use daily stock price data to calculate the stock price returns. Tobin's Q_{t-1}, ROA_{t-1} and stock price $return_{t-1}$ are defined as mentioned above and measure the performance of the past fiscal year. Total assets is defined as the total value of assets on the balance sheet in each fiscal year. LN total assets is logarithmized total assets in each fiscal year. Total debt ratio is the total value of debt divided by total assets in each fiscal year. Finally, FYs since IPO computes the number of fiscal years since the initial public offering.

The findings in table 5.1 and 5.2 present the empirical evidence of the fixed effects model using two different performance proxies: Tobin's Q and ROA. In the next section I will present the empirical findings estimated with the random effects model, again using the performance proxies Tobin's Q and ROA. Finally, I will use the Hausman test to determine whether the fixed effects or the random effects model is the more efficient model for the estimation of my panel data set.

Table 5.3 shows the empirical findings estimated with the random effects model. In general, Table 5.3 indicates that the advice proxies 'board meetings' and 'board size' have a positive impact on Tobin's Q. Moreover, 'founder CEO' and 'CEO ownership' both have a positive coefficient in the random effects models. However, none of the coefficients in model (21) are significant.

Table 5.4 presents the empirical findings estimated with the random effects model and the performance proxy ROA. First, Table 5.4 shows that the proxy 'founder CEO' has a negative and significant impact on ROA. The coefficient 'founder CEO' is significant at the 1% level. The negative outcome of the governance proxy 'founder CEO' suggests that founders in LPE firms might desire to retain control over corporate decisions and funds. This phenomenon is known in the corporate governance literature as 'founder entrenchment'.

On the other hand, the proxy 'CEO ownership' has a positive and significant coefficient at the 5% level. This finding suggests that CEO ownership has a positive impact on ROA. This finding is in line with the 'alignment of interest hypothesis', which suggests that CEO ownership increases the effort and performance of CEOs in LPE firms.

The control variables Tobin's Q t-1 and 'total assets' have a positive and significant coefficient at the 1% level. Furthermore, 'total debt ratio' again has a negative and significant coefficient at the 1% level.

Table 5.3: Random effects regression models on Tobin's Q

	Tobin's Q																				
	(15)			(16)			(17)			(18)			(19)			(20)			(21)		
	Coeff.	z-value		Coeff.	z-value		Coeff.	z-value		Coeff.	z-value		Coeff.	z-value		Coeff.	z-value		Coeff.	z-value	
Board meetings	0.011	0.800																	0.017	0.870	
Board size				0.017	0.650														0.021	0.410	
Fraction outside directors							-0.286	-0.770											-0.889	-1.090	
Founder CEO										0.169	0.850								0.147	0.430	
Duality													0.141	0.830					0.065	0.220	
CEO ownership																0.553	0.370		2.622	1.190	
Tobin's Q t-1	0.286	2.360	**	0.333	3.280	***	0.343	3.410	***	0.331	3.270	***	0.338	3.350	***	0.399	3.290	***	0.213	1.420	
ROA t-1	0.029	0.050		0.035	0.080		0.027	0.060		0.058	0.130		0.070	0.160		0.028	0.050		0.049	0.070	
Stock return t-1	-0.065	-0.300		-0.057	-0.320		-0.060	-0.340		-0.058	-0.330		-0.066	-0.380		-0.107	-0.420		-0.058	-0.200	
LN total assets	0.060	0.890		0.052	1.100		0.047	1.030		0.058	1.300		0.052	1.130		0.044	0.620		0.090	0.910	
Total debt ratio	-0.273	-0.620		-0.124	-0.370		-0.129	-0.390		-0.142	-0.430		-0.118	-0.360		-0.112	-0.240		-0.760	-1.200	
FYs since IPO	-0.021	-1.860	*	-0.019	-2.110	**	-0.016	-1.750	*	-0.016	-1.820	*	-0.017	-1.860	*	-0.014	-1.390		-0.014	-0.930	
Constant	0.700	1.760	*	0.559	1.890	*	0.891	1.950	*	0.597	2.110	**	0.615	2.180	**	0.660	1.540		1.007	1.170	
Number of Obs.	308			413			413			413			413			283			232		
Number of Groups	49			63			63			63			63			48			42		
R^2 (within)	0.073			0.021			0.020			0.022			0.022			0.011			0.056		
Wald X^2	10.370			17.140			17.800			17.450			17.470			12.920			9.730		

