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To my Family

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Contents

List of Abbreviations

ALFI	Association of the Luxembourg Fund Industry
CCLux	Centrale de Communications Luxembourg S.A.
CIS	Collective Investment Schemes
CSSF	Commission de surveillance du secteur financier
e.g.	Exempli gratia (Latin: For example)
et al.	Et alii (Latin: And others)
EPS	Earnings per share
EU	European Union
EUR	Euro
FCP	Fonds Commun de Placement
FIF	Fully integrated fund
FM	Fama and MacBeth (1973)
GDP	Gross domestic product
I/B/E/S	Institutional Brokers' Estimate System
IA	Information asymmetry
ibid	Ibidem (Latin: At the same place)
ICI	Investment Company Institute
i.e.	Id est (Latin: That is)
IPO	Initial public offering
IOSCO	International Organization of Securities Commissions
LLSV	La Porta, Lopez-de-Silanes, Shleifer, and Vishny
ln	Natural logarithm
MER	Management expense ratio
NAV	Net asset value
NPV	Net present value
OEA	Office of Economic Analysis
OLS	Ordinary least squares

PI1	Partially integrated 1 fund
PI2	Partially integrated 2 fund
R&D	Research and development
SEC	Securities and Exchange Commission
SF	Standalone fund
SICAF	Société d'Investissement à Capital Fixe
SICAV	Société d'Investissement à Capital Variable
S&P	Standard & Poor's
TER	Total expense ratio
TER (Nw.)	Total expense ratio without fee waiver
the Law	Law of 20 December 2002 relating to Undertakings for Collective Investment in Luxembourg
TSC	Total shareholder costs
UCI	Undertaking for Collective Investment
UCITS	Undertakings for Collective Investment in Transferable Securities
UCITS III	Directive 2001/107/EC and 2001/108/EC
U.S.	United States of America

Chapter 1

Introduction

> "[T]he explosion of interest in corporate governance is too easily interpreted as a theme, even, a nuance, in Finance. Nomenclature aside, corporate governance is a watershed, comparable to the reinvention of the field beginning in the late 1950's by Modigliani, Miller, Scholes, Merton, Jensen, Fama et al."
> (Greenbaum, 2006, p. 7).

The last decade has witnessed a rapidly growing body of academic research in corporate governance. Furthermore, the popular press also developed a penchant for stories about corporate malfeasance or what Jensen (2004) calls the "agency costs of overvalued equity". Apart from corporate misbehavior, Becht et al. (2005) attribute the reinforced interest in corporate governance to five further underlying factors: world-wide privatization, pension fund reform, the takeover wave in the eighties, deregulation and integration of capital markets, and the East Asian crisis.

However, the foundations for the academic thinking on corporate governance and finance were established as early as 1932. That year saw the publication of the decisive book by Berle and Means. They pointed out that ownership is generally dispersed in modern corporations, leading to the separation of ownership and control. Investors (principals) employ managers (agents) to run the firm, thereby separating management from finance or, put differently, ownership from control. The shareholders need the specialized knowledge of the manager for the firm to be run efficiently while managers need the shareholders' funds in order to finance the firm's operations and their remuneration. The agency problem arises as shareholders duly contribute their money, yet they are too dispersed in order to monitor management efficiently, leaving managers with nearly unfettered control. This is problematic as the interests of the shareholders are often not in

line with the interests of the managers.

Only in the seventies, formal economic modeling started to be applied to the study of firm-level agency problems. In their seminal article, Jensen and Meckling (1976) apply formal agency theory to the firm and model the agency costs of outside equity. They show that a manager who has anything less than 100% of the cash flow rights has potentially diverging interests from the owners. Or to put it in their words, "If both parties to the relationship are utility maximizers there is good reason to believe that the agent will not always act in the best interest of the principal." (ibid, p. 308). Managers may build "empires", buy perks for themselves, or divert resources to their own ends. Jensen and Meckling (1976) see the firm as a "nexus of contracts". This contractual view of the firm dates back to Coase (1937) and Alchian and Demsetz (1972). Other early works of the agency theory have been developed by Fama (1980) and Fama and Jensen (1983). Apart from agency theory, corporate governance could also be argued to originate from the transaction costs literature (for a comparison of transaction costs economics versus agency theory, see, especially, Williamson, 1988, 2002).

Yet how does corporate governance relate to the agency problem? One prominent definition of corporate governance is contained in the survey article by Shleifer and Vishny (1997). They define corporate governance as "the ways in which suppliers of finance to corporations assure themselves of getting a return on their investment" (ibid, p. 737). Becht et al. (2005) take a wider perspective and argue that corporate governance encompasses various agents, that is creditors, suppliers, clients, and other stakeholders. At a more general level, Hart (1995) argues that corporate governance aspects are determined by two conditions. First, the existence of an agency problem or conflict of interest and second, the difficulty of resolving these issues through a contract. This means that the link between the agency problem and corporate governance is the failure to write complete contracts contingent on all future states of the world and the corresponding managerial action (see also, Shleifer and Vishny, 1997). The notion of incomplete contracts and control rights were pioneered by Grossman and Hart (1986) and Hart and Moore (1990).[1] The latter concept defines the right to decide on actions that were not specified in the original contract and clearly their importance is reinforced in an incomplete contracting world.

Tirole (2001) argues that corporate governance addresses both an adverse selection

[1] For early papers incorporating these ideas in the financial contracting literature, see Aghion and Bolton (1992) and Dewatripont and Tirole (1994). In these models cash flows are verifiable. For models where cash flows and profits are either non-observable or non-verifiable, see the costly state verification models by Townsend (1979) and Gale and Hellwig (1985) (profits are unobservable) or Bolton and Scharfstein (1990), Fluck (1998) and Hart and Moore (1998) (profits are non-verifiable).

as well as a moral hazard problem. At an abstract level, adverse selection means that one party is better informed before signing the contract than the other party, a problem usually referred to as "hidden type". This is the general "lemons-problem" as defined by Akerlof (1970). In the finance context, the pecking order model by Myers and Majluf (1984) is essentially build upon the premise of adverse selection. This means that shareholders cannot distinguish between good or bad firms and hence there might be situations where firms abstain from raising capital following their assessment that their securities would likely be underpriced. Moral hazard refers to situations where one party does not behave as stipulated in the contract, which is usually referred to as "hidden action". Jensen (1986) argues that managers are reluctant to pay out free cash flow to shareholders, but instead prefer to waste free cash on acquisitions or their own pet projects. This situation boils down to moral hazard on the part of managers. The common thread underlying these two concepts is the existence of information asymmetry. The theoretical and practical importance of the latter topic was acknowledged in 2001 with the Nobel Prize being jointly awarded to Akerlof, Spence, and Stiglitz for their seminal work on markets with asymmetric information (Akerlof, 1970; Spence, 1973; Rothschild and Stigliz, 1976). Early treaties in the field of corporate finance which applied these seminal insights are Leland and Pyle (1977), Ross (1977), and Bhattacharya (1979).

At the core, this thesis is about potential problems in finance resulting from asymmetric information. The first two chapters focus on a situation in corporate finance where agency conflicts are thought to be potentially severe. This part of the dissertation analyzes firms' cash holdings. This is important as Myers and Rajan (1998) observed that it is easier to make cash holdings disappear than to divert, for example, a plant. Referring to the above discussion, the second chapter and third chapter of this thesis focus on adverse selection and moral hazard in the context of corporate liquidity. Yet, this thesis does not confine itself to corporate finance issues, but takes a wider perspective and also investigates agency relationships in a different environment, i.e. agency problems in the mutual fund industry. This analysis is pursued in the last chapter. Generally, the last chapter focuses on moral hazard in the case of investment companies. This conflict arises as mutual fund owners typically employ a management company to invest their funds, but the management company might not employ the funds in the best interest of the fund holders. More specifically, Bogle (2005) argues that nowhere in corporate America is the conflict induced through the separation of ownership and control more severe than in the costs charged to mutual fund shareholders. This is due to the fact that the management company charges an advisory fee for its services which clearly represents income for the management company, but expenses for mutual fund investors. The management company might be tempted to maximize the management fee and thereby hurt its fund

holders. The following discussion introduces the chapters more rigorously and provides a short overview of the results.

The second chapter investigates the value of cash for a broad international sample consisting of 7,474 firms from 45 countries over the 1995 to 2005 period. Importantly, Brealey et al. (2005) enumerate the value of liquidity as one of the ten unsolved problems in finance. The novelty in this study is that the value of cash is studied with respect to firm-specific and time-varying information asymmetry. While the extant literature has already studied the value of cash, the focus has always been on different corporate governance regimes. This chapter investigates two well-known but contradictory hypotheses in corporate finance by studying the value of cash holdings in connection with information asymmetry. The first hypothesis relates to the adverse selection problem and the underlying model dates back to Myers and Majluf (1984). To be specific, adverse selection leads managers to abstain from raising external capital as they are not willing to issue undervalued securities. In this sense, cash can be used as a buffer for management in order to avoid having to tap financial markets. However, the other side of the story relates to Jensen (1986). He analyzes the agency costs of free cash flow and this notion is based on moral hazard. The argument is that managers do not want to disburse free cash flow to shareholders and instead they waste the funds on inefficient investments or on their own pet projects. The results in the second chapter find overriding support for the free cash flow theory. This result holds for various econometric specifications, definitions of cash, and splits that are applied to disentangle the two effects.

The third chapter also focuses on cash holdings, but with respect to a different setting. It aims at determining the relation between cash holdings and governance in a cross-country setting. Previous studies on cash holdings and governance were either laid out as cross-country studies and focused on the level of shareholder protection as a governance element or they focused on one country and incorporated some firm-level corporate governance score. Yet these two different empirical strains achieved opposing empirical results. The contribution of this chapter is to integrate the effect of country-level shareholder protection and firm-level governance in one combined regression framework in order to provide for a richer perspective. The results suggest that both firm- and country-level governance are important determinants of corporate liquidity holdings. However, by extrapolating the country influence of the corporate governance index, this chapter reveals that it is only the investor protection that influences cash holdings. This latter finding is in line with previous papers that argue that country effects dominate firm effects (e.g. Harford et al. (2006)). Furthermore, the results reveal a significant valuation discount for firms being either located in poor shareholder protection countries or lacking sound

corporate governance systems.

The fourth chapter analyzes a research avenue in governance that has hitherto been given scant attention: It investigates the governance environment of mutual funds. Specifically, this chapter analyzes a unique hand-collected data set of 2,230 Luxembourg-domiciled equity funds and studies the relationship between fees charged to investors and the governance characteristics of these funds. The study focuses on UCITS ("Undertakings for Collective Investment in Transferable Securities"), the European equivalent of U.S. mutual funds. 90% of UCITS in Europe are sold out of Luxembourg (EFAMA, 2007). The results show that the majority of funds are vertically integrated with the management company and the custodian belonging to the same financial group as the fund's promoter. In addition, most boards are not independent, but the majority of directors are employees of the management company. The analysis of governance characteristics and fees reveals that both vertical integration and board dominance by the management company lead to *lower* expense ratios. This finding is in stark contrast to similar analyses for the U.S. mutual fund industry on independent directors. However, the result is consistent with related evidence of cross-subsidization in financial conglomerates and is also in line with the notion that fund governance is not the most important driver of fee setting in the Luxembourg-based asset management industry.

The remainder of this work is structured as follows. Chapter 2 considers the value of cash under asymmetric information. Chapter 3 presents a cross-country study that analyzes the importance of firm- versus country governance for determining the level and value of cash holdings. Chapter 4 investigates the governance environment of mutual funds. Chapter 5 draws the threads together by providing a short conclusion.

Chapter 2

Information Asymmetry and the Value of Cash[1]

JP Morgan economists have calculated that savings by companies in rich countries increased by more than $1 trillion from 2000 to 2004 and measured against the last 40 years companies have never hoarded so much cash as they do today.[2]

By observing this corporate behavior, a natural question to ask is which factors lead firms to accumulate such enormous amounts of funds. Finding possible answers to this conundrum is especially enlightening as the benchmark textbook model would tell us that under the assumption of perfect capital markets, cash holdings are irrelevant to the firm. The reason is that in this idealized situation external finance can always be obtained at fair terms. However, by looking at figures from the corporate landscape, the irrelevancy of cash is not supported. For example, the U.S. software giant Microsoft presented in its 2004 annual report a cash position amounting to $60.6 billion. However, amid growing investor pressure, Microsoft announced in July 2004 that it would pay a one-time dividend of $32 billion in 2004 and buy back up to $30 billion of the company's stock over the next four years. Upon the arrival of that news, Microsoft's stock price rose by 5.7% in the after-trading which exemplifies that cash can by no means be regarded as irrelevant in investors' eyes.[3]

Hence, in order to depict the current business setting some of the assumptions of perfect capital markets have to be relaxed. First, if transaction costs are incorporated into the model, an optimal cash balance will be determined and the irrelevancy of cash

[1] This chapter is based on a study of the same title by Grüninger and Hirschvogl (2007).
[2] JPMorgan Research: Corporates are driving the global saving glut, June 24, 2005.
[3] The Wall Street Journal, Microsoft to Dole Out its Cash Hoard, July 21, 2004, p. A.1.

does not hold anymore. Second, if information asymmetry (henceforth referred to as IA) is considered in the analysis, adverse selection and moral hazard problems result. Focusing on adverse selection, the underlying model dates back to Myers and Majluf (1984), who explicitly consider the role of cash holdings in the presence of IA. Adverse selection leads managers to abstain from raising external capital as they are not willing to issue undervalued securities. Therefore, a cash buffer can prevent the management from being forced to pass up positive NPV projects. However, there are two sides to everything. In this respect, Jensen (1986) analyzes the agency costs of free cash flow and hence focuses on the dark side of cash holdings. His framework is based on moral hazard. Instead of paying out free cash flow to the capital providers, managers waste the funds on inefficient investments or on their own pet projects.

From the preceding discussion, it becomes obvious that cash holdings and IA are interrelated. This means that studying corporate cash holdings with an emphasis on IA could provide valuable insights into the firms' motivation to hold cash. This is exactly the novel path that our study takes and contributes to the literature. The existing cash literature can loosely be divided into two different strands. The first category examines the determinants of cash holdings and whether there exists an optimal amount from the perspective of the shareholders. The second approach focuses on the impact of liquidity on firm performance and firm valuation. Importantly, the empirical study presented in this chapter belongs to the second category. Potentially, it would be interesting to follow the first path and analyze how a firm's cash reserve is influenced by the level of IA. Yet, it is virtually impossible to derive clear predictions and to unambiguously interpret the results from following this path: On the one hand, according to the pecking order theory a firm should hold more money when the level of IA is higher, because financial slack is valuable. On the other hand, this argument is especially important for firms with greater investment opportunities and according to the pecking order firms should use cash in the first place. Thus, depending on the stance one adopts completely opposite predictions for the influence of IA on the level of cash can be derived. The free cash flow problem leads to similar ambiguous predictions. One can argue that firms with a higher degree of IA hold more cash, because the management is very reluctant to distribute excess cash to shareholders. However, it also can be argued that IA results in lower cash holdings, because the management can easily dissipate cash. These difficulties of formulating clear predictions explain why we follow the second strand of literature and investigate the influence of IA on the value of cash and not on the level of the liquidity. Specifically, we study the value implications of cash holdings under consideration of firm-specific time-varying IA.

We consider this approach to be a novel path as we analyze the value implications of cash holdings from a different angle. Although in the past researchers have already investigated the value consequences of corporate cash holdings, they did so with respect to corporate governance issues and not with an emphasis on IA. In this strand of literature, most authors find that a low corporate governance regime has detrimental effects on the value of corporate liquidity holdings (see, for example, Dittmar et al., 2003; Pinkowitz et al., 2006; Dittmar and Mahrt-Smith, 2007). However, we think it is very illuminating to focus on IA as another channel where corporate cash holdings can have benefits in line with the Myers and Majluf (1984) argument (as external capital is costly) and/or also costs according to Jensen (1986) (as increased managerial discretion could lead managers to squander corporate liquidity resources). We empirically test the two hypotheses and investigate which effect outweighs the other. In this respect, our sample is very extensive encompassing 7,474 firms from 45 countries for the period 1995 to 2005, which is equal to 42,476 firm-year observations. We also employ different estimation methods. Specifically, the results are calculated via fixed effects estimation techniques and also with the Fama-MacBeth procedure. We derive our results for the actual cash ratio and also with the help of an estimated metric called 'excess cash'.

Considering the actual cash ratio, our results reveal that the marginal value of cash (without considering IA) is on average around one dollar. However, by incorporating IA (dispersion of analysts' earnings forecasts), the marginal value of cash incurs a substantial valuation discount and is significantly decreased. This evidence provides an initial corroboration of the free cash flow argument by Jensen (1986). For our data set it seems to hold that the agency costs due to moral hazard tend to outweigh the benefits due to the availability of internal funds. However, in order to distinguish more precisely between our two opposing hypotheses, we split the sample according to governance and financing constraints measures. In this respect, we find that the value of cash is higher if governance is stronger which further emphasizes the free cash flow argument. On the other hand, the results based on the financing constraints measures do not paint a clear picture and hence no clear-cut conclusions can be drawn. As a robustness test of the results using the actual cash-ratio we derive a measure for excess cash based on Opler et al. (1999). Importantly, the results remain qualitatively the same for this different metric.

Taken together, the results have important implications and question generally accepted principles of the capital structure and the cash literature. We find no evidence that financial slack is valuable as predicted by the pecking order theory. From this it follows that it is not in the shareholders' interest that firms hold cash reserves because of IA. Hence, the precautionary motive to hold cash appears to be questionable. However,

our findings do not contradict the pecking order theory in general. We do not argue that firms should not use internal funds in the first place, but we argue that firms should not accumulate cash with the intention to avoid external finance in the future.

This chapter proceeds as follows: Section 2 introduces the theoretical background, puts forward our hypotheses and reviews the related literature. Section 3 describes the data as well as the methods we use in this study. Section 4 continues by reporting the results from our empirical investigation and provides various robustness tests. Finally, Section 5 provides the concluding remarks.

2.1 Theoretical Background, Hypotheses, and Related Literature

2.1.1 Theoretical Background and Hypotheses

According to the pecking order theory (Myers, 1984; Myers and Majluf, 1984), firms prefer internal to external financing. This theory is based on an information advantage of the management. Due to IA, firms could be forced to forgo positive NPV projects if internal funds are not sufficient to finance the project. If such a situation occurs, financial slack is valuable. According to Myers and Majluf (1984), the only opportunity to issue stock without any loss of market value occurs if IA is nonexistent or at least negligibly small. This idea describes the notion of time-varying adverse selection costs.[4] Based on this observation there are periods in which firms are not restricted in their access to external capital and periods in which external finance is prohibitively costly. In the latter events financial slack, i.e., liquidity reserves, is especially important and should have a higher value.

This reasoning boils down to the following hypothesis:

Hypothesis 1: In periods with a higher degree of IA cash has *more* value for a firm than in periods where the degree of IA is lower.

However, based on Jensen's (1986) free cash flow theory the complete opposite could be expected.[5] Internal funds allow the management to shield themselves away from the rigor of the capital market, hence they do not need the approval of the capital providers

[4] The idea of varying IA is implemented in the models of Korajczyk et al. (1992) and Viswanath (1993). They show that it can indeed be optimal for a firm to deviate from a strict pecking order rule, i.e., to finance a new project with new equity even if there are other financial resources available.

[5] See also Stulz (1990) and Jensen (1993).

and they are free to decide according to their own discretion. As the management is very reluctant to pay out funds to capital providers, the executives have the incentive to invest even when there are no positive NPV projects available, hence financial slack can have major disadvantages. Yet, this is not the end of the story. Even if there is more room for the management to use funds for value-destroying and self-serving projects when cash reserves are high, there are some limitations due to corporate governance mechanisms (e.g., the markets for corporate control (Stulz, 1988)). Nevertheless, the higher the degree of IA, the more difficult it becomes to distinguish between value-destroying and optimal investments. Due to the information advantage of the management, shareholders, for example, cannot always judge whether an investment has a positive NPV or, as another example, whether high cash reserves are based on an optimal liquidity management or whether they are the result of managerial risk aversion (Fama and Jensen, 1983).

This reasoning results in the following hypothesis:

Hypothesis 2: In periods with a higher degree of IA cash has *less* value for a firm than in periods with a lower degree of IA.

Importantly, we acknowledge that empirically testing these two hypotheses involves three major difficulties:

(i) *How to disentangle the two supposed effects of the conflicting hypotheses?*[6] The two hypotheses result in the direct opposite expectation concerning the influence of IA on the value of cash. If no relationship can be found, it cannot be ruled out that both effects are at work and cancel each other out. Even if a relationship can be detected, it still cannot be ruled out that the opposite effect is also existent, but to a lesser degree. Given that we are ultimately interested in the overall effect, this does not pose a real problem. Nevertheless, it can be attempted to disentangle these two effects to some extent by splitting the sample into subgroups. The first hypothesis is strongly related with the access to external financing. Firms that face tighter financial constraints can be expected to suffer more, especially if the degree of IA is high. By splitting up the sample according to the degree of financial constraints, it is expected that the value of cash in conjunction with IA is higher in the subgroup encompassing the constrained firms. This finding would support Hypothesis 1, regardless of the overall effect. For firms with a weaker corporate governance structure Hypothesis 2 should be more relevant. By splitting up the sample according to this criterion, it can be expected that the value of cash in combination with IA is lower in the subgroup with a weaker governance structure.

[6] This paper is similar to the paper by Eisfeldt and Rampini (2007) as they also study the value of cash in relation with Myers and Majluf (1984) and Jensen (1986). Yet in contrast to this paper, they focus on the value of aggregate liquidity.

This result would support Hypothesis 2, regardless of the overall effect.

(ii) *How to measure firm-specific time-varying IA?* To analyze the relation between the value of cash and IA, a proxy for the latter is required. We have to rely on proxies that were used in previous research and are meanwhile well established. Nevertheless, the use of such a measurement is a crucial matter. The proxy we use is discussed in detail in the data section (refer to Section 2.2.1.1).

(iii) *How to measure the value of cash?* While our study represents, to the best of our knowledge, the first that investigates the influence of IA on the value of cash, it is fortunately not the first study that analyzes the value of cash in some other settings. Fama and French (1998) study the impact of debt and dividends on firm value. Pinkowitz et al. (2006) modified the method of Fama and French (1998) to estimate the marginal value of cash. Dittmar and Mahrt-Smith (2007) also use such a modified version of the method of Fama and French (1998) to estimate the impact of cash on firm value. Dittmar and Mahrt-Smith (2007) are interested in the value of liquidity in relation to a firm's corporate governance system. This approach can easily be adapted to the questions analyzed in our study. For a comprehensive explanation of the methods employed in this chapter refer to Section 2.2.2.

2.1.2 Related Literature

There is a growing literature that investigates the value of a (marginal) dollar (Pinkowitz et al., 2006; Dittmar and Mahrt-Smith, 2007; Faulkeneder and Wang, 2006). These papers are related to our work as they also study the value of cash and provide interesting and important findings on this matter, however, their theoretical framework is different from ours. They do not analyze the relation between the value of cash and firm-specific, time-varying IA. Nevertheless, in the literature various empirical papers can be found that are related to our research question and further motivate our two hypotheses. In the following, we refer to a few studies that (i) find evidence for the pecking order theory with time-varying adverse selection costs (background of Hypothesis 1), or (ii) empirically test the free cash flow problem (back-ground of Hypothesis 2), or (iii) examine a related question based on these two theoretical concepts.

Autore and Kovacs (2006) empirically show that firms prefer to access financial markets for issuing equity when the level of IA is lower. This evidence supports their hypothesis and they show that including time-varying adverse selection costs in the pecking order theory can explain violations of exactly that theory. Given this finding, it can be expected that in periods with a higher degree of IA, cash is more important for firms and

should have a higher market value. In contrast, Leary and Roberts (2007) do not confirm the results of Autore and Kovacs (2006) and argue that the variation of IA cannot explain the violation of the pecking order theory. The use of different measures of IA could be an explanation for these contradictory findings. While Autore and Kovacs (2006) use a firm-specific and time-varying proxy, Leary and Roberts (2007) estimations are based on an aggregated proxy similar to the one used by Choe et al. (1993). At this point, we would like to emphasize that we consider it of crucial importance to measure IA on a firm-level basis because we do not believe that IA behaves in the same way over time for all firms.

With respect to evidence for the free cash flow hypothesis, Nohel and Tarhan (1998) investigate the consequences of share repurchases on operating performance. Their empirical findings reveal that operating performance improves after share repurchases, but only for firms that have low growth opportunities. Contrary to expectations, the reason for the augmented performance is not associated with better growth opportunities following share repurchases but results from the more efficient employment of assets. Accordingly, the authors argue that this evidence can best be explained by the free cash flow hypothesis. Moreover, Shin and Stulz (1998) empirically show that segments of a diversified firm depend on an internal capital market and that agency costs have an effect on the efficient use of the internal capital market access. More direct evidence on the agency costs of managerial discretion in connection with corporate cash holdings is provided by Dittmar et al. (2003). They study more than 11,000 firms from over 45 countries and find that firms in countries with low investor protection hold double the amount of cash when compared to their counterparts in countries with a high level of shareholder rights. Their results become even more pronounced when they control for the capital market development. They argue that their results are in line with the hypothesis that in countries with a low level of shareholder protection, shareholders simply lack the means for forcing managers to pay out cash to them. The authors interpret their results as confirming the free cash flow hypothesis. Similarly, Kalcheva and Lins (2007) find that firms with low corporate governance at the corporate level hold more cash and this effect becomes stronger for firms in low investor protection countries. Moreover, Pinkowitz and Williamson (2004) focus on the influence of country-level investor protection on the value of cash holdings and their findings reveal that cash is worth less in countries where minority rights are weaker. Taken together, poor protection of investor rights at the company level as well as at the country level make it easier for the executives to dissipate cash for their own ends.

The paper by Lundstrum (2003) is closely related to our study as it also focuses on IA. Specifically, Lundstrum (2003) tests whether the benefits from accessing an internal capital market in order to avoid selling underpriced securities outweigh the agency costs created by the availability of liquid resources. On the one hand, building on the Williamson (1986) information cost theory, he argues that internal capital markets have a positive effect on firm value for two reasons. First, firms do not have to sell undervalued securities if IA masks the true value of the shares and, second, internal capital markets allow managers to undergo investments that the capital market would be unwilling to finance. The reason is that IA hinders managers in conveying their informational advantage credibly to the market. On the other hand, the free cash flow theory predicts that more liquid funds at the managers' discretion lead to agency costs due to money squandering. The reason for this stems from the fact that an internal capital market increases liquid assets and hence amplifies those agency costs. His results reveal that although access to an internal capital market exerts a positive effect on firm value, this result only holds for firms with a low level of IA. In the case of high information problems, no gains from the availability of an internal capital market can be realized. This corroborates the free cash flow theory.

2.2 Data and Methods

Our regression specifications are primarily based on the method of Fama and French (1998). These authors investigate how firm value is related to dividends and debt. Pinkowitz and Williamson (2004), Pinkowitz et al. (2006), as well as Dittmar and Mahrt-Smith (2007) use a modified version of this approach to estimate the value of cash holdings. We also employ this modified version for calculating our results. For this reason, we require variables on firm characteristics. On the one hand, we need variables on firm value and cash holdings and, on the other hand, various control variables have to be collected. These variables are listed and described in Section 2.2.2, where the estimation models are explained in detail. For the sake of investigating the influence of IA on the value of cash, a measure for IA must be constructed. This metric is explained in Section 2.2.1.1. Furthermore, in Section 2.2.1.3 we present the splits that are used to test for the influence of financial constraints and the corporate governance structure on the value of cash in conjunction with IA.

2.2.1 Data

2.2.1.1 How to Measure IA?

To this date, numerous studies have been published that use different proxies for IA. Certainly, no perfect measure for the level of IA can be found, but at least scholars have put forward different reasonable proxies.

Announcement effects can be captured to measure the level of IA (e.g. Choe et al., 1993). The reason is that announcements reveal information to the market. On the one hand, a lower price reaction indicates that the market participants are less surprised by the news, i.e., the level of IA was relatively low. On the other hand, a lower reaction could indicate a less important signaling role of corporate actions, which also means that the level of IA was relatively low. The main disadvantage of this proxy is that it can only be measured discretely at the time of an announcement and not continuously on a firm-level basis. Therefore, it can only be used for aggregated estimations.

Many studies use size (e.g. Ozkan and Ozkan, 2004) or the market-to-book ratio (e.g. Frank and Goyal, 2003) as a proxy for IA. Large firms are better monitored and more information is available. Growth opportunities entail more discretion and uncertainty for the future. However, size and growth as proxies are useful in capturing variation in the cross-section rather than the time-series variation (Autore and Kovacs, 2005). Accordingly, the use of these variables as proxies for IA can nullify the advantages of having panel data.

But there are also other proxies that can capture the time-series variation. Krishnaswami and Subramaniam (1999) discuss five different proxies (errors in analysts' forecasts, standard deviation of forecasts, normalized forecast error, volatility of abnormal returns around earnings announcements, and volatility in daily stock return) that are often used in corporate finance studies. The use of the volatility of returns around earning announcements as proxy is not a feasible method to measure IA in a large cross-country study. If we used the volatility in stock return as proxy, we would not be able to distinguish between the effect of risk and the effect of IA. The errors in analysts' forecasts capture the difference between the mean analysts' forecasts and the actual earnings per share. By referring to a study by Elton et al. (1984), the authors argue that the errors in analysts' forecasts are an especially appropriate proxy for IA. Specifically, Elton et al. (1984) find that the main part of the forecast error in the last month of the fiscal year can be explained by misestimation of firm-specific factors rather than by misestimation of economy or industry factors. Therefore, we will use this measure as one of our proxies for IA. Since this variable can be influenced by risk, Krishnaswami and Subramaniam

(1999) divide the errors in analysts' forecasts by the volatility of the firm's quarterly earnings which results in the normalized forecast error. However, we are unable to apply this correction for risk because we do not have quarterly data for most of the countries. Therefore, we use the errors in analysts' forecasts (without normalization) only in a robustness test. In our main specifications, the dispersion of analysts' forecasts is our proxy for IA. This variable measures the deviation of the forecasts of different analysts. Greater disagreement among analysts indicates a higher level of IA. Importantly, Diether et al. (2002) provide evidence that the dispersion in analysts' forecasts is not a proxy for risk.[7] Moreover, different studies have confirmed the relationship between the dispersion in the forecasts and the level of IA. Parkash et al. (1995) analyze the relationship between firm-specific attributes and analysts' uncertainty in predicting earnings. They show that the amount and quality of information available about a firm significantly influence the volatility of the earnings forecasts. D'Mello and Ferris (2000) present evidence in line with a stronger announcement effect for firms whose forecasts exhibit lower dispersion. Another important reason for using the dispersion as our proxy is that it is also used by Autore and Kovacs (2006)[8] who find evidence—as mentioned in the theoretical section—that firms avoid accessing financial markets in periods with a high degree of IA.[9]

For the calculation of the dispersion in analysts' forecasts, we use the one-year consensus forecasts of the earnings per share provided by I/B/E/S. Firm observations are excluded if the standard deviation of the forecasts is not based on the estimates of at least three analysts. The dispersion of the forecasts (defined as the firm-level standard deviation of all forecasts of the various analysts) is not updated each month for every firm. Accordingly, if we took the data only for one specific month, we would loose all

[7] They argue that dispersion cannot be a proxy for risk, because they find a negative relation between dispersion and the future stock returns. We control for the influence of such a relation on our results in the robustness tests in Section 2.3.3.

[8] The proxy for IA used by Autore and Kovacs (2006) is also based on dispersion, but they compute the variable in a different way. They divide the dispersion in a given quarter by the average of the dispersion in the prior four quarters. This is done in order to explicitly consider the time-variation of dispersion and not the cross-sectional variation. Since we have no quarterly data for most of our firms, we do not divide dispersion by the average of the prior dispersion. If we used the values of the prior years instead of the prior quarters, we would lose too many observations. Nevertheless, our estimations are also based on the time-variation of IA, because we estimate with fixed effects (and not with OLS), and therefore we focus on the within dimension. In a robustness test Autore and Kovacs (2006) also use the unscaled dispersion and estimate with fixed effects. They find the same relationship for this variable as in their main specification.

[9] Krishnaswami and Subramaniam (1999) use in their analysis two additional measures for IA which are not used in our study. First, they look at the reaction to the announcement of quarterly earnings. However, due to data limitations we cannot use this variable. Second, they use the residual volatility in stock returns as a proxy. We are reluctant to use this proxy, as one cannot distinguish between the effect of risk and the effect of IA. Another variable that is sometimes used in corporate finance studies to proxy for IA is the number of analysts covering a firm (e.g. Lundstrum, 2003). We do not use this variable, because we consider it rather as a proxy for the size of the firm.

firm-year observations for which we would have no (updated) estimate for this particular month. Therefore, we calculate for every year the average of the monthly dispersions.[10] In order to make the measure comparable for different firms, the standard deviation of the forecasts needs to be scaled. This is usually done by either dividing the standard deviation by the stock price, by the absolute value of the mean, or by the median forecast. However, we abstain from using the stock price for scaling and use the median[11] instead because our dependent variable (firm value) is related to the stock price. We realize that if we were to scale by the stock price, an endogeneity problem could occur. By adding one to the measure and taking the natural logarithm, our measure approaches a normal distribution. Thus, the measure equals:[12]

$$dispM = \ln\left(1 + \frac{standard\,deviation\,of\,analysts'\,forecasts}{|median|}\right) \tag{2.2.1}$$

where the standard deviation is the mean of the standard deviations taken over the entire year. The descriptive statistics of this variable is provided in Table 2.2 (refer to Section 2.2.2.1).

2.2.1.2 The Sample

Our data set covers the period from 1995 to 2005. All firms from the different countries are included for which I/B/E/S provides analysts' forecasts[13] and for which we can retrieve company data from Worldscope. We use yearly data because for most countries quarterly data are not available. Furthermore, because of their specific business environment, financial firms and utilities are omitted from the sample. Additionally, in order to ensure comparative data, firms whose fiscal year does not end with the calendar year have to be excluded. Importantly, to reduce the impact of outliers, we trim all variables at the 1% and the 99% tails. Finally, we exclude countries with fewer than 30 firm-year observations. In the most basic specification, the (unbalanced) sample consists of 7,474

[10] Towards the end of the year, the dispersion usually decreases because there is less room for unexpected events and less uncertainty. Since we do not have the dispersion for each firm for every month, this average could underestimate the dispersion of firms for which we have no observations in the first month of the year. Thus, we tested another method to calculate the average. Specifically, we computed the average for only a few months. For January and February a forecast is only available for a small portion of our sample firms and the dispersion varies widely. Therefore, we decided to use the average of the dispersion in March, April and May. The results do not change qualitatively.