Tobin's Q is measured as the ratio of the market value of the firm divided by its replacement costs. Board meetings is defined as the total number of board meetings in a fiscal year. Board size measures the number of directors on the board for each fiscal year as mentioned in the annual report. Fraction of outside directors is defined as the number of outside directors divided by the total number of directors. Founder CEO is 1 if the founder of the private equity firm is the CEO of the firm, otherwise 0. Moreover, variable duality equals 1 if the CEO at the same time holds the position of chairperson. CEO ownership measures the equity stakes in % held by the CEO. Stock price return is calculated as % stock returns over the past 12 months. I use daily stock price data to calculate the stock price returns. Tobin's Q $_{t-1}$, ROA $_{t-1}$ and stock price return $_{t-1}$ are defined as mentioned above and measure the performance of the past fiscal year. Total assets is defined as the total value of assets on the balance sheet in each fiscal year. LN total assets is logarithmized total assets in each fiscal year. Total debt ratio is the total value of debt divided by total assets in each fiscal year. Finally, FYs since IPO computes the number of fiscal years since the initial public offering.

Table 5.4: Random effects regression models on ROA

	ROA																							
	(22)			(23)			(24)			(25)			(26)			(27)			(28)					
	Coeff.	z-value		Coeff.	z-value		Coeff.	z-value		Coeff.	z-value		Coeff.	z-value		Coeff.	z-value		Coeff.	z-value				
Board meetings	-0.002	-1.260																	0.000	-0.260				
Board size				-0.003	-0.930														-0.006	-1.330				
Fraction outside directors							0.044	0.930											-0.108	-1.410				
Founder CEO										-0.063	-2.660	***							-0.091	-2.750	***			
Duality													-0.057	-2.790	***				0.010	0.350				
CEO ownership																0.380	1.990	**	0.475	2.170	**			
Tobin's Q t-1	0.062	4.470	***	0.058	4.340	***	0.059	4.400	***	0.060	4.550	***	0.058	4.430	***	0.054	3.790	***	0.059	3.940	***			
ROA t-1	-0.048	-0.760		0.012	0.200		0.007	0.120		-0.001	-0.020		-0.013	-0.220		-0.012	-0.160		-0.081	-1.100				
Stock return t-1	-0.013	-0.490		-0.003	-0.120		-0.003	-0.110		-0.003	-0.110		0.001	0.040		-0.018	-0.580		-0.029	-0.930				
LN total assets	0.029	3.880	***	0.017	3.110	***	0.018	3.110	***	0.017	3.170	***	0.020	3.550	***	0.042	5.020	***	0.049	5.300	***			
Total debt ratio	-0.286	-5.590	***	-0.193	-4.450	***	-0.198	-4.510	***	-0.184	-4.300	***	-0.202	-4.680	***	-0.299	-5.430	***	-0.363	-5.720	***			
FYs since IPO	0.000	-0.050		0.001	1.300		0.001	0.820		0.001	0.650		0.001	0.590		0.000	-0.270		-0.001	-1.030				
Constant	-0.125	-2.860	***	-0.100	-2.820	***	-0.154	-2.670	***	-0.105	-3.140	***	-0.109	-3.210	***	-0.235	-4.640	***	-0.106	-1.300				
Number of Obs.	294				390		390			390			390			267			223					
Number of Groups	49				63		63			63			63			47			42					
R^2 (within)	0.236				0.164		0.169			0.172			0.170			0.238			0.262					
Wald X^2	53.320				46.500		47.090			53.250			54.390			54.790			66.220					

ROA is defined as ratio of net income divided by the total assets of the firm. Board meetings is defined as the total number of board meetings in a fiscal year. Board size measures the number of directors on the board for each fiscal year as mentioned in the annual report. Fraction of outside directors is defined as the number of outside directors divided by the total number of directors. Founder CEO is 1 if the founder of the private equity firm is the CEO of the firm, otherwise 0. Moreover, variable duality equals 1 if the CEO at the same time holds the position of chairperson. CEO ownership measures the equity stakes in % held by the CEO. Stock price return is calculated as % stock returns over the past 12 months. I use daily stock price data to calculate the stock price returns. Tobin's Q $_{t-1}$, ROA $_{t-1}$ and stock price return $_{t-1}$ are defined as mentioned above and measure the performance of the past fiscal year. Total assets is defined as the total value of assets on the balance sheet in each fiscal year. LN total assets is logarithmized total assets in each fiscal year. Total debt ratio is the total value of debt divided by total assets in each fiscal year. Finally, FYs since IPO computes the number of fiscal years since the initial public offering.