[11] The results do not qualitatively change if the mean is used instead of the median.

[12] A more detailed version of this formula is presented in the appendix.

[13] If for a firm the variable *dispM* cannot be calculated for at least one year, the firm is excluded from the analysis.

firms and 42,746 firm-year observations from 45 countries.

2.2.1.3 Variables Used to Divide the Sample into Subgroups

We divide the sample into subgroups in order to test whether this has an impact on the way IA influences the value of cash.

The following variables are used to split the sample into subgroups (using median-splits) to investigate the influence of corporate governance variables. Table 2.1 contains a list of the countries contained in the sample and the descriptive statistics of the variables (measured at the country level).

Rule of law index: This measurement is provided by the Worldbank. Among other things, it captures—for the different countries—the extent to which agents have confidence in the rules of society, the quality of contract enforcement and the courts. It is assumed that firms in countries with a lower rule of law index generally have a weaker corporate governance structure. We use the index for the year 2000 (the year in the middle of the sample period).

Corruption index: This value is also provided by the Worldbank. It measures the extent to which public power is used for private gains in different countries. Generally, firms in countries with a higher extent of corruption have a weaker corporate governance structure. Again, we use the index for the year 2000.

Anti-director-rights index: This index is an aggregated measure for the level of shareholder rights in a country. The index is taken from the data provided by the website of Rafael La Porta.[14] A detailed description of the construction of this index can be found in La Porta et al. (1998). Again, we use the index for the year 2000.

Legal system: Countries can be classified broadly according to their different law traditions. While civil law is based on a series of written codes or laws, common law is developed by custom. Importantly, La Porta et al. (1998) find that in common law countries shareholders are better protected against expropriation by insiders compared to civil law countries.

Closely held shares: While the previous measurements are only available at the country level, we additionally use a variable that can be derived at the firm level. This item measures the percentage of shares held by insiders. For splits that are based on this variable, we do not use median splits but apply different cut-off levels that

[14] http://mba.tuck.dartmouth.edu/pages/faculty/rafael.laporta/publications.html.

are described later. The numbers are taken from the Worldscope database which provides a time series for this measure.

The following variables are used to split the sample into subgroups to investigate the influence of financing constraints.

Stock market capitalization to GDP: It is computed as the ratio of the value of listed shares in a country to its GDP. We expect countries with a higher score to have a higher developed capital market. Accordingly, firms in these countries should have better access to capital, i.e., they are less constrained. This variable is provided on the website of Ross Levine.[15] We use the values for the year 2000.

Private bond market capitalization to GDP: It is equal to the ratio of a country's private domestic debt securities (issued by financial institutions and corporations) to its GDP. The same argument applies as for the employment of the variable above. The data is also provided on the website of Ross Levine. Again, we use the values for the year 2000.

Firm size: The previous two measurements are only available at the country level. By using firm size as a proxy for the extent of financial constraints, the sample can be analyzed at the firm level basis. According to Almeida et al. (2004) small firms are rather constrained. Firm size is measured by the firm's market capitalization and is derived as a time series from the Worldscope database.

Payout ratio: Additionally, we use the payout ratio to proxy for financial constraints. It is defined as the ratio of total dividends and share repurchases to operating income. Almeida et al. (2004) put forward that firms with a small payout ratio are rather constrained. We obtain the variable as a time series from the Worldscope database.

Admittedly, there is not always a clear-cut distinction between the variables that are used to divide the sample according to the governance structure and those that are used for splitting according to financial constraints. For instance, the legal system is used as a proxy for the strength of the governance structure. At the same time, civil law countries generally have smaller and narrower capital markets (La Porta et al., 1998), i.e., the legal system could also be associated with financial constraints. For a careful interpretation of the results, this caveat has to be kept in mind.

[15] www.econ.brown.edu/fac/Ross_Levine/Publications.htm.

Table 2.1: Observations per Country and Index Values

country	N method 1	N method 2	corrupt. index	rule of law index	anti-dir. right index	stock-gdp ratio	bond-gdp ratio	com. law	civil law
Argentina	151	141	-0.40	0.07	4	0.44	0.05	0	1
Belgium	428	370	1.32	1.53	0	0.81	0.46	0	1
Brazil	515	356	-0.01	-0.21	3	0.38	0.09	0	1
Canada	1551	1023	2.25	1.87	5	1.16	0.22	1	0
Chile	395	78	1.50	1.23	5	0.86	0.17	0	1
China	816	0	-0.38	-0.42	.	0.42	0.09	0	1
Colombia	42	0	-0.51	-0.73	3	0.13	0.00	0	1
Czech Republic	51	0	0.39	0.51	.	0.21	0.07	0	1
Denmark	452	69	2.31	1.87	2	0.68	1.03	0	1
Finland	671	608	2.49	2.02	3	2.70	0.24	0	1
France	2090	1842	1.41	1.36	3	1.13	0.40	0	1
Germany	2005	1727	1.67	1.84	1	0.73	0.62	0	1
Greece	694	168	0.84	0.66	2	1.42	0.00	0	1
Hong Kong	941	64	1.43	1.44	5	3.76	0.18	1	0
Hungary	101	0	0.71	0.77	.	0.31	0.02	0	1
India	121	0	-0.31	0.15	5	0.37	0.00	1	0
Indonesia	572	0	-1.05	-1.03	2	0.28	0.01	0	1
Ireland	217	208	1.50	1.71	4	0.80	0.08	1	0
Israel	153	83	1.11	0.96	3	0.56	.	1	0
Italy	891	786	0.79	0.88	1	0.70	0.33	0	1
Japan	846	0	1.28	1.66	4	0.82	0.47	0	1
Korea, South	2100	0	0.33	0.52	2	0.56	0.40	0	1
Malaysia	891	312	0.21	0.39	4	1.46	0.49	1	0
Mexico	628	177	-0.49	-0.45	1	0.24	0.02	0	1
Netherlands	1036	919	2.30	1.89	2	1.81	0.47	0	1
Norway	580	73	2.07	1.90	4	0.39	0.20	0	1
Pakistan	40	0	-0.94	-0.75	5	0.09	.	1	0
Peru	104	77	-0.16	-0.60	3	0.23	0.04	0	1
Philippines	268	0	-0.53	-0.55	3	0.66	0.00	0	1
Poland	217	63	0.48	0.54	.	0.18	.	0	1
Portugal	227	211	1.37	1.07	3	0.60	0.25	0	1
Russia	54	0	-1.04	-0.99	.	0.22	.	0	1
Singapore	750	578	2.44	1.91	4	1.93	0.18	1	0
South Africa	168	51	0.49	0.15	5	1.77	0.09	1	0
Spain	619	542	1.62	1.29	4	0.84	0.15	0	1
Sweden	964	93	2.43	1.87	3	1.47	0.43	0	1
Switzerland	871	796	2.17	2.11	2	3.03	0.43	0	1
Taiwan	2057	0	0.63	0.76	3	1.02	0.26	0	1
Thailand	888	0	-0.37	0.30	2	0.36	0.12	1	0
Turkey	265	227	-0.36	-0.07	2	0.46	.	0	1
United Kingdom	2571	2316	2.10	1.80	5	1.93	0.20	1	0
United States	13102	11270	1.73	1.79	5	1.64	1.02	1	0

This table shows the number of observations (N meth. 1, N meth. 2) of the countries that are included in the two regression specifications and it presents the values of the indices that are used to split the firms into subgroups by country characteristics. The definitions of the indices are provided in Section 2.2.1.3. A point indicates that for a country the index value is not defined.

2.2.2 Methods

In the cash literature, three distinctly different approaches to estimate the value of cash are pursued. For a higher reliability of our results, we use not only one but two of these methods. We focus on the approach by Pinkowitz et al. (2006) as our main regression specification and consider the approach by Dittmar and Mahrt-Smith (2007) as our main robustness test.[16] The following sections describe these two methods in detail.

2.2.2.1 The Approach by Pinkowitz, Stulz and Williamson (2006)

This estimation method is based on the valuation regressions of Fama and French (1998). Whereas Fama and French (1998) study the influence of debt and dividends on firm value, Pinkowitz et al. (2006) modify their approach to estimate the value of cash. The basic regression specification of Fama and French (1998) is:

$$\begin{aligned}(V_t - A_t) = \alpha &+ \beta_1 E_t + \beta_2 dE_t + \beta_3 dE_{t+2} + \beta_4 dA_t + \beta_5 dA_{t+2} + \beta_6 RD_t \\ &+ \beta_7 dRD_t + \beta_8 dRD_{t+2} + \beta_9 I_t + \beta_{10} dI_t + \beta_{11} dI_{t+2} + \beta_{12} D_t \\ &+ \beta_{13} dD_t + \beta_{14} dD_{t+2} + \beta_{15} dV_{t+2} + \varepsilon_t\end{aligned} \tag{2.2.2}$$

with:

V_t:	Total market value of the firm
A_t:	Book value of total assets
E_t:	Earnings before interest and extraordinary items but after depreciation and taxes
RD_t:	R&D expenditures
I_t:	Interest expenses
D_t:	Total dividends paid
dX_t:	Past two-year change of the variable X, i.e., $X_{t-2} - X_t$
dX_{t+2}:	Future two-year change of the variable X, i.e $X_t - X_{t+2}$

All variables are scaled by total assets (A_t). The dependent variable is the spread of value over cost. The control variables (levels and differences) are included in the model to capture expectations about future earnings and other effects that could influence the value of the firm. To estimate the value of cash, Pinkowitz et al. (2006) modify this regression in some aspects. As a main difference, they split up the change in assets into its cash and non-cash component. Furthermore, they use V_t (scaled by A_t) as the dependent

[16] The approach that is not used in this study is the method of Faulkeneder and Wang (2006). They regress the cash ratio (levels and differences) on the excess stock return.

variable, so that the coefficient of the cash variable can be interpreted as the value of one dollar. Additionally, they use one-year differences instead of two-year differences with the consequence that fewer observations are lost. Taken together, Pinkowitz et al. (2006) use the following regression specification:

$$\begin{aligned} V_t = {} & \alpha + \beta_1 E_t + \beta_2 dE_t + \beta_3 dE_{t+1} + \beta_4 dNA_t + \beta_5 dNA_{t+1} + \beta_6 RD_t \\ & + \beta_7 dRD_t + \beta_8 dRD_{t+1} + \beta_9 I_t + \beta_{10} dI_t + \beta_{11} dI_{t+1} + \beta_{12} D_t + \beta_{13} dD_t \\ & + \beta_{14} dD_{t+1} + \beta_{15} dV_{t+1} + \beta_{16} dC_t + \beta 17 dC_{t+1} + \varepsilon_t \end{aligned} \tag{2.2.3}$$

with:

NA_t: Net assets (book value of total assets minus cash)

C_t: Cash

dX_t: Past one-year change of the variable X_t, i.e., $X_{t-1} - X_t$

dX_{t+1}: Future one-year change of the variable X, i.e., $X_t - X_{t+1}$

The model of Fama and French (1998) includes the leads and lags as proxies for expectations. An increase in cash holdings may also change expectations about future growth. Therefore, Pinkowitz et al. (2006) additionally use another estimation approach where they include the level of cash instead of the differences:

$$\begin{aligned} V_t = {} & \alpha + \beta_1 E_t + \beta_2 dE_t + \beta_3 dE_{t+1} + \beta_4 dNA_t + \beta_5 dNA_{t+1} + \beta_6 RD_t \\ & + \beta_7 dRD_t + \beta_8 dRD_{t+1} + \beta_9 I_t + \beta_{10} dI_t + \beta_{11} dI_{t+1} + \beta_{12} D_t + \beta_{13} dD_t \\ & + \beta_{14} dD_{t+1} + \beta_{15} dV_{t+1} + \beta_{16} C_t + \varepsilon_t \end{aligned} \tag{2.2.4}$$

Since we appreciate this argumentation, we use the second approach as our main regression specification. Nevertheless, we also employ the first method as a robustness check to our results. The descriptive statistics of the data are presented in Table 2.2 (Panel A).[17] The values are very similar to those presented in Pinkowitz and Williamson (2004).

[17] The dividend payments include share repurchases as this is done in Pinkowitz and Williamson (2004) but not in Pinkowitz et al. (2006) and in Fama and French (1998).

Table 2.2: Descriptive Statistics

	Panel A					
variable	N	p10	mean	p50	p90	sd
V	42,746	0.515	1.280	0.962	2.370	1.030
dV(t+1)	42,746	-0.399	0.163	0.045	0.806	0.892
RD	42,746	0.000	0.016	0.000	0.053	0.041
dRD(t)	42,746	-0.001	0.001	0.000	0.005	0.012
dRD(t+1)	42,746	-0.001	0.001	0.000	0.006	0.012
E	42,746	-0.035	0.056	0.062	0.155	0.101
dE(t)	42,746	-0.051	0.007	0.008	0.064	0.064
dE(t+1)	42,746	-0.053	0.010	0.008	0.075	0.069
dNA(t)	42,746	-0.115	0.064	0.054	0.283	0.184
dNA(t+1)	42,746	-0.120	0.095	0.047	0.344	0.255
D	42,746	0.000	0.018	0.009	0.049	0.027
dD(t)	42,746	-0.010	0.002	0.000	0.016	0.020
dD(t+1)	42,746	-0.011	0.003	0.000	0.020	0.023
I	42,746	0.002	0.020	0.016	0.043	0.019
dI(t)	42,746	-0.008	0.001	0.000	0.010	0.010
dI(t+1)	42,746	-0.008	0.001	0.000	0.011	0.011
C	42,746	0.009	0.125	0.073	0.310	0.147
dC(t)	42,519	-0.063	0.006	0.002	0.082	0.080
dC(t+1)	42,587	-0.063	0.012	0.002	0.090	0.093
dispM	29,963	0.023	0.193	0.109	0.458	0.249
V2	25,777	0.937	2.050	1.470	3.630	1.910
dV2(t+1)	25,777	-0.498	0.275	0.083	1.170	1.570
RD	25,777	0.000	0.031	0.000	0.091	0.089
dRD(t)	25,777	-0.001	0.002	0.000	0.009	0.023
dRD(t+1)	25,777	-0.001	0.003	0.000	0.009	0.024
E	25,777	-0.042	0.065	0.076	0.189	0.155
dE(t)	25,777	-0.059	0.010	0.010	0.080	0.102
dE(t+1)	25,777	-0.059	0.014	0.010	0.094	0.102

(continued)

Table 2.2: —*Continued*

	Panel B					
variable	N	p10	mean	p50	p90	sd
dNA(t)	25,777	-0.143	0.066	0.058	0.327	0.231
dNA(t+1)	25,777	-0.144	0.117	0.050	0.414	0.345
D	25,777	0.000	0.024	0.011	0.062	0.037
dD(t)	25,777	-0.013	0.003	0.000	0.020	0.028
dD(t+1)	25,777	-0.014	0.004	0.000	0.024	0.033
I	25,777	0.003	0.021	0.018	0.042	0.019
dI(t)	25,777	-0.008	0.001	0.000	0.010	0.011
dI(t+1)	25,777	-0.008	0.001	0.000	0.011	0.013
C	25,777	0.009	0.177	0.069	0.417	0.345
dC(t)	25,742	-0.071	0.009	0.002	0.098	0.135
dC(t+1)	25,754	-0.071	0.014	0.003	0.109	0.152
dispM	20,089	0.019	0.173	0.088	0.426	0.241
errorF12	19,229	0.000	0.331	0.065	1.020	0.927
lnCash	25,777	-4.700	-2.730	-2.670	-0.875	1.490
realNA	25,777	10.900	13.200	13.000	15.600	1.750
FCF	25,777	-0.070	0.019	0.035	0.119	0.142
NWC	25,777	-0.154	0.059	0.054	0.298	0.191
vola12	25,777	0.054	0.124	0.105	0.219	0.072
RD/sales	25,777	0.000	0.031	0.000	0.083	0.115
MV	25,777	0.871	1.660	1.330	2.830	1.080
SALESg	25,777	-7.240	17.000	9.400	46.500	33.800
leverage	25,777	0.016	0.250	0.239	0.476	0.177
DIVDUM	25,777	0.000	0.714	1.000	1.000	0.452
Capex	25,777	0.017	0.075	0.055	0.155	0.068

The table shows summary statistics (number of observations, 10% and 90% percentile, mean, median, and the standard deviation) of the scaled variables over the 1995 to 2005 period included in our two regression specifications. The variables in Panel A are required for the regression approach by Pinkowitz et al. (2006). The variables in Panel B are required for the regression approach by Dittmar and Mahrt-Smith (2007). The definitions of these variables are provided in Section 2.2.2.2.

Ultimately, we are interested in the value of cash holdings in connection with IA. In order to proxy for this effect, an interaction term (INT) is included in the model. This variable is calculated by multiplying the cash level (C) with the dispersion variable ($dispM$). Additionally, the variable $dispM_{i,t}$ as such is used as an explanatory variable to control for a direct influence of IA on firm value. The model is estimated by running a fixed effects regression. The fixed effects estimator focuses on differences within firms (the within dimension of the data). This is exactly what we need in order to investigate how the value of cash in a firm changes when the degree of IA varies over time. To control for macroeconomic effects, time dummies are included in the model. The preceding argumentation results in the following final model:

$$\begin{aligned} V_{i,t} = {} & \alpha + \beta_1 E_{i,t} + \beta_2 dE_{i,t} + \beta_3 dE_{i,t+1} + \beta_4 dNA_{i,t} + \beta_5 dNA_{i,t+1} \\ & + \beta_6 RD_{i,t} + \beta_7 dRD_{i,t} + \beta_8 dRD_{i,t+1} + \beta_9 I_{i,t} + \beta_{10} dI_{i,t} + \beta_{11} dI_{i,t+1} \\ & + \beta_{12} D_{i,t} + \beta_{13} dD_{i,t} + \beta_{14} dD_{i,t+1} + \beta_{15} dV_{i,t+1} + \beta_{16} C_{i,t} \\ & + \beta_{17} (C \times dispM)_{i,t} + \beta_{18} dispM_{i,t} + \alpha_i + \mu_t + \varepsilon_{i,t} \end{aligned} \tag{2.2.5}$$

The statistical inference is based on Driscoll and Kraay (1998) standard errors.[18] These standard errors are not only heteroscedasticity consistent but they are also robust to very general forms of cross-sectional and temporal dependence. Moreover, robustness to cross-sectional correlation of the error terms of the individual firms is often mentioned (e.g. Fama and French, 1998) as the main advantage of the estimation approach of Fama and MacBeth (1973). Although the Driscoll and Kraay (1998) standard errors are robust to cross-sectional dependence, we additionally estimate the model with the approach of Fama and MacBeth as this method is more commonly used in the literature. By using the Fama-MacBeth procedure, however, one cannot control for unobserved firm effects.

2.2.2.2 The Approach by Dittmar and Mahrt-Smith (2007)

This section describes our second approach used to measure the influence of cash on the value of the firm in the presence of IA. This approach serves as a robustness test to the previous method. It is not used as the main specification for two reasons. First, our Hypothesis 1 is based on the pecking order theory. In a pecking order world there is actually no cash optimum which, however, must be known to calculate the variable

[18] Höchle (2007) shows in a Monte Carlo simulation that the finite sample properties of Driscoll and Kraay's nonparametric covariance matrix estimator are significantly better than those of commonly used alternatives in the case that cross-sectional dependence is present.

"excess cash" that is used in this approach. Second, the calculation of "excess cash" requires more variables that are not available for all firms in the sample and, therefore, more observations drop out of the sample reducing the sample size substantially.

The approach by Dittmar and Mahrt-Smith (2007) is similar to the first method as it also uses the valuation regressions of Fama and French (1998). However, instead of including as the independent variable the actual cash level or the difference, excess cash is calculated beforehand. Specifically, the necessary calculations are laid out as a two-step approach where in the first step the normal level of cash is predicted based on the specification by Opler et al. (1999). The residuals from the prediction regression, i.e., the difference between the actual cash level and the predicted cash ratio, are defined as "excess cash". This name stems from the fact that this level of cash can neither be justified under the transaction cost motive nor under the precautionary motive. The former hypothesis puts forward that a certain level of cash is necessary in order to economize on transaction costs (Keynes, 1936; Miller and Orr, 1966). Transaction costs are determined by characteristics that either increase the probability and costs of cash shortfalls or increase the costs of raising funds. In order to control for this effect, Dittmar and Mahrt-Smith (2007), following Opler et al. (1999), include net assets (total assets minus cash), net working capital, and a proxy for cash flow volatility in their prediction regression.

Apart from the transactions cost motive, a second driving force for holding cash is called the precautionary motive. It is built on the premise that financial slack is valuable if investment opportunities are expected and external finance is prohibitively costly due to adverse selection costs (see, in particular, Myers and Majluf, 1984). This implies that one also has to control for investment opportunities (market-to-book ratio), cash flow, and also for the access to external capital as proxied by firm size (book value of assets in 2000 U.S. dollars). However, as Dittmar and Mahrt-Smith (2007) have postulated, there are endogeneity problems if the raw market-to-book ratio is used to predict the normal level of cash in order to calculate excess cash, and then the latter variable is again used to predict the market-to-book ratio. Dittmar and Mahrt-Smith (2007) picked up on this issue and instrumented the market-to-book ratio with past sales growth ($SALESg$) and then used this instrumented market-to-book ratio in order to predict cash. We endorse their approach and also instrument the market-to-book ratio by the average of last year's and this year's sales growth. However, as a modification to Dittmar and Mahrt-Smith (2007) we also include capital expenditures, leverage, and a dividend dummy into the analysis in order to fully adhere to the standard approach by Opler et al. (1999).[19]

[19] The exception is that Opler et al. (1999) also include a regulation dummy; however, we include sector dummies. Furthermore, as volatility measure we cannot use an industry sigma due to multi-

Furthermore, based on the latter authors we also estimate the prediction regression with the Fama-MacBeth estimation approach.

Therefore, following Opler et al. (1999) and Dittmar and Mahrt-Smith (2007), the regression specification for estimating the optimal level of cash is defined as follows:

$$\begin{aligned}\ln\left(\frac{C_t}{NA_t}\right) = \alpha &+ \beta_1 \ln(realNA_t) + \beta_2 \frac{FCF_t}{NA_t} + \beta_3 \frac{NWC_t}{NA_t} + \beta_4 (Vola12)_t \\ &+ \beta_5 \frac{\hat{MV}_t}{TA_t} + \beta_6 \frac{RD_t}{Sales_t} + \beta_7 \frac{Capex_t}{NA_t} + \beta_8 \frac{Debt_t}{TA_t} \\ &+ \beta_9 DIVDUM_t + SECTDUM + \varepsilon_t\end{aligned} \tag{2.2.6}$$

with:

C_t:	Cash
NA_t:	Net assets (book value of total assets minus cash)
$realNA_t$:	Natural logarithm of net assets in dollar terms for the year 2000
FCF_t:	Operating income after interest and taxes
NWC_t:	Working capital minus cash
$Vola12_t$:	Standard deviation of a firm's monthly stock return over the prior 12 months
$\hat{MV}_t$:	Market value of the firm computed as shares outstanding times price plus total liabilities (instrumented with the average of last year's and this year's sales growth ($SALESg$))
RD_t:	R&D expenditures
$Capex_t$:	Capital expenditures
$Debt_t$:	Total debt (interest bearing)
$DIVDUM_t$:	Dividend dummy which is set equal to one if the firm paid dividends or engaged in share repurchases and it is set equal to zero in all the other cases
$SECTDUM$:	Sector dummies

Excess cash ($ExCash$) is then calculated as the difference between the actual cash ratio and the exponential of the predicted log cash ratio. The descriptive statistics of the data are presented in Table 2.2 (Panel B). The values are broadly in line with those reported in Dittmar and Mahrt-Smith (2007). Having in a first step determined excess cash, Dittmar and Mahrt-Smith (2007) continue by calculating the effects of this variable on the value of the firm. This is of particular interest as excess cash filters out the

collinearity. Hence, we use the standard deviation of the firm's stock price instead as our volatility measure. However, our results remain qualitatively the same if we calculate the volatility of the cash flows averaged over our sectors and instead do not include the sector dummies in the prediction regression.

component of the actual cash ratio that cannot be directly related to operational needs or investment opportunities for the future. Therefore, excess cash is held for discretionary reasons. Consequently, it is especially prone to managerial squandering, as by their very nature liquid assets can more easily be siphoned off when compared to plant or equipment. This means that excess cash is directly related to the free cash flow hypothesis of Jensen (1986). Taken together, as the emphasis of this chapter is to study the value consequences of cash in the presence of IA, excess cash can provide valuable insights in this setting. Like Pinkowitz et al. (2006),[20] Dittmar and Mahrt-Smith (2007) also use the valuation regressions of Fama and French (1998):[21]

$$\begin{aligned} V_{i,t} = {} & \alpha + \beta_1 E_{i,t} + \beta_2 dE_{i,t} + \beta_3 dE_{i,t+1} + \beta_4 dNA_{i,t} + \beta_5 dNA_{i,t+1} \\ & + \beta_6 RD_{i,t} + \beta_7 dRD_{i,t} + \beta_8 dRD_{i,t+1} + \beta_9 I_{i,t} + \beta_{10} dI_{i,t} + \beta_{11} dI_{i,t+1} \\ & + \beta_{12} D_{i,t} + \beta_{13} dD_{i,t} + \beta_{14} dD_{i,t+1} + \beta_{15} dV_{i,t+1} + \beta_{16} ExCash_{i,t} \\ & + \beta_{17} (ExCash \times dispM)_{i,t} + \beta_{18} dispM_{i,t} + \alpha_i + \mu_t + \varepsilon_{i,t} \end{aligned} \tag{2.2.7}$$

The variables have already been defined in Section 2.2.2.1 and the calculation of the variable *ExCash* is outlined above. Following Dittmar and Mahrt-Smith (2007) all variables are scaled by net assets and the valuation regression is only calculated for positive values of excess cash.

2.3 Empirical Tests of the Hypotheses

2.3.1 Results from the Approach by Pinkowitz, Stulz, and Williamson (2006)

Table 2.3 presents the estimation results of the model without IA. It provides a basis for the comparison of the estimated coefficients with those in other studies that do not analyze the influence of IA. Pinkowitz and Williamson (2004) also include fixed effects and Fama-MacBeth estimations for the cash level and cash changes for the whole sample. Most of the coefficients have the expected signs and many are very similar to those in Pinkowitz and Williamson (2004). Nevertheless, there are also numbers that differ

[20] Please refer to Section 2.2.2.1 for details on the valuation regressions of Fama and French (1998).

[21] Dittmar and Mahrt-Smith (2007) argue that they only use the level of excess cash and not the change. One of the most important arguments is that a change in excess cash can potentially come from two sources: either a change in the level of cash or in the prediction regression. Hence, it is difficult to interpret the actual meaning of a change in excess cash. For the full reasoning, please refer to Dittmar and Mahrt-Smith (2007).

strongly. For instance, they present a positive coefficient for the earnings variable (E) in the Fama-MacBeth model compared to a negative one for the fixed effects specification. In contrast, we find in both specifications a positive value. Such differences between the two estimation approaches are somewhat surprising. It could be explained by the fact that the Fama-MacBeth approach cannot control for firm fixed effects. However, we also present a coefficient that gets the opposite sign in each of the two estimation methods. The past change in earnings (E_t) gets a negative sign by the estimation with fixed effects and a positive sign by using the Fama-MacBeth procedure. However, the coefficient with the negative sign is not statistically significant. Interestingly, Pinkowitz and Williamson (2004) also get mixed signs for the variable E_t. While one explanation of this outcome is based on the differences in the model assumptions, we potentially see another reason in the way the changes of the earnings are calculated. Fama and French (1998) include the earnings changes as proxy for the expected growth of profits using two-year changes. Our study is based on Pinkowitz and Williamson (2004) and uses one-year changes having the advantage of more observations but possibly leading to a noisier proxy. In Section 2.3.3 the model is estimated with two-year changes as a robustness test. Additionally, other aspects could also explain why we get some different coefficients if compared to Pinkowitz and Williamson (2004). We estimate with an international sample and not only with U.S. firms. Furthermore, we control for macroeconomic effects by including time dummies. While we so far highlighted differences between the estimation methods, it should be emphasized that the majority of the estimated coefficients are consistent across the two models.

Importantly, the coefficients of interest are the one of cash (C) and that of the cash change (dC_t), respectively. By interpreting the results we focus on the fixed effect specification that includes the level of cash because we consider this method as the most appropriate one. The results of the other specifications are also presented whether the results are robust or not. Additionally, estimations are presented where all U.S. firms are excluded. This is done to check whether the findings are driven by the large fraction of U.S. firms in the sample.The coefficient of cash for the whole sample is 0.696 and it is strongly significant. This figure can be interpreted as the marginal value of one unit of money. The comparable coefficient in Pinkowitz and Williamson (2004) is equal to 1.05. As their sample is not laid out in an international setting, this value should rather be compared with that of Pinkowitz et al. (2006). Unfortunately, they do not present this coefficient for the whole sample but only for subgroups. In addition, they only use the Fama-MacBeth approach for deriving their calculations. Their estimated coefficient of C—depending on the subgroups (high versus low corruption)—ranges between 0.03 and 1.24. Hence, our coefficient lies in this range and is therefore a plausible outcome.

Table 2.3: Estimated Value of Cash

	all firms				non-U.S. firms			
	FixEf.		FMBeth		FixEf.		FMBeth	
	level	diff.	level	diff.	level	diff.	level	diff.
E	2.884***	2.678***	1.785***	1.325***	2.277***	2.204***	1.958***	1.919***
	(27.54)	(15.88)	9.7	(7.92)	(12.10)	(10.11)	(7.13)	(6.63)
dE(t)	-0.082	-0.157***	0.802***	0.808***	-0.220**	-0.269**	0.023	-0.027
	(-1.19)	(-2.93)	(4.12)	(4.02)	(-2.09)	(-2.20)	(0.10)	(-0.12)
dE(t+1)	1.729***	1.499***	1.793***	1.444***	1.118***	1.007***	1.058***	0.971***
	(27.26)	(25.55)	(11.77)	(12.14)	(8.32)	(9.78)	(5.50)	(7.21)
dNA(t)	0.322***	0.302***	0.760***	0.661***	0.255***	0.232***	0.542***	0.452***
	(12.88)	(15.40)	(8.32)	(7.93)	(14.30)	(12.16)	(6.53)	(5.65)
dNA(t+1)	0.588***	0.647***	0.455***	0.544***	0.588***	0.612***	0.469***	0.509***
	(8.42)	(10.06)	(4.42)	(4.93)	(8.52)	(8.92)	(3.90)	(4.05)
RD	4.011***	3.645***	5.672***	7.392***	1.654**	1.659**	6.107***	6.904***
	(18.38)	(12.37)	(13.22)	(14.26)	(2.47)	(2.14)	(9.79)	(10.05)
dRD(t)	1.689***	1.561***	2.585**	2.584**	1.836***	1.578***	2.173	1.981
	(4.83)	(5.17)	(2.68)	(2.34)	(3.85)	(3.19)	(1.76)	(1.60)
dRD(t+1)	6.326***	5.385***	8.643***	9.266***	3.593***	3.369***	7.526***	8.090***
	(10.96)	(15.41)	(8.90)	(10.33)	(12.19)	(11.62)	(8.39)	(9.32)
I	-0.342	-0.848***	0.967	-1.952**	-1.294***	-1.714***	-0.074	-1.555**
	(-1.47)	(-3.28)	(1.39)	(-2.50)	(-3.59)	(-4.66)	(-0.10)	(-2.40)
dI(t)	-1.169***	-1.161***	-0.516	0.090	-0.022	0.058	0.607	1.239**
	(-3.07)	(-3.64)	(-0.49)	(0.13)	(-0.05)	(0.14)	(0.91)	(2.29)
dI(t+1)	-2.861***	-3.577***	-2.739**	-4.334***	-2.073***	-2.623***	-1.525*	-2.416***
	(-9.87)	(-13.88)	(-2.93)	(-4.72)	(-7.41)	(-10.20)	(-2.16)	(-3.85)
D	1.162***	2.032***	7.150***	7.873***	2.229***	2.830***	7.571***	8.156***
	(3.06)	(5.97)	(25.61)	(28.50)	(4.15)	(5.48)	(12.31)	(14.71)

(continued)

Table 2.3: —*Continued*

	all firms				non-U.S. firms			
	FixEf.		FMBeth		FixEf.		FMBeth	
	level	diff.	level	diff.	level	diff.	level	diff.
dD(t)	-0.392**	-0.426**	-2.350***	-1.887***	-0.484**	-0.496***	-1.930***	-1.733***
	(-2.19)	(-2.52)	(-5.32)	(-4.16)	(-2.46)	(-2.59)	(-3.93)	(-3.55)
dD(t+1)	0.623***	0.970***	2.754***	3.507***	0.868***	1.124***	2.846***	3.305***
	(4.51)	(8.62)	(8.65)	(10.00)	(4.63)	(6.88)	(6.54)	(7.47)
dV(t+1)	-0.247***	-0.288***	-0.127	-0.172	-0.263***	-0.289***	-0.170	-0.202
	(-5.67)	(-6.04)	(-1.33)	(-1.63)	(-4.65)	(-4.89)	(-1.37)	(-1.58)
C	**0.696*** **		**1.868*** **		**0.466*** **		**1.104*** **	
	(5.99)		(10.36)		(6.30)		(7.94)	
dC(t)		**0.809*** **		**1.324*** **		**0.552*** **		**0.780*** **
		(17.31)		(5.62)		(9.80)		(3.89)
dC(t+1)		0.997***		1.146***		0.785***		0.830***
		(7.91)		(4.62)		(7.98)		(3.84)
Const.	0.812***	1.021***	0.552***	0.792***	0.787***	0.960***	0.571***	0.695***
	(30.94)	(82.11)	(39.85)	(28.58)	(27.88)	(55.88)	(41.52)	(41.01)
R^2	0.289	0.321	0.397	0.375	0.272	0.291	0.375	0.374
N	42746	42392	42746	42392	29644	29515	29644	29515
Groups	7474	7433	10	10	4991	4981	10	10

This table shows estimation results without IA for fixed effects regressions (FixEf.) and Fama MacBeth regressions (FMBeth) for the cross-country sample over the 1995 to 2005 period. The dependent variable in all specifications is the total market value scaled by total assets. The definitions of all variables are provided in Section 2.2.1.2. Year dummies are included in all specifications, but are not presented. Statistical inference is based on Driscoll and Kraay (1998). t-values are presented in parentheses. The R^2 of the fixed effects regression represents the R^2 of the within dimension. The R^2 of the Fama MacBeth regression is the average value of the R^2 of the single years. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

Considering our results from other estimation methods included in Table 2.3, it becomes obvious that the coefficient of C and dC_t considerably varies with the model. However, by comparing the results of the sample that includes the U.S. firms and the sample without U.S. firms, it can be noticed that the differences between the coefficients based on the two samples are consistently found, i.e., the coefficient of cash (and the change of cash) for the sample with U.S. firms is higher in every specification. This corresponds to the results derived by splitting the sample in other subgroups. Therefore, we do not claim to estimate the effective marginal value of cash. We only claim to be able to roughly evaluate whether the value of cash differs in subgroups and whether the effect of IA on cash is positive or negative. The limitation of the interpretation of the isolated numbers becomes particularly apparent when the scaling of the variables is changed (e.g., net assets instead of total assets). When we change the scale we find qualitatively the same results, but the coefficients of C and dC_t considerably change in some specifications.