A further analysis of the fixed effects and random effects estimators is presented in Table 5.5. The findings there present the results of the Hausman test. As mentioned in sub-chapter 5.1, the explanatory variable x_i might be correlated with an unobserved effect a_i which has an impact on the consistency and efficiency of the selected estimators. The fixed effects estimators are consistent when the explanatory variables x_i are correlated with the unobserved effect a_i. Given this assumption, only the fixed effects estimators are efficient, whereas the random effects estimators are not consistent.

Table 5.5: Hausman test

	Tobin's Q				ROA			
	FE	**RE**	**Diff.**	**S.E.**	**FE**	**RE**	**Diff.**	**S.E.**
Board meetings	0.057	0.017	0.040	0.019	-0.003	0.000	-0.002	0.002
Board size	-0.070	0.021	-0.091	0.098	0.014	-0.006	0.020	0.011
Fraction outside directors	-2.090	-0.889	-1.201	1.726	-0.067	-0.108	0.041	0.197
Founder CEO	0.260	0.147	0.113	0.977	-0.131	-0.091	-0.040	0.130
Duality	-0.210	0.065	-0.274	0.652	0.035	0.010	0.025	0.071
CEO ownership	13.703	2.622	11.082	3.882	0.503	0.475	0.028	0.485
Tobin's Q t-1	-0.178	0.213	-0.391	0.087	0.101	0.059	0.042	0.011
ROA t-1	0.421	0.049	0.372	0.254	-0.151	-0.081	-0.070	0.043
Stock return t-1	-0.091	-0.058	-0.034	.	-0.048	-0.029	-0.019	0.002
LN total assets	0.921	0.090	0.831	0.225	0.028	0.049	-0.021	0.026
Total debt ratio	-2.145	-0.760	-1.385	0.445	-0.407	-0.363	-0.044	0.058
FYs since IPO	-0.143	-0.014	-0.129	0.038	0.006	-0.001	0.008	0.004
X^2	45.640				19.240			
Prob>X^2	0.000				0.083			

Tobin's Q is measured as the ratio of the market value of the firm divided by its replacement costs. ROA is defined as ratio of net income divided by the total assets of the firm. Board meetings is defined as the total number of board meetings in a fiscal year. Board size measures the number of directors on the board for each fiscal year as mentioned in the annual report. Fraction of outside directors is defined as the number of outside directors divided by the total number of directors. Founder CEO is 1 if the founder of the private equity firm is the CEO of the firm, otherwise 0. Moreover, variable duality equals 1 if the CEO at the same time holds the position of chairperson. CEO ownership measures the equity stakes in % held by the CEO. Stock price return is calculated as % stock returns over the past 12 months. I use daily stock price data to calculate the stock price returns. Tobin's Q $_{t-1}$, ROA $_{t-1}$ and stock price return $_{t-1}$ are defined as mentioned above and measure the performance of the past fiscal year. Total assets is defined as the total value of assets on the balance sheet in each fiscal year. LN total assets is logarithmized total assets in each fiscal year. Total debt ratio is the total value of debt divided by total assets in each fiscal year. Finally, FYs since IPO computes the number of fiscal years since the initial public offering.

In contrast, if the explanatory variables x_i are uncorrelated with the unobserved effect $a_{i,,}$ the random effects estimator will be consistent and efficient, whereas the fixed effects estimator will still be consistent, but not efficient.

Based on the theoretical arguments and empirical findings presented in Table 5.5, the fixed effects model should be applied to the explanatory variables selected in the full model approach. In particular, Table 5.5 shows that the Hausman test rejects the null hypothesis for the estimate with Tobin's Q, as well as with the estimate with ROA. The null hypothesis of the Hausman test states that the random effects estimator is consistent. This hypothesis is rejected with a X^2 of 45.640 for the estimate with Tobin's Q and with a X^2 of 19.240 for that with ROA. The probability that the rejection of the null hypothesis is false is relatively small due to a probability of 0.000 for Tobin's Q and 0.083 for ROA.

Summary**:** The fixed effects regression models show that board meetings and CEO ownership have a positive and significant impact on Tobin's Q. The empirical findings on the governance proxy 'board meetings' confirm the advice hypothesis stated in Chapter 3. In line with the argumentation of Jensen (1993), board meetings are an important mechanism, because it is useful for directors to meet and exchange with other directors and management.

Moreover, the finding on CEO ownership confirms the 'alignment of interest hypothesis', which suggests that CEOs increase their effort and performance with an increase in ownership.