Table 2.4 presents the results of the models that include the dispersion of analysts' forecasts ($dispM$) and its interaction with cash. Again, the estimation is carried out for the whole sample as well as for the sample without U.S. firms. The observations for which $dispM$ is not defined drop away. The numbers of groups stay the same because in a first step we exclude all firms for which $dispM$ is not defined in at least one year. In all specifications we find a significantly negative coefficient for the interaction variable. Apparently, the results clearly support our Hypothesis 2 and not Hypothesis 1. That means that the value of cash is not higher when the degree of IA is higher—it is even lower. Thus, the free cash flow problem seems to be more relevant in relation to IA than the advantage of having a liquidity reserve when raising external funds is difficult. To see whether the negative effect of IA on liquidity is also economically significant, we calculate—despite our own reservations—the marginal value of cash and the influence of IA. By including an interaction term in the analysis, the marginal value of cash has to be calculated as follows:

$$\frac{V}{A} = \alpha + ... + \beta_c \frac{C}{A} + \beta_{INT} \left(\frac{C}{A} \times dispM \right) + \beta_{dispM} dispM \tag{2.3.1}$$

$$\frac{\partial \frac{V}{A}}{\partial \frac{C}{A}} = \frac{\partial V}{\partial C} = \beta_c + \beta_{INT} dispM \tag{2.3.2}$$

Table 2.4: Estimated Value of Cash in Relation with IA

	all firms				non-U.S. firms			
	FixEf.		FMBeth		FixEf.		FMBeth	
	level	diff.	level	diff.	level	diff.	level	diff.
E	4.305***	3.983***	2.448***	1.872***	4.299***	4.206***	3.032***	3.106***
	(18.94)	(12.97)	(12.31)	(7.90)	(10.18)	(10.20)	(6.61)	(6.99)
dE(t)	-0.368***	-0.396***	0.789**	0.804**	-0.736***	-0.824***	-0.269	-0.399
	(-3.04)	(-2.94)	(3.15)	(3.07)	(-3.39)	(-3.62)	(-0.92)	(-1.41)
dE(t+1)	2.487***	2.164***	2.339***	1.771***	1.948***	1.736***	1.366***	1.126***
	(23.74)	(22.83)	(14.32)	(12.43)	(10.36)	(11.93)	(6.74)	(7.03)
dNA(t)	0.329***	0.312***	0.819***	0.712***	0.228***	0.228***	0.600***	0.497***
	(9.04)	(10.66)	(8.17)	(7.64)	(11.78)	(11.19)	(5.90)	(5.24)
dNA(t+1)	0.579***	0.646***	0.447***	0.558***	0.568***	0.583***	0.461***	0.510***
	(6.84)	(8.56)	(4.05)	(4.78)	(7.07)	(7.49)	(3.72)	(3.89)
RD	5.022***	4.280***	5.833***	7.660***	0.979	0.718	5.655***	6.602***
	(19.19)	(11.87)	(10.24)	(11.84)	(1.18)	(0.82)	(7.40)	(7.65)
dRD(t)	1.104**	1.296***	2.195**	2.496**	2.405***	2.281***	3.469**	3.015*
	(2.06)	(2.69)	(2.79)	(2.42)	(4.17)	(4.00)	(2.46)	(1.99)
dRD(t+1)	6.568***	5.454***	8.700***	9.454***	3.025***	2.736***	6.960***	7.736***
	(8.90)	(9.74)	(8.39)	(8.61)	(3.59)	(3.42)	(5.93)	(6.78)
I	-1.318**	-1.706***	0.738	-2.857***	-2.564***	-2.836***	-1.077	-2.992***
	(-2.44)	(-2.64)	(1.01)	(-4.26)	(-4.74)	(-5.58)	(-1.18)	(-3.98)
dI(t)	-0.728	-0.774	-0.590	0.422	1.284**	1.253***	1.719**	2.673***
	(-1.56)	(-1.53)	(-0.44)	(0.48)	(2.46)	(2.61)	(2.28)	(4.01)
dI(t+1)	-3.571***	-4.413***	-2.997**	-5.126***	-2.606***	-3.147***	-1.085	-2.237**
	(-9.35)	(-12.20)	(-2.97)	(-5.02)	(-5.82)	(-7.50)	(-1.02)	(-2.43)
D	0.088	1.152***	6.740***	7.470***	0.629	1.337***	7.197***	7.777***
	(0.20)	(3.13)	(20.94)	(20.69)	(1.25)	(2.93)	(12.06)	(15.53)

(continued)

Table 2.4: —*Continued*

	all firms				non-U.S. firms			
	FixEf. (level/diff.)		FMBeth (level/diff.)		FixEf. (level/diff.)		FMBeth (level/diff.)	
dD(t)	-0.324 (-1.37)	-0.367* (-1.78)	-2.478*** (-5.13)	-1.853*** (-3.77)	-0.299 (-0.98)	-0.349 (-1.13)	-1.945*** (-4.82)	-1.673*** (-3.86)
dD(t+1)	0.102 (0.55)	0.571*** (3.04)	2.483*** (7.50)	3.393*** (8.65)	0.201 (0.62)	0.494 (1.63)	2.763*** (5.25)	3.263*** (6.12)
dV(t+1)	-0.272*** (-5.66)	-0.305*** (-6.09)	-0.142 (-1.44)	-0.178 (-1.62)	-0.280*** (-4.64)	-0.298*** (-4.86)	-0.186 (-1.35)	-0.209 (-1.46)
dispM	**0.009** (0.42)	**-0.062***** (-4.71)	**-0.033** (-1.00)	**-0.052** (-1.27)	**0.036** (1.28)	**-0.063***** (-3.21)	**0.179***** (3.77)	**0.160**** (3.01)
C	**0.782***** (4.50)		**2.118***** (10.84)		**0.391***** (4.53)		**1.308***** (6.48)	
dC(t)		**1.007***** (12.03)		**2.050***** (6.08)		**0.695***** (7.61)		**1.436***** (4.78)
dC(t+1)		1.009*** (6.88)		1.220*** (4.60)		0.803*** (6.87)		0.847*** (3.95)
C×dispM	**-0.594***** (-3.34)		**-0.326*** (-1.96)		**-1.041***** (-10.24)		**-0.512**** (-2.45)	
dC(t+1)×dispM		**-1.149***** (-5.99)		**-3.400***** (-6.12)		**-0.885***** (-6.52)		**-2.544***** (-4.30)
Const.	0.925*** (21.51)	1.016*** (45.24)	0.535*** (29.21)	0.815*** (36.81)	0.751*** (21.93)	0.945*** (36.47)	0.494*** (24.92)	0.629*** (27.21)
R^2	0.346	0.376	0.433	0.409	0.334	0.351	0.426	0.424
N	29963	29708	29963	29708	19661	19585	19661	19585
Groups	7474	7412	10	10	4991	4970	10	10

Estimation results with IA for fixed effects regressions (FixEf.) and Fama MacBeth regressions (FMBeth) over the 1995 to 2005 period. The dependent variable in all specifications is the total market value scaled by total assets. Definitions of all variables are provided in Section 2.2.1.2. Year dummies are included, but are not presented. Statistical inference is based on Driscoll and Kraay (1998). *t*-values are presented in parentheses. The R^2 of the fixed effects regression represents the R^2 of the within dimension. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

Considering the results of the fixed effects estimation with the cash level, the coefficient of C is 0.782 and that of the interaction is -0.594. Based on the median value of *dispM* (0.109, see Table 2.2) the marginal value of cash is 0.717. An increase in the degree of IA of one standard deviation (0.249, see Table 2.2) results in a marginal value of cash that is 0.148 units of money lower, i.e., the marginal value amounts to 0.569. We conclude that the negative effect of IA on cash is substantial. To control for the direct influence of the dispersion on the firm value, we also included the variable *dispM* by itself. We did not formulate an explicit expectation on the coefficient of this variable. The results reveal that there is no clear relationship. In some specifications it is negative; in others it is positive. The negative relationship can be explained by the fact that IA in general is something unfavorable. Another explanation could be based on a possible correlation with a firm's risk. A possible reason for a positive result could be related to the model of Miller (1977). He argues that under certain assumptions a higher divergence of opinions among investors tends to increase the market value of securities as only the most optimistic investors engage in trading.[22]

In Table 2.5 we present the results of our more detailed analysis by splitting the sample according to firm characteristics. First, we examine splits by the firm size (measured with total assets) and by the payout ratio to test the impact of financial constraints. Second, the sample is split by the proportion of inside ownership (closely held shares) to test for an influence of the corporate governance structure. Considering the results of the fixed effects estimation, we can conclude that cash has a higher value for small firms (smaller than the median firm) than for large firms (larger than the median firm). This is consistent with the idea that large firms can more easily access financial markets, but the result is not robust. The estimation with the Fama-MacBeth method does not confirm this finding, but that does not pose a problem as we are primarily interested in the coefficient of the interaction term, for which we are able to present more robust results. The negative effect of IA on cash is less strong (or does not even exist) for small firms. Supposedly, the negative effect of IA on cash (as predicted by Hypothesis 2) is to some extent canceled out by an opposite effect, i.e., cash is more important in periods with higher IA (as predicted by Hypothesis 1). When the payout ratio is used as proxy for the degree of financial constraints, we again find that cash is more valuable for firms that face financing constraints. The results for the interaction variable are mixed. Based on the split by the payout ratio we cannot conclude that there is an opposite effect as discussed before. The final split by firm characteristics results in three groups. In the choice of the cut-off levels (0–5%, 5–25%, and 25% or more) we follow Morck et al. (1988) (see also Opler et al., 1999, for these cut-off levels). Thus, we expect that cash has less value

[22] Diether et al. (2002) provide evidence for this model.

and that IA has a more negative impact for firms with inside ownership between 5% and 25% due to an entrenchment effect. Firms with such a high proportion of managerial ownership could suffer more from agency conflicts because the managers could fleece the shareholders more easily. Yet, in most specifications we find that cash has more value in the middle range, contrary to the prediction. Thus, the findings indicate that in the middle range an incentive effect is prevalent rather than an entrenchment effect and it is in line with the results of McConnell and Servaes (1990). They find a positive relationship between the firm value and the inside ownership up to a fraction of about 45%. The relationship between the coefficient of the interaction variable and the proportion of the closely held shares is not that clear. We can only detect a tendency that the negative influence of IA is most pronounced for firms featuring a low managerial shareholding.

Table 2.5: Estimated Value of Cash in Different Subgroups (Firm Characteristics)

		all firms		non-U.S. firms		U.S. firms	
		FixEf.	FMBeth	FixEf.	FMBeth	FixEf.	FMBeth
large firms	C	0.467***	2.249***	0.176	1.454***	1.114***	3.647***
		(2.68)	(8.47)	(1.63)	(5.62)	(3.35)	(9.33)
	C×dispM	-1.018***	-0.524	-1.307***	-1.539*	0.423	2.181*
		(-4.32)	(-0.58)	(-4.38)	(-2.04)	(1.10)	(2.04)
	N	14979	14979	10432	10432	4547	4547
	Groups	3761	10	2760	10	1007	10
small firms	C	0.844***	1.919***	0.335**	1.088***	1.167***	2.117***
		(4.08)	(9.38)	(2.18)	(6.32)	(4.50)	(9.88)
	C×dispM	-0.281	-0.166	-0.463***	0.175	0.041	-0.033
		(-1.20)	(-0.41)	(-3.49)	(0.54)	(0.13)	(-0.08)
	N	14984	14984	9229	9229	5755	5755
	Groups	4720	10	2799	10	1926	10
payout ratio high	C	0.241	0.820***	0.173	0.730***	0.219	1.016***
		(1.39)	(4.96)	(1.10)	(5.41)	(0.78)	(4.06)
	C×dispM	-0.250	-1.631**	-0.299*	-1.299**	0.904***	-1.353**
		(-0.79)	(-2.58)	(-1.73)	(-2.42)	(3.13)	(-2.72)
	N	14862	14862	11095	11095	3767	3767
	Groups	4434	10	3322	10	1114	10
payout ratio low	C	1.145***	2.780***	0.770***	1.969***	1.416***	3.016***
		(4.75)	(10.36)	(3.41)	(5.80)	(5.37)	(11.04)
	C×dispM	-0.658***	-1.036***	-1.367***	-1.280***	0.062	-0.350
		(-2.82)	(-5.93)	(-5.83)	(-4.73)	(0.24)	(-1.12)

(continued)

Table 2.5: —*Continued*

		all firms		non-U.S. firms		U.S. firms	
		FixEf.	FMBeth	FixEf.	FMBeth	FixEf.	FMBeth
	N	14867	14867	8372	8372	6495	6495
	Groups	5524	10	3374	10	2156	10
inside ownership	C	0.990*** (5.41)	2.247*** (6.09)	0.529* (1.80)	1.078* (1.84)	1.308*** (5.59)	2.669*** (7.78)
0-5%	C×dispM	-1.251** (-2.45)	0.322 (0.27)	-3.038*** (-5.21)	0.489 (0.25)	-1.212* (-1.73)	-0.369 (-0.33)
	N	3326	3326	966	966	2360	2360
	Groups	1144	10	410	10	734	10
inside ownership	C	1.042*** (4.26)	2.671*** (9.79)	-0.061 (-0.29)	1.351** (3.20)	1.463*** (4.83)	2.924*** (9.25)
5-25%	C×dispM	-0.501** (-2.28)	0.621 (1.15)	-1.899*** (-3.37)	1.276 (1.23)	0.105 (0.49)	0.742 (1.13)
	N	6559	6559	2809	2809	3750	3750
	Groups	2563	10	1175	10	1389	10
inside ownership	C	0.286*** (2.61)	1.974*** (11.40)	0.239** (2.15)	1.092*** (7.63)	0.600 (1.53)	2.842*** (9.57)
+25%	C×dispM	-0.284 (-1.14)	-0.851*** (-3.67)	-0.911*** (-4.20)	-1.438*** (-3.25)	0.436 (1.55)	-0.524 (-1.33)
	N	14787	14787	10857	10857	3930	3930
	Groups	4793	10	3260	10	1537	10

This table shows estimation results without IA for fixed effects regressions (FixEf.) and FamaMacBeth regressions (FM-Beth) for different sub-samples over the 1995 to 2005 period. The dependent variable in all specifications is the total market value scaled by total assets. Year dummies and different variables on firm characteristics (as in Table 2.2 and 2.3) are included in all specifications, but are not presented for brevity reasons. The definitions of all variables are provided in Section 2.2.1.2. Statistical inference is based on Driscoll and Kraay (1998). *t*-values are presented in parentheses. . ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

We now turn to the estimation results included in Table 2.6 where we split the sample by proxies for the corporate governance and financing practices at the country level. The first three splits are based on three indices that were described in Section 2.2.1.3, i.e., the rule of law index, the anti-director-rights index and the corruption index. For each index, the sample is divided into two groups according to a higher (lower) index value than the median country. A higher index value indicates that a country has better corporate governance practices. With very few exceptions we find exactly what we expected. The coefficient of cash is higher (with one exception) for firms located in countries with a higher index value and the negative influence of IA on cash is stronger for firms in countries with a lower index value (also with one exception). This result supports the

idea that IA is more problematic for firms operating in countries with lower corporate governance standards.

The next two splits are based on the financing practices of the countries. We use the stock market capitalization and that of the private bond market, respectively, divided by the gross domestic product as measurement for the financing practices. We expect that in countries with a lower level of those ratios, internal financing is more important and hence cash holdings play a major role. If we were to find a less negative coefficient of the interaction term or even a positive relationship between cash and IA, we would interpret this result as supporting our Hypothesis 1. Surprisingly, we find exactly the opposite. The coefficient of cash and the coefficient of the interaction term are generally smaller for firms in countries with a lower ratio. Therefore, we cannot corroborate our Hypothesis 1. We put forward two reasons for this finding. The first explanation is based on the correlation of a country's financing and its corporate governance practices. Common law countries are typically market-based countries and we can expect that these countries have a higher ratio of bond and stock capitalization to GDP than civil law countries. At the same time, investors generally are better protected in common law countries (La Porta et al., 2000). Our other explanation is based on the role of IA in capital markets and the role of financial intermediaries. Civil law countries are rather bank-based and, therefore, financial intermediaries play a decisive role. Financial intermediaries can be considered as a natural response to IA (Leland and Pyle, 1977). In contrast to shareholders and bondholders, banks know more about a company's prospects because banks have more information sources than the average market participant. Hence, the adverse selection problem is less important for banks than for other investors. Consequently, in market-based countries where firms typically access financial markets to raise funds, IA is more problematic. Thus, our Hypothesis 1 (cash has more value when IA is high) should be more important for common law countries and this could be reflected in the less negative interaction term, which is not even significant in most specifications.