5.2.2. Robustness check

The previous sub-chapter discussed initial empirical findings on the impact of selected governance proxies on the performance of LPE firms. In particular, the regression models used in sub-chapter 5.2.1 contained data relevant to the advice, founder and ownership hypotheses for LPE firms. The present sub-chapter will use comparable governance proxies concerning the robustness of the findings presented in sub-chapter 5.2.1.

Table 5.6 contains the empirical findings of the fixed effects model on Tobin's Q. Its results show that no governance proxies are significant: significant coefficients are only recorded for the control variables. The control variable 'total assets' is positive and significant at the 1% level. On the other hand, the control variables 'total debt ratio' and 'fiscal years since IPO' both have negative coefficients. Total debt ratio is significant at the 5% level and fiscal years since IPO is significant at the 1% level.

Table 5.7 presents the empirical findings of the fixed effects model on ROA, which indicate that 'founder chairperson' has a negative and significant coefficient at the 10% level. This finding suggests that founders might desire to retain control over corporate decisions and funds.

The control variable Tobin's Q t-1 has a negative and significant coefficient at the 1% level, as does the control variable 'total debt ratio'.

Table 5.6: Robustness check fixed effects regression models on Tobin's Q

	Tobin's Q														
	(29)			(30)			(31)			(32)			(33)		
	Coeff.	t-value		Coeff.	t-value		Coeff.	t-value		Coeff.	t-value		Coeff.	t-value	
Board committees	-0.222	-1.570											-0.215	-1.030	
No. outside directors				-0.084	-1.380								-0.119	-1.200	
Founder chairperson							0.009	0.020					-0.426	-0.520	
Chairperson ownership										4.950	0.950		4.664	0.810	
Tobin's Q t-1	0.060	0.460		0.114	0.960		0.102	0.860		0.051	0.350		0.037	0.240	
ROA t-1	0.240	0.450		0.235	0.500		0.260	0.550		0.418	0.650		0.400	0.600	
Stock price return t-1	-0.071	-0.330		-0.067	-0.370		-0.048	-0.260		-0.102	-0.380		-0.120	-0.430	
LN total assets	0.518	3.300	***	0.461	3.380	***	0.441	3.230	***	0.584	3.250	***	0.634	3.330	***
Total debt ratio	-1.054	-2.010	**	-0.821	-1.820	*	-0.729	-1.630		-1.178	-1.820	*	-1.610	-2.300	**
FY since IPO	-0.095	-3.950	***	-0.089	-4.410	***	-0.086	-4.220	***	-0.106	-3.380	***	-0.110	-3.170	***
Constant	-0.324	-0.350		-0.241	-0.280		-0.624	-0.770		-1.301	-1.210		-0.108	-0.080	
Number of Obs.	355			413			413			293			278		
Number of Groups	57			63			63			50			46		
R^2 (within)	0.082			0.072			0.067			0.083			0.101		
Rho	0.477			0.477			0.450			0.422			0.465		

Tobin's Q is measured as the ratio of the market value of the firm divided by its replacement costs. Number of outside directors is computed as the number of non-management directors on the board. Founder chairperson equals 1 when the founder holds the position of chairperson, otherwise 0. Chairperson ownership is defined as the % equity ownership of the chairperson. Stock price return is calculated as % stock returns over the past 12 months. I use daily stock price data to calculate the stock price returns. Tobin's Q_{t-1}, ROA_{t-1} and stock price $return_{t-1}$ are defined as mentioned above and measure the performance of the past fiscal year. LN total assets is logarithmized total assets in each fiscal year. Total debt ratio is the total value of debt divided by total assets in each fiscal year. Finally, FYs since IPO computes the number of fiscal years since the initial public offering.