Table 2.6: Estimated Value of Cash in Different Subgroups (Country Characteristics)

		all firms		non-U.S. firms	
		FixEf.	FMBeth	FixEf.	FMBeth
rule of law index high	C	0.883*** (4.92)	2.427*** (11.10)	0.426*** (4.97)	1.481*** (5.56)
	C×dispM	-0.497** (-2.54)	-0.062 (-0.24)	-0.998*** (-6.93)	0.016 (0.05)

(continued)

Table 2.6: —*Continued*

		all firms		non-U.S. firms	
		FixEf.	FMBeth	FixEf.	FMBeth
	N	23240	23240	12938	12938
	Groups	5470	10	2986	10
rule of law index low	C	0.374** (2.34)	0.950*** (5.34)	0.374** (2.34)	0.950*** (5.34)
	C×dispM	-1.281*** (-4.62)	-1.674*** (-3.50)	-1.281*** (-4.62)	-1.674*** (-3.50)
	N	6723	6723	6723	6723
	Groups	2011	10	2011	10
anti-director rights index high	C	1.028*** (4.99)	2.471*** (10.82)	0.533*** (6.12)	1.213*** (5.18)
	C×dispM	-0.269 (-1.14)	0.055 (0.20)	-0.996*** (-3.66)	-0.008 (-0.02)
	N	17246	17246	6944	6944
	Groups	4217	10	1726	10
anti-director rights index low	C	0.250** (2.16)	1.353*** (4.79)	0.250** (2.16)	1.353*** (4.79)
	C×dispM	-0.985*** (-5.26)	-0.721* (-1.95)	-0.985*** (-5.26)	-0.721* (-1.95)
	N	11966	11966	11966	11966
	Groups	3048	10	3048	10
corruption index high	C	0.883*** (4.92)	2.427*** (11.10)	0.426*** (4.97)	1.481*** (5.56)
	C×dispM	-0.497** (-2.54)	-0.062 (-0.24)	-0.998*** (-6.93)	0.016 (0.05)
	N	23240	23240	12938	12938
	Groups	5470	10	2986	10
corruption index low	C	0.374** (2.34)	0.950*** (5.34)	0.374** (2.34)	0.950*** (5.34)
	C×dispM	-1.281*** (-4.62)	-1.674*** (-3.50)	-1.281*** (-4.62)	-1.674*** (-3.50)
	N	6723	6723	6723	6723
	Groups	2011	10	2011	10
stock/gdp high	C	0.852*** (4.57)	2.357*** (10.95)	0.378*** (3.54)	1.452*** (5.62)
	C×dispM	-0.436** (-2.43)	-0.071 (-0.29)	-0.861*** (-7.40)	-0.017 (-0.06)

(continued)

Table 2.6: —*Continued*

		all firms		non-U.S. firms	
		FixEf.	FMBeth	FixEf.	FMBeth
	N	24886	24886	14584	14584
	Groups	5943	10	3458	10
stock/gdp low	C	0.373*** (6.90)	1.034*** (10.15)	0.373*** (6.90)	1.034*** (10.15)
	C×dispM	-1.378*** (-5.59)	-1.338*** (-3.82)	-1.378*** (-5.59)	-1.338*** (-3.82)
	N	5077	5077	5077	5077
	Groups	1539	10	1539	10
bond/gdp high	C	0.814*** (3.88)	2.430*** (11.45)	0.097 (0.73)	1.418*** (4.87)
	C×dispM	-0.497** (-2.48)	-0.276 (-1.54)	-0.863*** (-5.01)	-0.179 (-0.50)
	N	22494	22494	12192	12192
	Groups	5528	10	3044	10
bond/gdp low	C	0.619*** (3.71)	1.032*** (5.36)	0.619*** (3.71)	1.032*** (5.36)
	C×dispM	-0.701*** (-2.67)	-1.206* (-2.12)	-0.701*** (-2.67)	-1.206* (-2.12)
	N	6995	6995	6995	6995
	Groups	1788	10	1788	10
common law	C	1.045*** (4.89)	2.491*** (10.60)	0.517*** (3.96)	1.164*** (4.69)
	C×dispM	-0.215 (-0.91)	0.078 (0.27)	-0.859*** (-3.05)	-0.053 (-0.13)
	N	16008	16008	5706	5706
	Groups	3981	10	1490	10
civil law	C	0.283*** (2.70)	1.345*** (5.28)	0.283*** (2.70)	1.345*** (5.28)
	C×dispM	-1.048*** (-6.94)	-0.618* (-2.02)	-1.048*** (-6.94)	-0.618* (-2.02)
	N	13955	13955	13955	13955
	Groups	3506	10	3506	10

This table shows estimation results without IA for fixed effects regressions (FixEf.) and FamaMacBeth regressions (FMBeth) for different sub-samples over the 1995 to 2005 period. The dependent variable in all specifications is the total market value scaled by total assets. Year dummies and different variables on firm characteristics (as in Table 2.2 and 2.3) are included in all specifications, but are not presented for brevity reasons. The definitions of all variables are provided in Section 2.2.1.2. Statistical inference is based on Driscoll and Kraay (1998). *t*-values are presented in parentheses. . ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

2.3.2 Results from the Approach by Dittmar and Mahrt-Smith (2007)

In Table 2.7 we report the results from estimating the Fama and French (1998) valuation regression for firms that experience a positive value of excess cash (refer to Section 2.2.2.2). The results are estimated with fixed effects regressions (our standard model) and as a double check we also run Fama-MacBeth regressions. In order to control for a U.S. effect, the results are also shown without North American firms. The value for *ExCash* is statistically and economically significant. Specifically, the marginal value of excess cash is positive and significant at the one percent level for all specifications. Focusing on the results from the fixed effects estimator, the coefficient of *ExCash* amounts to 1.905 which means that one dollar put into excess cash increases the firm value by more than its par value. These results point to a value-enhancing role of excess cash and they are comparable to other studies in this field, e.g., Dittmar and Mahrt-Smith (2007) who find a value for excess cash of 2 to 3 dollars depending on the governance proxy used.[23]

However, as outlined above the emphasis of our study is placed on investigating the value consequences of cash in the presence of IA. Therefore, in Table 2.7 the models also include the dispersion of analysts' earnings forecasts (*dispM*) as our measure for IA. In order to study the combined effect of excess cash and IA, an interaction variable is also included in the model. Our results reveal that the coefficient on the interaction term is negative and significant in all but one specification. Importantly, we find that IA decreases the marginal benefit of holding excess cash. This means that the empirical evidence corroborates our Hypothesis 2. In order to illustrate the detrimental value effect of IA, we calculate the marginal value of excess with IA for the fixed effects calculations (see Section 2.3.1). In Table 2.7 the stand-alone coefficient on *ExCash* amounts to 1.905. However, if IA is taken into account, the marginal value of excess cash is reduced to a value of 1.863 (based on a median value of *dispM* of 0.088 according to Table 2.2 (Panel B).[24] And if we now increase the IA by one standard deviation [0.241, see Table 2.2 (Panel B)], the marginal value of excess cash decreases by 0.115 (6.2%) money units to a low level of 1.747.[25] Therefore, these results can be interpreted as a valuation discount placed on firms where IA constitutes a problem and the evidence clearly supports our Hypothesis 2. This means that the agency costs from the free-cash flow theory dominate

[23] Dittmar and Mahrt-Smith (2007) abstain from interpreting the stand-alone coefficient on excess cash as they argue that excess cash could still be afflicted with endogeneity and hence they only focus on the interpretation of their interaction term (excess cash times governance index).

[24] The calculation is done as follows: $1.905 + (-0.479) \times 0.088$. For more information on the calculation of the marginal value of cash, please refer to Section 2.3.1.

[25] The calculation is done as follows: $1.905 + (-0.479) \times (0.088 + 0.241)$.

any supposed cost savings from the availability of internal capital.

The empirical models presented thus far provided a first attempt to investigate whether IA impacts the value effect of cash holdings. However, for the sake of distinguishing more accurately between our two conflicting hypotheses, we split the sample into subgroups based on corporate governance (related to the free cash flow theory) and financing constraints (related to Myers and Majluf (1984) adverse selection problem) (for details refer to 2.2.1.3).[26]

Table 2.7: Estimated Value of Excess Cash in Relation with IA

	all firms		non-U.S. firms	
	FixEf.	FMBeth	FixEf.	FMBeth
E	5.440***	2.337***	5.223***	3.207***
	(24.76)	(5.47)	(14.52)	(5.34)
dE(t)	-0.057	1.894***	-0.511*	0.17
	(-0.61)	(5.18)	(-1.68)	(0.39)
dE(t+1)	3.281***	2.681***	2.089***	0.858
	(12.91)	(8.26)	(4.58)	(1.42)
dNA(t)	0.351***	1.076***	0.176***	0.421***
	(2.74)	(8.05)	(3.49)	(4.62)
dNA(t+1)	0.697***	0.634***	0.484***	0.483**
	(6.13)	(4.18)	(3.70)	(2.37)
RD	10.748***	8.183***	8.268***	6.627***
	(6.56)	(11.57)	(3.52)	(5.90)
dRD(t)	-2.088	0.498	0.668	4.338
	(-1.46)	(0.28)	(0.59)	(1.54)
dRD(t+1)	8.260***	9.044***	4.227**	7.444***
	(9.89)	(4.80)	(2.15)	(5.47)
I	-0.775	-4.560***	-2.846	-5.307***
	(-0.73)	(-4.23)	(-1.21)	(-4.99)
dI(t)	0.586	-1.327	3.311***	3.233***
	(0.71)	(-0.65)	(2.83)	(3.51)
dI(t+1)	-2.381***	-8.829***	-1.663	-3.851*
	(-3.49)	(-6.51)	(-1.55)	(-2.09)
D	-2.130***	4.492***	0.511	4.868***
	(-5.12)	(10.51)	(0.94)	(7.14)
dD(t)	-0.215	-2.553**	-0.296	-1.787**
	(-0.76)	(-2.89)	(-0.71)	(-3.21)

(continued)

[26] The only difference to the classifications taken for the actual cash ratio is that in the case of excess cash we abstain from grouping firms along the dimension of size and the payout ratio as these two characteristics are endogenously related to the computation of excess cash and the ownership split is also omitted as the results have turned out to be not significant for the actual cash ratio.

Table 2.7: —*Continued*

	all firms		non-U.S. firms	
	FixEf.	FMBeth	FixEf.	FMBeth
dD(t+1)	-1.169***	0.781	0.159	1.294
	(-8.78)	(1.06)	(1.07)	(1.67)
dV(t+1)	-0.274***	-0.136	-0.154*	-0.048
	(-4.09)	(-1.26)	(-1.78)	(-0.29)
dispM	-0.007	-0.034	0.04	0.131
	(-0.16)	(-0.29)	(0.66)	(1.29)
ExCash	1.905***	3.083***	1.299***	2.036***
	(8.84)	(14.82)	(7.41)	(9.78)
ExCash×dispM	-0.479**	-0.42	-0.776***	-1.016**
	(-2.23)	(-0.49)	(-2.80)	(-2.35)
Const.	1.182***	1.063***	0.948***	1.019***
	(14.83)	(21.59)	(19.28)	(28.36)
R^2	0.444	0.589	0.362	0.617
N	10876	10876	6569	6569
Groups	3455	10	1895	10

Fixed effects regressions (with year dummies) and Fama MacBeth regressions (1995 to 2005). The dependent variable is the total market value scaled by net assets. The explanatory variables are defined in Section 2.2.1.3. *t*-values (Driscoll and Kraay, 1998) are presented in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

The results are reported in Table 2.8. Accordingly, the first corporate governance grouping is based on the rule of law index (corporate governance variable at the country level). A first glimpse at the results reveals that they correspond to our expectations. The evidence for the interaction term further confirms our Hypothesis 2 as the interaction term is significantly more negative in low rule of law countries. This means that IA significantly decreases the value of cash and this effect is even more pronounced if the governance environment is weak. Moreover, this result is further emphasized by investigating the evidence for the anti-director-rights index, which is a further corporate governance split at the country level. In line with the previous discussion, the marginal value of excess cash is significantly decreased if the shareholder protection is weak. Accordingly, this result further enforces Jensen's (1986) free cash flow theory. The evidence for the corruption index also points in the same direction. The interaction term for high corruption countries (low corruption index) is negative and relatively higher in absolute terms (-2.563) than the interaction term if corruption is relatively low (-0.283). This means that a) IA decreases the value of cash and b) that this effect is even more pronounced if the external governance environment is weak. The last split of governance at the country-level (common law countries versus civil law countries) reveals that according to expectations the coefficient on *ExCash* is lower in civil law countries (0.934) versus common law countries. This

confirms the results by La Porta et al. (1998) indicating that the governance environment in countries with a civil law tradition is weaker. This result is also confirmed by the interaction term, which is significantly negative in civil-law countries and not significant, albeit still negative, in common-law countries. Taken together, the splits according to corporate governance measures further emphasize that the free cash flow theory of Jensen (1986) is the common denominator between the results because the coefficient on *ExCash* is lower in a low governance environment as well as the interaction being more negative if the governance is weaker.

Table 2.8: Estimated Value of Cash in Different Subgroups (Country Characteristics)

		all firms		non-U.S. firms	
		FixEf.	FMBeth	FixEf.	FMBeth
rule of law index high	ExCash	1.952*** (6.59)	3.172*** (12.55)	1.165*** (5.82)	2.164*** (7.76)
	ExCash×dispM	-0.317* (-1.70)	0.194 (0.16)	-0.258 (-0.89)	-1.175* (-1.89)
	N	8513	8513	4206	4206
	Groups	2768	10	1207	10
rule of law index low	ExCash	1.403*** (5.68)	1.738*** (5.77)	1.403*** (5.68)	1.738*** (5.77)
	ExCash×dispM	-1.982*** (-5.28)	-0.112 (-0.10)	-1.982*** (-5.28)	-0.112 (-0.10)
	N	2363	2363	2363	2363
	Groups	688	10	688	10
anti-director rights index high	ExCash	2.155*** (6.17)	3.370*** (13.27)	1.948*** (6.76)	2.435*** (6.29)
	ExCash×dispM	-0.26 (-1.15)	0.051 (0.04)	-1.241 (-1.51)	-0.552 (-0.42)
	N	6578	6578	2271	2271
	Groups	2288	10	723	10
anti-director rights index low	ExCash	0.929*** (7.56)	1.884*** (8.93)	0.929*** (7.56)	1.884*** (8.93)
	ExCash×dispM	-0.446** (-2.27)	-1.478** (-2.71)	-0.446** (-2.27)	-1.478** (-2.71)
	N	4295	4295	4295	4295
	Groups	1170	10	1170	10

(continued)

Table 2.8: —*Continued*

		all firms		non-U.S. firms	
		FixEf.	FMBeth	FixEf.	FMBeth
corruption index high	ExCash	1.929*** (6.34)	3.180*** (12.71)	0.977*** (5.70)	2.078*** (8.28)
	ExCash×dispM	-0.283 (-1.45)	0.193 (0.16)	-0.034 (-0.11)	-0.941 (-1.49)
	N	8442	8442	4135	4135
	Groups	2769	10	1208	10
corruption index low	ExCash	1.802*** (4.42)	1.895*** (5.72)	1.802*** (4.42)	1.895*** (5.72)
	ExCash×dispM	-2.563*** (-5.54)	-0.367 (-0.36)	-2.563*** (-5.54)	-0.367 (-0.36)
	N	2434	2434	2434	2434
	Groups	689	10	689	10
stock/gdp high	ExCash	1.948*** (7.48)	3.170*** (13.26)	1.041*** (9.35)	2.086*** (12.44)
	ExCash×dispM	-0.329 (-1.41)	0.115 (0.11)	-0.457 (-1.51)	-0.181 (-0.29)
	N	8738	8738	4431	4431
	Groups	2819	10	1258	10
stock/gdp low	ExCash	1.643*** (3.67)	1.975*** (3.88)	1.643*** (3.67)	1.975*** (3.88)
	ExCash×dispM	-1.912** (-2.27)	-2.910* (-2.11)	-1.912** (-2.27)	-2.910* (-2.11)
	N	2138	2138	2138	2138
	Groups	639	10	639	10
bond/gdp high	ExCash	1.861*** (6.71)	3.138*** (13.84)	0.748*** (8.19)	1.769*** (8.67)
	ExCash×dispM	-0.325 (-1.26)	-0.171 (-0.18)	-0.291 (-1.37)	-1.164* (-2.05)
	N	8285	8285	3978	3978
	Groups	2623	10	1061	10
bond/gdp low	ExCash	1.847*** (5.80)	2.199*** (5.84)	1.847*** (5.80)	2.199*** (5.84)
	ExCash×dispM	-1.194* (-1.67)	0.063 (0.06)	-1.194* (-1.67)	0.063 (0.06)
	N	2454	2454	2454	2454
	Groups	787	10	787	10

(continued)

Table 2.8: —*Continued*

		all firms		non-U.S. firms	
		FixEf.	FMBeth	FixEf.	FMBeth
common law	ExCash	2.157*** (6.00)	3.344*** (13.11)	1.934*** (6.11)	2.525*** (6.24)
	ExCash×dispM	-0.197 (-0.88)	0.155 (0.11)	-0.986 (-1.11)	-1.251 (-0.92)
	N	6256	6256	1949	1949
	Groups	2191	10	626	10
civil law	ExCash	0.934*** (7.79)	1.910*** (8.95)	0.934*** (7.79)	1.910*** (8.95)
	ExCash×dispM	-0.492** (-2.55)	-1.476** (-2.69)	-0.492** (-2.55)	-1.476** (-2.69)
	N	4620	4620	4620	4620
	Groups	1269	10	1269	10

This table shows estimation results without IA for fixed effects regressions (FixEf.) and FamaMacBeth regressions (FM-Beth) for different sub-samples over the 1995 to 2005 period. The dependent variable in all specifications is the total market value scaled by total assets. Year dummies and different variables on firm characteristics (as in Table 2.2 and 2.3) are included in all specifications, but are not presented for brevity reasons. The definitions of all variables are provided in Section 2.2.1.2. Statistical inference is based on Driscoll and Kraay (1998). *t*-values are presented in parentheses. . ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

Finally, the results for the splits according to financing constraints at the country-level (stock/gdp and bond/gdp) should proxy for the fact that in countries where the capital market is less developed, i.e., lower stock/gdp and/or lower bond/gdp, hoarding cash becomes more important as external finance is harder to obtain. This means that we expect that in countries where the capital market development is lower, the coefficient on *ExCash* is higher and the interaction term is relatively less negative. However, this prediction is not borne out by our data. For both measures of the capital market development (stock/gdp and bond/gdp) the coefficient on *ExCash* is lower for more constrained countries and the interaction term is only significantly negative in the same environment. One explanation of this result is that our proxy for the capital market development is imperfect as there is a high correlation between the country law tradition (civil law versus common law) and our capital market development measures. In effect, stock/gdp and bond/gdp are then actually proxies for the governance environment and hence, to a lesser extent, measures for the capital market development.