Table 5.7: Robustness check fixed effects regression models on ROA

	ROA														
	(34)			(35)			(36)			(37)			(38)		
	Coeff.	t-value		Coeff.	t-value		Coeff.	t-value		Coeff.	t-value		Coeff.	t-value	
Board committees	0.023	1.210											-0.002	-0.070	
No. outside directors				0.005	0.570								0.008	0.640	
Founder chairperson							-0.160	-2.110	**				-0.185	-1.850	*
Chairperson ownership										-0.827	-1.210		-0.198	-0.270	
Tobin's Q t-1	0.100	5.950	***	0.093	5.720	***	0.096	5.950	***	0.098	5.300	***	0.100	5.310	***
ROA t-1	-0.088	-1.220		-0.084	-1.270		-0.087	-1.310		-0.085	-1.010		-0.081	-0.950	
Stock price return t-1	-0.028	-0.970		-0.020	-0.820		-0.022	-0.880		-0.039	-1.150		-0.037	-1.090	
LN total assets	0.036	1.690	*	0.051	2.650	***	0.056	2.930	***	0.036	1.550		0.038	1.530	
Total debt ratio	-0.370	-5.310	***	-0.386	-6.080	***	-0.389	-6.260	***	-0.469	-5.680	***	-0.423	-4.810	***
FY since IPO	0.003	1.000		0.002	0.760		0.001	0.430		0.002	0.430		0.003	0.700	
Constant	-0.304	-2.470	**	-0.355	-2.970	***	-0.312	-2.760	***	-0.192	-1.380		-0.224	-1.390	
Number of Obs.	334			390			390			278			265		
Number of Groups	56			63			63			49			46		
R^2 (within)	0.204			0.190			0.200			0.223			0.240		
Rho	0.392			0.408			0.448			0.380			0.463		

ROA is defined as ratio of net income divided by the total assets of the firm. Number of outside directors is computed as the number of non-management directors on the board. Founder chairperson equals 1 when the founder holds the position of chairperson, otherwise 0. Chairperson ownership is defined as the % equity ownership of the chairperson. Stock price return is calculated as % stock returns over the past 12 months. I use daily stock price data to calculate the stock price returns. Tobin's Q $_{t-1}$, ROA $_{t-1}$ and stock price return $_{t-1}$ are defined as mentioned above and measure the performance of the past fiscal year. LN total assets is logarithmized total assets in each fiscal year. Total debt ratio is the total value of debt divided by total assets in each fiscal year. Finally, FYs since IPO computes the number of fiscal years since the initial public offering.

Tables 5.8 and 5.9 present the empirical findings of the random effects models using Tobin's Q and ROA as performance proxies. First, the results in Table 5.8 show that in model (43) only the control variable Tobin's Q t-1 has a significant coefficient. The coefficient is positive and significant at the 1% level.

Table 5.9 shows the empirical findings of the random effects models on ROA. The coefficient of the governance proxy 'founder chairperson' is negative and significant at the 1% level. ThIS negative outcome expresses the desire of founders to retain control over corporate decisions and funds. As mentioned above, the corporate governance literature describes this behavior as founder entrenchment.

The ownership proxy 'chairperson ownership' has a positive coefficient and is significant at the 5% level. This finding supports the hypothesis that managerial ownership increases the effort of managers and hence, too, corporate performance.

Finally, Table 5.9 presents the findings on the control variables. The control variables Tobin's Q t-1 and 'total assets' both have a positive and significant coefficient at the 1% level. In table 5.9 the coefficient of total debt ratio is negative and significant at the 1% level.

Table 5.8: Robustness check random effects regression models on Tobin's Q

	Tobin's Q														
	(39)			(40)			(41)			(42)			(43)		
	Coeff.	z-value		Coeff.	z-value		Coeff.	z-value		Coeff.	z-value		Coeff.	z-value	
Board committees	0.022	0.420											0.020	0.260	
No. outside directors				0.004	0.130								0.016	0.300	
Founder chairperson							0.221	1.250					0.214	0.930	
Chairperson ownership										4.803	2.220		5.134	2.020	
Tobin's Q t-1	0.404	3.810	***	0.341	3.380	***	0.340	3.380	***	0.371	3.120	***	0.324	2.590	***
ROA t-1	0.024	0.050		0.039	0.090		0.068	0.160		0.049	0.090		0.223	0.360	
Stock price return t-1	-0.076	-0.350		-0.064	-0.360		-0.059	-0.340		-0.041	-0.160		-0.081	-0.290	
LN total assets	0.029	0.560		0.060	1.340		0.051	1.150		0.091	1.370		0.083	1.100	
Total debt ratio	-0.026	-0.070		-0.123	-0.370		-0.133	-0.400		0.011	0.030		-0.099	-0.210	
FY since IPO	-0.016	-1.780		-0.018	-2.040		-0.014	-1.530		-0.013	-1.390		-0.013	-1.090	
Constant	0.666	2.150	*	0.597	1.910	**	0.582	2.100		0.221	0.540		0.139	0.290	
Number of Obs.	355			413			413			293			278		
Number of Groups	57			63			63			50			46		
R^2 (within)	0.013			0.021			0.019			0.020			0.022		
Wald X^2	18.120			16.730			18.990			18.660			61.310		

Tobin's Q is measured as the ratio of the market value of the firm divided by its replacement costs. Number of outside directors is computed as the number of non-management directors on the board. Founder chairperson equals 1 when the founder holds the position of chairperson, otherwise 0. Chairperson ownership is defined as the % equity ownership of the chairperson. Stock price return is calculated as % stock returns over the past 12 months. I use daily stock price data to calculate the stock price returns. Tobin's Q $_{t-1}$, ROA $_{t-1}$ and stock price return $_{t-1}$ are defined as mentioned above and measure the performance of the past fiscal year. LN total assets is logarithmized total assets in each fiscal year. Total debt ratio is the total value of debt divided by total assets in each fiscal year. Finally, FYs since IPO computes the number of fiscal years since the initial public offering.

Table 5.9: Robustness check random effects regression models on ROA

	ROA														
	(44)			(45)			(46)			(47)			(48)		
	Coeff.	z-value		Coeff.	z-value		Coeff.	z-value		Coeff.	z-value		Coeff.	z-value	
Board committees	0.005	0.610											0.004	0.440	
No. outside directors				-0.002	-0.520								-0.009	-1.520	
Founder chairperson							-0.045	-2.030	**				-0.084	-3.070	***
Chairperson ownership										0.552	1.950	*	0.794	2.510	**
Tobin's Q t-1	0.069	4.760	***	0.056	4.260	***	0.061	4.550	***	0.057	3.830	***	0.062	4.120	***
ROA t-1	-0.022	-0.340		0.010	0.170		-0.007	-0.120		0.022	0.310		-0.007	-0.090	
Stock price return t-1	-0.012	-0.420		-0.002	-0.080		-0.002	-0.090		-0.020	-0.590		-0.018	-0.520	
LN total assets	0.028	3.410	***	0.016	2.990	***	0.018	3.210	***	0.041	4.850	***	0.050	5.540	***
Total debt ratio	-0.273	-5.200	***	-0.193	-4.460	***	-0.200	-4.550	***	-0.270	-4.890	***	-0.263	-4.610	***
FY since IPO	0.000	0.210		0.001	1.360		0.000	0.430		0.000	0.100		-0.001	-0.970	
Constant	-0.178	-3.640	***	-0.101	-2.660	***	-0.106	-3.020	***	-0.253	-4.880	***	-0.239	-4.150	***
Number of Obs.	334			390			390			278			265		
Number of Groups	56			63			63			49			46		
R^2 (within)	0.195			0.166			0.180			0.186			0.240		
Wald X^2	52.870			45.820			50.960			52.760			61.310		

ROA is defined as ratio of net income divided by the total assets of the firm. Number of outside directors is computed as the number of non-management directors on the board. Founder chairperson equals 1 when the founder holds the position of chairperson, otherwise 0. Chairperson ownership is defined as the % equity ownership of the chairperson. Stock price return is calculated as % stock returns over the past 12 months. I use daily stock price data to calculate the stock price returns. Tobin's Q_{t-1}, ROA_{t-1} and stock price $return_{t-1}$ are defined as mentioned above and measure the performance of the past fiscal year. LN total assets is logarithmized total assets in each fiscal year. Total debt ratio is the total value of debt divided by total assets in each fiscal year. Finally, FYs since IPO computes the number of fiscal years since the initial public offering.

Table 5.10 shows the results of the Hausman test. The findings of the Hausman test reject the null hypothesis for the estimate with Tobin's Q, as well with the estimate with ROA. This hypothesis is rejected with a X^2 of 21.970 for the estimate with Tobin's Q and with a X^2 of 30.780 for that with ROA. The probability that the rejection of the null hypothesis is false is relatively small, due to a probability of 0.015 for Tobin's Q and 0.001 for ROA. In particular, the results of the Hausman test suggest that the fixed effects model is more appropriate for the estimation of selected explanatory variables than the random effects model.