In a nutshell, the results provide an overwhelming view that IA decreases the value of cash, which is in line with Jensen's (1986) free cash flow argument and which corresponds to our Hypothesis 2. On the other hand, the results consequently do not confirm Myers and Majluf's (1984) argumentation for the value benefits of financial slack (our Hypothesis 1).

2.3.3 Robustness Tests

To further test the robustness of our main result, we alter the specification of our estimations as well as the definition of some variables. The coefficients of interest are presented in Table 2.9. For brevity, we only report (with one exception) the results of the fixed effects estimation with the level of cash. For the ease of comparison, Panel A of Table 2.9 shows again the coefficients of cash and the interaction variable as they were presented in the first column of Table 2.4. The other panels show the results of the robustness tests where we changed some parameters of the estimations as described subsequently:

- *Panel B:* As discussed above, the valuation regression used in this study is based on Fama and French (1998). While they use two-year changes for the calculation of those explanatory variables that capture differences, we followed in our main specification Pinkowitz et al. (2006) and Dittmar and Mahrt-Smith (2007) who only use one-year changes. By using two-year changes the sample becomes smaller, but we still find a clear negative influence of IA on the value of cash.

- *Panel C:* We estimate the regression without including time dummies. The coefficients and the statistical inference do not change considerably.

- *Panel D:* In this specification we estimated the model with ordinary least squares and cluster robust standard errors (Arellano (1987), Rogers (1993)). The coefficient of C changes considerably, that of the interaction variable changes to a lesser extent. The interaction remains significant but not anymore at the 1% significance level.

- *Panel E:* To control for a possible correlation between risk and IA we include two more variables. First, we add the volatility of the monthly stock returns over the year. Second, we include the interaction of the volatility and the cash ratio (C). We find a higher coefficient and a higher t-value for the interaction of cash and IA. Moreover, the estimation reveals that there is positive interaction between cash and risk (at least for non-U.S. firms). This can be explained by the fact that cash is more important when the risk of the firm is higher. This test indicates that the influence of risk and of the IA runs in the opposite direction. Obviously, we can conclude that our results cannot be explained by a positive correlation between our measurement of IA and risk.

- *Panel F:* In Panel F, we change the proxy for IA. Instead of using the dispersion of analysts' forecasts, we employ the forecast error (see the discussion in Section 2.2.1.1). We calculate this variable as follows:

$$forecastError = \ln\left(1 + \frac{|eps_{forecast} - eps_{actual}|}{|median|}\right) \tag{2.3.3}$$

where the forecast of the earnings per share is the average of all forecasts provided by the analysts in November and December. The difference of the actual and the forecasted earnings per share in absolute terms is scaled by the median of the earnings per share forecast. Similar to the calculation of *dispM*, we add one to this ratio and take the natural logarithm. Observations are excluded if the average of the forecasts is not at least based on the estimates of two analysts. The estimation indicates that our main finding is robust to a change of the measurement of IA.

Table 2.9: Robustness Tests

		all firms	non-U.S. firms
Panel A (base case)	C	0.782*** (4.50)	0.391*** (4.53)
	C×dispM	**-0.594*** (-3.34)**	**-1.041*** (-10.24)**
	N	29963	19661
	Groups	7474	4991
Panel B (2-year lags)	C	0.512** (2.22)	0.296** (2.05)
	C×dispM	**-0.804*** (-4.15)**	**-0.754*** (-9.51)**
	N	22908	15182
	Groups	6072	4135
Panel C (no time dummies)	C	0.839*** (4.65)	0.566*** (6.54)
	C×dispM	**-0.587*** (-2.97)**	**-1.163*** (-9.17)**
	N	29963	19661
	Groups	7474	4991
Panel D (pooled OLS)	C	2.281*** (19.28)	1.501*** (10.79)
	C×dispM	**-0.610** (-2.31)**	**-0.479* (-1.83)**
	N	29963	19661
	Groups	7474	4991

(continued)

Table 2.9: —*Continued*

		all firms	non-U.S. firms
Panel E (volatility)	C	0.567** (2.34)	0.215* (1.73)
	C×dispM	**-0.687***** (-3.72)	**-1.205***** (-14.97)
	Vola	-0.322** (1.98)	-0.129 (0.79)
	C×Vola	1.534 (1.58)	1.730** (2.00)
	N	29559	19441
	Groups	7408	4961
Panel F (forecast error)	C	0.797*** (4.85)	0.266** (2.54)
	C×forecastError	**-0.237**** (-2.06)	**-0.266***** (-2.43)
	N	31370	20452
	Groups	8016	5354

This table provides an overview of the estimation results of different robustness tests. The sample period corresponds to the period from 1995 to 2005. The regression specifications are explained in Section 2.3.3. The dependent variable in all specifications is the total market value scaled by total assets. The definitions of all variables are provided in Section 2.2.1.3 and Section 2.3.3, respectively. Statistical inference is based on Driscoll and Kraay (1998) (Panel A, B, C, E,F) and on White (1980) (Panel D). *t*-values are presented in parentheses. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

2.4 Conclusion

This chapters examines the value effects of corporate cash holdings. To date, the common practice in the cash holdings literature is to examine the valuation effects of cash holdings whereby the researcher discriminates according to corporate governance measures. However, we take a different perspective and focus on the valuation effects of cash in connection with information asymmetry. Specifically, we put forward two different hypotheses. First, focusing on Myers and Majluf (1984), cash in combination with information asymmetry should have a positive influence on the value of the firm because the adverse selection problem will be mitigated. Second, referring to Jensen (1986), the free cash flow argument coupled with information asymmetry leads to moral hazard and accordingly the value of cash should be lower.

For the sake of empirically opposing these two hypotheses, we employ a large data set covering 7,474 firms from 45 countries. We use the Fama and French (1998) valuation

regressions and derive our results from two different cash specifications. As the main approach we use the actual cash ratio in line with Pinkowitz et al. (2006) and as a robustness test we also calculate excess cash based on Opler et al. (1999) and Dittmar and Mahrt-Smith (2007).

The results for the actual cash ratio reveal that the value of one unit of cash without taking information asymmetry into account is on average around one. This result is consistent with previous papers in this field (see Pinkowitz and Williamson, 2004; Pinkowitz et al., 2006). However, if a firm faces a high level of information asymmetry, the value of its cash reserves is significantly and substantially reduced. This evidence indicates that the agency costs of the free cash flow argument outweigh the benefits from cash as internal capital. For being able to further distinguish between our two opposing hypotheses, we split the sample according to governance and financing constraints. Taken together, these splits further emphasize our results that agency costs due to moral hazard decrease the value of cash. Specifically, the value of cash is higher if the level of governance is stronger. According to the splits on the basis of financing constraints, the expectation that cash is valued relatively higher if the firms are financially constrained (either on the firm-level or because the markets are less developed) are only borne out partly by our data.

Our second approach which is based on the framework of Dittmar and Mahrt-Smith (2007) and the calculation of excess cash according to Opler et al. (1999) serves as a robustness test for the results above. If we use excess cash as our measure of cash holdings the results stay qualitatively the same compared to the results derived with the actual cash ratio. Accordingly, information asymmetry significantly decreases the value of excess cash. This evidence further confirms the free cash flow theory by Jensen (1986) and provides no empirical justification for the theoretical argument by Myers and Majluf (1984). When we consider the governance and financing constraints in our second approach, the results are also in line with what was found by the estimations with the actual cash ratio. Again the value of excess cash is higher if the level of governance is stronger; however, based on financing constraints no clear picture emerges.

Taken together, our comprehensive results—which survive extensive robustness tests—clearly indicate that the agency costs from the free cash flow theory outweigh the benefits from 'financial slack' in mitigating adverse selection.

Appendix

Detailed formula for measure of information asymmetry ($dispM_{i,t}$)

$$\ln\left(1+\frac{1}{M_{i,t}}\times\sqrt{\sum_{m_{i,t}=1}^{M_{i,t}}\left(\frac{\frac{1}{A_{m_{i,t}}-1}\times\sum_{a_{m_{i,t}}=1}^{A_{m_{i,t}}}(EPS_{a_{m_{i,t}}}-\frac{1}{A_{m_{i,t}}}\times\sum_{a_{m_{i,t}}=1}^{A_{m_{i,t}}}EPS_{a_{m_{i,t}}})^2}{Med_{m_{i,t}}}\right)}\right)$$

with:

$Med_{m_{i,t}}$:	Absolute median earning per share forecast in month m in year t for firm i
$A_{m_{i,t}}$:	Number of analysts that cover firm i in year t in month m
$M_{i,t}$:	Number of months for which more than three analysts cover firm i in year t
$EPS_{a_{m_{i,t}}}$:	Earnings per share estimate of analyst a for firm i in year t in month m

Chapter 3

Cash and Governance[1]

The main impetus to this paper was sparked by coming across an article in the Wall Street Journal (April 3, 2006) that says "Typically, companies recycle a country's savings by borrowing the money to invest [...]. In the past five years, though, people and companies in the U.S. have switched roles. Households have been saving less [...]. Meanwhile, companies have been spending a lot less than they earn, building up huge hoards of cash." The main question that arises from this statement is: What is the reason for this corporate behavior or posed differently - Which *factors* lead firms to accumulate enormous amounts of cash? Bates et al. (2007) report that the average cash to assets ratio for industrial firms increased by 129% from 1980 to 2004. In effect, the related question is: What are the *value implications* of great cash piles in the company? And this is exactly what this paper strives for: finding answers to the last two questions.

Conventional wisdom suggests that cash is a zero net present value (NPV) investment. Hence, one dollar of additional cash should increase the market value by exactly one dollar. Accordingly, *in the absence of market frictions*, firms should optimally hold no cash as external finance can always be obtained at a price that resembles its fair value. However, relaxing the assumption of perfect capital markets and integrating transaction costs and taxes in the analysis, cash suddenly has a value attached to it. The underlying notion is that in this setting, external finance becomes costly and holding cash is an optimal response to having to raise costly external finance. The rationale behind this effect is subsumed under the *trade-off model* of cash holdings.

Second, if also the forces of *asymmetric information* and *agency costs* come into play, then the motivation for holding cash becomes even more pronounced. The underlying

[1] This chapter is based on a study of the same title by Hirschvogl (2007a).

arguments date back to seminal papers in the capital structure literature. For instance, Myers and Majluf (1984) are the only ones who explicitly refer to cash or in their words: "financial slack". In their model, informational asymmetries lead firms to build up cash in order to finance all positive NPV projects as managers abstain from issuing undervalued securities. Similarly, agency costs of debt in the form of the underinvestment problem (Myers, 1977) and the asset substitution problem (Jensen and Meckling, 1976) make external finance more costly and provide further motivation for firms to hold cash. However, there are two sides to everything. Importantly, Jensen (1986) puts forward the agency costs of free cash flow and thus contributes to the literature by analyzing the *costs* of excessive cash holdings. In sum, holding cash can be beneficial but sometimes also costly for shareholders, which effect dominates is an empirical question and will be addressed in the present work.

However, the motivation to study the determinants of cash holdings was not driven by theoretical arguments, but by detecting a contradiction in the existing empirical literature. Specifically, Dittmar et al. (2003) conduct a *cross-country study* and find a negative relationship between governance at the *country-level* and cash holdings, i.e. firms in weaker governance countries hold more cash. However, focusing on *one country*, Harford et al. (2006) observe a positive effect between governance at the *firm-level* and cash holdings, hence firms with weaker governance hold less cash. In this context, the latter two studies focus on either one dimension of governance only - either they are laid out as cross-country studies and then lose the firm-level governance dimension or the studies focus on one specific country but then hold the country-level governance fixed. This study extends the latter two strands of empirical literature by analyzing cash holdings in a cross-country setting, but including *proxies for governance at the firm-level as well as the country-level*. The only study who pursued the same approach[2] is Kalcheva and Lins (2007). However, their measure of firm-level governance is equal to absolute and also relative managerial ownership, in contrast to this study which uses the Transparency and Disclosure index as developed by Standard & Poor's in 2001. Thus, the rich setting of this study allows investigating the governance motive for holding cash by emphasizing the *country- and firm-dimension*.

Aside from the determinants of cash holdings, the second contribution of the paper is to turn to a different angle and analyze the value consequences of cash holdings. In this respect, the key idea is to establish a link between bad governance and value destruction, expressed in a lower sensitivity of market value to cash. The central idea behind this approach dates back to the related literature on agency costs (most notably, Jensen and

[2] From the first draft of this paper to the present one, another paper was written that is similar in vein, for details refer to Huang and Zhang (2007).

Meckling, 1976). If the level of corporate governance is very low, then the checks and balances in the company are not very well established and managers' control is unfettered. This in turn provides an incentive for managers to waste corporate resources and as Myers and Rajan (1998) point out, it is easier for management to siphon off cash as to use a plant for the sake of private benefits. Hence, investors value cash inside the firm for less than the fair value as they expect that cash is partly kept for the benefit of enjoying private benefits to the detriment of outside investors. Therefore, liquid assets represent a promising avenue to study the value consequences of good or bad corporate governance.

The results in the first part of the paper suggest that both dimensions of governance, that is the firm-level and the country-level, are important determinants of cash holdings. The influence of shareholder rights is negative while the governance practices at the firm-level have a positive effect on cash. In effect, corroborating the results from previous studies but using one combined regression framework. Yet, if the corporate governance index is cleaned off country influences, then it loses its significance. This result provides an answer to the question whether country- or firm-level governance dominates and it clearly shows that only investor protection, i.e. the country-level, is significant in this respect.[3] The results in the second part of the paper reveal that firms with low corporate governance or firms operating in low shareholder protection countries endure a huge valuation discount. One additional dollar of cash built up over the last period increases the market value of those firms by far less than the fair value of one dollar. Finally, the last part of the paper investigates the reasons for the valuation discount of low corporate governance firms. The results bring to light that although firms lacking sound governance systems do not hold more excess cash, yet they use less cash for supposedly value-enhancing activities, such as R&D expense or capital expenditures.

The paper proceeds as follows. Section 2 reviews the main theoretical as well as empirical literature on cash holdings and derives the hypotheses tested in this study. Section 3 describes the data and discusses the summary statistics and then proceeds by outlining the main results from this empirical work. And last but not least, section 4 provides the concluding remarks.

3.1 Related Literature on Cash Holdings

In the absence of market frictions, firms should optimally maintain zero excess liquidity as external finance can always be obtained at a fair price. However, the existence of market frictions provides a rationale for firms to hold cash. In this context, the trade-off theory,

[3] This result is consistent with the hypothesis in Doidge et al. (2007) and Harford et al. (2006).

the precautionary motive and the agency motive for holding cash will be reviewed.

3.1.1 Transaction Costs and Trade-off Theory

In this model, the firm equates the marginal costs and benefits of cash in order to determine an optimal level of liquid asset holdings. In specific, the cost of liquid assets refers to the lower return (liquidity premium) generated by holding liquid assets. Another cost is the tax disadvantage of cash due to double taxation of income from liquid assets at the corporate as well as shareholder level (Masulis and Trueman, 1988). On the other hand, the benefits of liquidity are the saving of transaction costs as put forward by Keynes (1936) and further analyzed by Tobin (1956) and Miller and Orr (1966). The underlying notion is that the fixed costs of accessing capital markets induce firms to hold cash as a pillow and approach the capital markets only infrequently. Transaction costs are determined by characteristics that either increase the cost of cash shortfalls or increase the cost of raising funds. In this vein, Kim et al. (1998) theoretically provide some of the drivers for the transaction costs. Empirically, Opler et al. (1999) find that firms with the following characteristics hold lower cash balances: big firms, firms with high net working capital, high leverage, firms that pay dividends, and regulated firms. Furthermore, their empirical analysis shows that cash holdings increase with the cashflow to assets ratio, the capital expenditures to assets ratio, industry volatility, and the R&D to sales ratio. Hence, firms with strong growth opportunities, firms with riskier activities, and small firms hold more cash. In their analysis, however, they cannot corroborate the hypothesis that positive excess cash leads firms to overinvest or spend their money on wasteful acquisitions. Therefore, they cannot confirm the agency motive of managerial entrenchment for holding cash. But what they find is that managers accumulate cash if they have the possibility to do so, hence they find evidence for the precautionary motive of holding cash.