Table 5.10: Hausman test

	Tobin's Q				ROA			
	FE	**RE**	**Diff.**	**S.E.**	**FE**	**RE**	**Diff.**	**S.E.**
Board committees	-0.215	0.020	-0.235	0.194	-0.002	0.004	-0.006	0.025
No. outside directors	-0.119	0.016	-0.134	0.085	0.008	-0.009	0.017	0.011
Founder chairperson	-0.426	0.214	-0.640	0.783	-0.185	-0.084	-0.101	0.096
Chairperson ownership	4.664	5.134	-0.469	5.142	-0.198	0.794	-0.992	0.674
Tobin's Q t-1	0.037	0.324	-0.287	0.088	0.100	0.062	0.038	0.011
ROA t-1	0.400	0.223	0.178	0.268	-0.081	-0.007	-0.074	0.040
Stockprice return t-1	-0.120	-0.081	-0.038	0.041	-0.037	-0.018	-0.019	.
LN total assets	0.634	0.083	0.551	0.175	0.038	0.050	-0.012	0.023
Total debt ratio	-1.610	-0.099	-1.511	0.514	-0.423	-0.263	-0.160	0.067
FY since IPO	-0.110	-0.013	-0.097	0.033	0.003	-0.001	0.005	0.004
X^2	21.970				30.780			
Prob>X^2	0.015				0.001			

Tobin's Q is measured as the ratio of the market value of the firm divided by its replacement costs. ROA is defined as ratio of net income divided by the total assets of the firm. Number of outside directors is computed as the number of non-management directors on the board. Founder chairperson equals 1 when the founder holds the position of chairperson, otherwise 0. Chairperson ownership is defined as the % equity ownership of the chairperson. Stock price return is calculated as % stock returns over the past 12 months. I use daily stock price data to calculate the stock price returns. Tobin's Q $_{t-1}$, ROA $_{t-1}$ and stock price return $_{t-1}$ are defined as mentioned above and measure the performance of the past fiscal year. LN total assets is logarithmized total assets in each fiscal year. Total debt ratio is the total value of debt divided by total assets in each fiscal year. Finally, FYs since IPO computes the number of fiscal years since the initial public offering.

Summary**:** The robustness check first applied the fixed effects model and the random effects model in order to use the results of these models for the Hausman test in the next step. The findings of the Hausman test in sub-chapters 5.2.1 and 5.2.2 suggest that the fixed effects model is more efficient as an estimation model for my selected governance variables than the random effects model.

First, the empirical findings of the robustness check present non-significant results for the advice proxies 'board committees' and 'number of outside directors'. Sub-chapter 5.2.1 I only refers, therefore, to the findings on the advice proxy 'board meetings'. The findings on the proxy 'board meetings' are positive and significant, which suggests that board meetings are an important mechanism, because it is useful for directors to meet and exchange ideas with other directors and with the management.

Second, my empirical findings in sub-chapter 5.2.1 and 5.2.2 show that ownership – indicated by the proxies 'CEO ownership' and 'chairperson ownership' – has a positive and significant impact on the performance of LPE firms. These empirical findings are in line with the 'alignment of interest hypothesis', which suggests that ownership increases the effort and performance of managers.

However, there is some evidence that founders have a negative impact on the performance of LPE firms. For example, sub-chapter 5.2.1 shows that the proxy 'founder CEO' has negative and significant coefficient at the 1% level in the random effects model. Furthermore, in sub-chapter 5.2.2 the proxy 'founder chairperson' also has a negative and significant coefficient at the 10% level in the fixed effects model. The corporate governance literature refers to the downside of founders as founder entrenchment. The governance literature suggests that founders might desire to retain control over corporate decisions and funds. As mentioned above, the outcome of the founder proxies is not clear in my empirical results and therefore has to be tackled in further research.

Finally, the control variable 'total debt ratio' has a negative and significant coefficient at the 1% level in both sub-chapters 5.2.1 and 5.2.2. This finding is interesting, because the private equity industry uses debt as a monitoring and incentive instrument in portfolio firms. In general, the governance literature describes debt as an instrument that reduces the

probability of management using the firm's free cash flow for investment projects with a negative net present value. Further research might deliver findings why debt has a positive impact on the performance of portfolio firms and a negative impact on LPE firms.

6. Conclusion

In the literature on private equity investments, the board of directors as a corporate governance instrument has received much attention in the past few decades. In particular, scholars have investigated from different perspectives not only the impact of private equity investments on the performance of private equity portfolio firms, but also the governance structure of the board of directors. The present thesis investigates the impact of board structure on the performance of LPE firms.

In Chapter 2, the thesis describes the principal-agent theory and corporate governance mechanisms. In general, the principal-agent theory constitutes the foundation of corporate governance research. In this thesis I follow Jensen and Meckling (1976) and discuss four aspects of the theory, describing, in particular, managerial power, managerial risk aversion, the free cash flow problem and three approaches to solving the principal-agent problem. Moreover, I show that in general corporate governance can tackle the issue described in the principal-agent theory.

Chapter 2 closes with an overview of the private equity industry, pointing out that there is a difference in the organizational structure of private equity firms. In particular, I differentiate between the structure of unlisted and listed private equity firms and show why private equity can be classed as a market-based corporate governance mechanism.

In order to investigate the impact of board structure on the performance of LPE firms, Chapter 3 presents the performance measures used in this thesis. In particular, I estimate the performance of LPE firms with Tobin's Q and ROA. These performance measures are state of the art and widely used in corporate governance literature.

Chapter 3 also provides a literature overview on the board of directors. This overview contains a spectrum of theoretical arguments and empirical evidence relating to the board of directors that forms the basis for a number of hypotheses developed on the advice function of the board of directors, and on founder status, leadership structure and managerial

ownership of LPE firms. These hypotheses are used to investigate the impact of the board of directors on the performance of LPE firms in Chapter 5.

Chapter 4 is divided into two sections. Sub-chapter 4.1 introduces the underlying panel data set that will be applied in the multivariate analysis of Chapter 5. Sub-chapter 4.2 provides an overview of the empirical findings on the board of directors literature with particular reference to corporate and board characteristics relating to corporate governance.

Chapter 5 opens with an introduction into methods that can be applied to analyze panel data sets and presents the empirical findings of the research project. In line with previous empirical investigations I estimate my panel data set using the fixed and random effects models. Chapter 5 discusses these models as empirical approaches to analyze panel data sets and introduces the Hausman test as a means to help scholars choose an efficient and consistent estimation model. In other words, the outcome of the Hausman test helps one to choose between the fixed effects and random effects models in pursuit of meaningful results.

Chapter 5 then presents the findings of this thesis. The thesis finds empirical evidence for the advice hypothesis. In particular, the advice proxy ‘board meetings’ has a positive and significant impact on the performance of LPE firms. Moreover, the control variable ‘total debt ratio’ has a negative and significant impact on that performance. These findings suggest that the governance of LPE firms improves with an increase in board meetings and a decrease in total debt. Based on the theoretical argumentation of the thesis, it may be concluded that the role of LPE boards is primarily advising the executive management rather than monitoring its actions.

The empirical evidence in Chapter 5 shows that founder CEOs and founder chairpersons have a negative impact on the performance of LPE firms. This suggests that founder CEOs and chairpersons are entrenched in LPE firms. On the other hand, anecdotal evidence supports the hypothesis that founders have certain skills that create corporate value. A prime example is Blackstone, whose founders started their private equity company with $400,000 assets on the balance sheet and increased its assets under management to $290 bn. within three decades.

Finally, Chapter 5 shows that ownership has a positive and significant impact on the performance of LPE firms. In particular, CEO ownership and chairperson ownership have a

positive impact on the performance of LPE firms. These findings are in line with the theoretical argument that ownership increases the effort of CEOs to behave in the interest of shareholders – a relationship known in the corporate governance literature as the *alignment of interest* hypothesis.

As most private equity firms do not disclose their activities, the understanding of the private equity industry presented here is not very clear cut. Further research might yield a better understanding of the private equity industry in general and the actions of company boards in particular.

One possible research question might consider whether the disclosure requirements of LPE firms bring them a competitive advantage vis à vis unlisted private equity firms. In other words, investors might be willing to commit more equity to funds of LPE firms than to those of unlisted private equity firms. This further research question could be addressed through a regression model.

Another question that arises is whether or not the composition of the board of directors in LPE firms has an impact on the performance of portfolio firms. The existing literature on private equity reveals that the announcement of private equity investments has a positive impact on the performance of portfolio firms. In such an analysis the skills and risk tolerance or aversion of the founder might play a significant role. This research question could be investigated with an event study and an ordinary least square regression model.

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Erklärung des Promovenden über die Nutzung von Hilfsmitteln

Hiermit erkläre ich, dass ich die eingereichte Dissertation – The Role of the Board of Directors in Private Equity Firms: An Empirical Analysis of the Performance of Listed Private Equity Firms – selbstständig verfasst habe. Bei der Abfassung habe ich nur die in der Arbeit angegebenen Hilfsmittel benutzt und alle wörtlich oder inhaltlichen übernommenen Stellen als solche gekennzeichnet. Die vorgelegte Dissertation hat weder in der gegenwärtigen noch in einer anderen Fassung einer anderen Fakultät der Bergischen Universität Wuppertal oder einer anderen wissenschaftlichen Hochschule vorgelegen.

Sevan Hambarsoomian