3.1.2 Asymmetric Information, Agency Costs of Debt, and Cash Holdings

The transaction cost model does neither consider information asymmetries nor agency costs. Hence, if those two effects are also included in the analysis, the motives for holding cash become even more pronounced as external finance becomes more costly (precautionary motive). Myers (1984) and Myers and Majluf (1984) propose the pecking order theory. Accordingly, asymmetric information between managers and investors leads firms

to abstain from issuing undervalued security. Therefore, cash ("financial slack") is a natural way to finance all positive investment projects as external finance would be too costly. In this model, firms finance their activities first with retained earnings and cash, secondly with debt and only as a means of last resort with equity. Hence, there exists no optimal level of cash which is only a sideshow and fluctuates with the development of internal cash flow.

Another strand of literature considers the agency costs of debt. In this case, the interests of the debtholders and shareholders differ. Jensen and Meckling (1976) argue that highly levered firms are likely to engage in asset substitution, making it more expensive and difficult for those firms to raise external finance. Naturally, this leads to a further argument of why cash holdings can be value-enhancing. Furthermore, as put forward by Myers (1977) firms with high leverage are prone to the underinvestment problem where management abstains from implementing positive NPV projects as the benefits would mostly accrue to the debtholders. In this setting, cash holdings are a response to the increased cost of acquiring external finance to fund value-enhancing projects.

3.1.3 Agency Costs of Managerial Discretion

As before, the subsequent discussion is also related to agency costs. However, the topic is studied from a different angle. Previously, agency costs of debt provided an optimal response for holding cash but now agency costs of free cash flow represent a deterrent to large cash amounts. As analyzed by Jensen (1986) large amounts of free cash flow lead managers to squander money on unprofitable acquisitions for the sake of empire-building or to pursue their pet projects.[4] Hence, there are costs associated with liquidity holdings in addition to the liquidity premium as already mentioned above. The preceding discussion relates to agency problems at the firm-level. However, factors at the country-level may also influence managerial opportunism. In this vein, shareholder protection can put a grip on outright stealing by management as outside investors are legally entitled to curb the management's decisions. Accordingly, the law dimension at the country-level may intensify or weaken agency problems at the firm-level. One might argue that agency problems at the-firm level may provide the incentives and lack of outside shareholder protection provides the ability of management/controlling shareholders to expropriate outside investors. The basic idea is as follows: the more protection outside investors enjoy, the more they are willing to provide capital at lower cost and consequently firms are less dependent on cash. The other side of the coin is that in countries with weak

[4] See also Stulz (1990) and Jensen (1993).

shareholder protection, firms face limited external finance opportunities, rendering cash more valuable in this setting. In this vein, La Porta et al. (1997) and La Porta et al. (1998) (hereafter, LLSV) have put forward some measures (anti-director rights, creditor rights, rule of law) for characterizing the institutional and legal systems across countries. However, although cash is more valuable in countries with weak shareholder protection, it is also well known that those countries are afflicted with more agency problems and hence lower firm values (see, for example, La Porta et al., 2002; Claessens et al., 2002). Hence, if according to Jensen (1986) high cash balances lead to overinvestment, then those countries with low protection of outside investors face an even more pronounced value discount.

In contrast to Opler et al. (1999), Dittmar et al. (2003) find that agency problems are an influential factor for the determination of cash holdings. Specifically, their results reveal that firms in countries with a low level of shareholder protection hold double the amount of cash than their counterparts in high shareholder protection countries. Interestingly, their results become even stronger if they control for capital market development. It is important to stress that Dittmar et al. (2003) use as their governance variable, the LLSV (1998) score at the country-level, hence they cannot control for agency problems at the firm-level. The derived predictions for the remaining variables are in line with prior evidence. For example, Dittmar et al. (2003) find that cash holdings increase with higher market-to-book ratios and higher R&D expenditures. On the other hand, their results show that cash holdings decrease with the size of the firm, with higher net working capital, and dividend payments.

Another study which emphasizes the agency motive is the work by Kalcheva and Lins (2007). However, in contrast to Dittmar et al. (2003), Kalcheva and Lins (2007) not only control for a country-level measure of shareholder protection, but they also incorporate a proxy for firm-level agency problems in their analysis. Hence, the paper by Kalcheva and Lins (2007) is closely related to this study, but while they use as their firm-level corporate governance variables different measures of managerial control rights, this paper uses the S&P Transparency and Disclosure Index (which will be discussed in section 4.3.1). The common denominator between Kalcheva and Lins (2007) and Dittmar et al. (2003) is that they both are cross-country studies and both use the LLSV (1998) measure of anti-director rights at the country-level. However, Kalcheva and Lins (2007) can be seen as a fruitful extension of Dittmar et al. (2003) as the former also incorporate the *corporate* agency problem. Interestingly, their results reveal that neither the anti-director rights index from LLSV (1998), nor most of their managerial control rights measures are significantly related to corporate cash holdings. Thus they cannot

corroborate the hypothesis that agency problems provide a motivation for firms to hold cash. Nevertheless, it is important to stress once again that this paper is closely related to Kalcheva and Lins (2007) in that they also study the determinants as well as the valuation consequences of cash. Furthermore, in pursuing this approach, the emphasis in their and this study is on two important dimensions: the country-level and the firm-level dimensions of governance.[5]

Similar to Opler et al. (1999), but contrary to Dittmar et al. (2003) and Kalcheva and Lins (2007), Harford et al. (2006) only study the U.S. capital market. Interestingly, they find that firms with high anti-takeover provisions (*weak shareholder rights*) have lower cash reserves. This stands in contrast to the results derived from cross-country studies (most notably, Dittmar et al., 2003) where firms hold more cash in countries with low anti-director rights (*weak shareholder rights*). Taken together, it is important to stress that whereas Dittmar et al. (2003) hold the firm-level dimension constant, Harford et al. (2006) hold the country-dimension constant. Therefore, it is interesting as a follow-up study to investigate the country- versus firm-layer in corporate governance and the relationship to cash holdings. This is exactly what the first part of this paper aims for: incorporating in a cross-country framework the country- and firm-dimension of corporate governance in the vein of Kalcheva and Lins (2007).

Hypothesis 1: Based on Dittmar et al. (2003), it is assumed that the country-level influence of governance is negative. Thus firms conducting their business in countries with low shareholder rights hold more cash.

Hypothesis 2: The influence of firm-level governance is not straightforward. Although Harford et al. (2006) find a positive influence of firm-level governance on cash holdings, they also put forward that the country-level might dominate the firm-level influence of governance. Given that their analysis focused on the U.S., no prediction concerning the influence of firm-level governance on cash can be inferred in an international context. It is left for the empirical part to shed more light on this matter.

Most notably, Pinkowitz et al. (2006) represent a cross-country study encompassing 35 countries and a period of 11 years. They focus on the value consequences of agency conflicts in relation to cash holdings. As corporate governance proxies the authors employ two measures: the anti-director rights index from LLSV (1998) and the index for the rule of law from the International Country Risk Guide. In order to derive their results, they

[5] In order to theoretically motivate the subject, the model by Pinkowitz and Williamson (2004) can be slightly modified. In their model, they use the illusive term b as a measure for the quality of institutions. If one replaces that variable by a term t*s whereby t refers to firm-level governance and s to shareholder rights, then their model delivers predictions consistent with the empirical results contained in this paper.

classify the countries according to the medians of those two variables and then use a valuation specification which is built on the regression specification of Fama and French (1998). Their results bring to light that in countries with high investor protection, one dollar invested in liquid assets is also approximately worth this dollar. However, more interestingly, in countries with weak shareholder protection, one dollar of liquid assets is worth much less: ranging from 0.29 to 0.33 dollar. Taken together, the weak relation between firm value and cash holdings further corroborates the agency theory of cash holdings. Moreover, Pinkowitz et al. (2006) find that the relation between dividends and firm value is weaker if the external governance environment is stronger, thus providing further evidence for agency theory.

Another paper in this vein is the comprehensive study by Dittmar and Mahrt-Smith (2007) which focuses on the U.S. and encompasses the period from 1990 to 2003. Using several governance variables such as the Gompers et al. (2003) corporate governance index (it relates to anti-takeover provisions), the index from Bebchuk et al. (2005) which is similar to the Gompers et al. (2003) index, and two measures for institutional share ownership, they can confirm the results derived by Pinkowitz et al. (2006). More specifically, Dittmar and Mahrt-Smith (2007) find that pouring one dollar of cash in a poorly governed firm only increases the market value from a minimum of 0.42 to a maximum of 0.88 dollars depending on the governance variable used. In addition, they find that poorly governed firms spend cash quickly in contrast to firms with stronger governance. All this evidence points to the fact that firms with weak governance use cash in ways that are not consistent with shareholders' interests. Furthermore, the authors reveal that for good corporate governance firms, one dollar of cash increases the market value by about two dollars.

Hypothesis 3: Similar to Pinkowitz et al. (2006) and Dittmar and Mahrt-Smith (2007), low governance (firm-level and country-level) significantly reduces the value of cash.

3.2 Empirical Methodology

3.2.1 Sample Selection and Variable Construction

For investigating the relationship between cash and governance, the sample is predetermined by the scope of the S&P Transparency and Disclosure Index being one of the

main explanatory variables. This index is composed of 98 disclosure criteria[6] and will be used as the proxy for firm-level corporate governance in this paper (similar to Doidge et al., 2007; Durnev and Kim, 2005). The advantages of this index lie in its objectivity across countries and its wide scope covering slightly more than 1,400 firms from about 40 countries which can be grouped into the following regions (number of firms included in parentheses): Asia Pacific (99 firms), Europe (351 firms), U.S. (460 firms), Emerging Asia (254 firms), Latin America (89 firms), and Japan (150 firms). The disadvantage concerning this corporate governance measure relates to its static nature as it is only available for the year 2001. In order to obtain financial data for the firms covered by the S&P ranking, they had to be matched on a case-by-case basis with the Datastream/Worldscope files. However, firms engaged in the financial industry were discarded from the analysis as they arguably hold cash for other purposes.[7] This procedure leads to a final sample of 935 firms for one year and 10,912 firm-year observations for the period 1996 to 2006.

As can be seen from the summary statistics, Table 3.1 (the S&P Transparency and Disclosure Index is labeled t), there is a wide variation in the governance score. It ranges from a low of about 20 points for Venezuela and Turkey to a maximum of about 70 for the U.S. and Finland. The mean score over all firms and countries is about 48 and many European countries can be found in the mean range. In line with intuition, most countries from the Asian and Latin American region have scores below the mean value.

A key contribution of this paper is that in contrast to most previous studies, two dimensions of governance are explicitly incorporated in the analysis. In addition to firm-level corporate governance, the LLSV (1998) measure of anti-director rights (called *srights*) is also included to capture governance at the country-level due to the cross-country nature of this paper. *Srights* proxies for the external governance environment as it is determined by laws on shareholder protection and hence it is the same for firms within one country. This index ranges from zero to five with higher values indicating better protection at the country-level. As can be seen from the summary statistics (Table 3.1: low shareholder rights (Panel A); high shareholder rights (Panel B)), the countries with the lowest shareholder rights do not only include countries from emerging markets, but also encompass surprisingly many European countries. For example, two European countries (Belgium and Luxembourg) represent the bottom league of all countries with *srights* scores of zero. But also Austria, Belgium, Denmark, Italy, Greece, and Switzerland are considered to be not very investor-friendly. On the other hand, Panel B contains the

[6] In the empirical part (section 4.3.2.1), the S&P Transparency index is scaled to reach until a value of five in order for the results to be directly comparable to the anti-director rights measure (it has a maximum value of five).

[7] This is consistent with the main studies in this literature; see, for example, Opler et al. (1999) or Pinkowitz et al. (2006).

countries with the highest shareholder rights (above a value of two). The mean *srights* for the high shareholder rights panel is 3.91 with India, Hongkong, Pakistan, UK, and U.S. taking the lead with the maximum score of five.

As a measure of cash holdings, I employ the ratio of cash and cash equivalents to net assets where net assets are defined as book value of assets minus cash and cash equivalents (see, Opler et al., 1999). In section 4.3.2.1, I employ the natural logarithm of the cash ratio as dependent variable. Table 3.1 contains the summary statistics and shows that there is a wide dispersion in the cash variable across the sample. The values for cash range from a low of 0.05 for Venezuela and a maximum of 0.48 for Ireland. Interestingly, the summary statistics reveal that the countries belonging to the low shareholder rights group have a lower cash ratio compared to their counterparts in the high shareholder rights sample. However, this effect could be driven by the higher number of observations in the latter group (due to a U.S. overweight).

The following control variables are included. First, as it is expected that bigger firms need less cash, size is included as control variable and computed as the logarithm of net assets (Mulligan, 1997). Second, high leverage firms are assumed to hoard less cash and thus a variable for leverage is also considered, computed as the ratio of long-term debt plus short-term debt divided by net assets. Third, net working capital to assets ratio (*nwc*) calculated as current assets less current liabilities and cash divided by net assets is expected to be a cash substitute. Fourth, as firms that spend a lot on capital expenditures are assumed to need more cash, capital expenditures (*capex*) are also taken into consideration. This variable is measured as the ratio of capital expenditures to net assets. Fourth, a proxy for free cash flow (*fcf*) is included in the empirical analysis computed as the ratio of Ebitda minus the sum of dividends, taxes, and interest payments in the nominator and net assets in the denominator. As it is expected that firms that experience higher growth need more cash, one-year sales growth (*salg1y*) is used as a proxy for growth opportunities. Finally, when viewed from an international perspective, another reason for holding cash might be the respective capital market development of the country; hence two proxies for this effect are included. They are taken from Beck et al. (2000) and measure the stock market capitalization as share of GDP (*mcap*) and the total amount of outstanding domestic debt (*privateb*), respectively. Furthermore, all empirical specifications include industry dummies (defined at the two-digit sic-code level) and region dummies (five regions: (1) Europe, (2) U.S., UK, Australia, New Zealand, (3) Latin America, Asia, (4) Japan, Singapore, Hongkong).[8]

[8] Region dummies are chosen as country-dummies cannot be taken due to the country-level nature of the anti-director rights index. Otherwise the country-level influence of this variable would be swept away by the country dummies.

Table 3.1: Summary Statistics for Low Shareholder Rights Countries (Panel A) and High Shareholder Rights Countries (Panel B).

Panel A. Low Shareholder Rights													
country	**size**	**cash**	**leverage**	**capex**	**nwc**	**fcf**	**div**	**t**	**mtb**	**salg1y**	**privateb**	**mcap**	**srights**
Austria	15.5	0.10	0.22	0.09	0.02	0.11	62,489	46.5	1.20	0.13	0.28	0.07	2
Belgium	15.8	0.14	0.25	0.09	-0.02	0.12	333,180	48.3	2.38	0.12	0.48	0.26	0
Denmark	15.1	0.10	0.21	0.09	0.12	0.12	382,179	56.0	2.91	0.18	1.04	0.22	2
Germany	16.6	0.16	0.25	0.09	0.03	0.10	419,288	52.8	2.13	0.09	0.37	0.19	1
Greece	15.9	0.08	0.26	0.13	-0.01	0.13	250,680	66.0	1.81	0.12	0.04	0.08	2
Indonesia	13.8	0.17	0.47	0.07	-0.03	0.07	22,746	35.4	1.69	0.43	0.00	0.05	2
Italy	16.6	0.11	0.35	0.05	-0.03	0.08	706,533	57.6	1.60	0.70	0.28	0.12	1
Korea	13.8	0.28	0.38	0.10	-0.07	0.01	45,866	45.4	1.57	0.26	0.32	0.25	2
Luxembourg	17.2	0.09	0.28	0.06	0.07	0.09	181,632	36.0	1.12	0.07	0.00	2.14	0
Mexico	15.3	0.12	0.23	0.06	0.02	0.09	130,080	22.3	1.90	0.14	0.01	0.15	1
Switzerland	16.2	0.19	0.31	0.05	0.05	0.11	475,060	50.6	2.43	0.07	0.62	0.71	2
Thailand	13.6	0.19	0.44	0.07	-0.08	0.13	44,355	48.8	2.40	0.14	0.00	0.26	2
Turkey	13.6	0.19	0.38	0.08	-0.03	0.01	9,322	19.0	1.82	0.29	0.01	0.06	2
Venezuela	13.8	0.05	0.09	0.06	-0.02	0.10	13,863	17.0	0.64	0.27	0.00	0.08	1
Mean	**15.2**	**0.14**	**0.29**	**0.08**	**0.00**	**0.09**	**219,805**	**43.0**	**1.83**	**0.22**	**0.25**	**0.33**	**1.4**

(continued)

Table 3.1–*Continued*

Panel B. High Shareholder Rights													
country	**size**	**cash**	**leverage**	**capex**	**nwc**	**fcf**	**div**	**t**	**mtb**	**salg1y**	**privateb**	**mcap**	**srights**
Argentina	14.6	0.09	0.49	0.07	-0.18	0.10	65,013	28.7	1.49	0.22	0.06	0.05	4
Australia	15.3	0.07	0.28	0.07	-0.05	0.07	282,056	56.3	2.06	0.11	0.14	0.43	4
Brazil	15.7	0.09	0.33	0.07	-0.07	0.07	237,733	28.8	1.14	0.19	0.04	0.12	3
Chile	14.4	0.18	0.31	0.06	0.01	0.03	87,381	32.6	1.62	5.73	0.00	0.43	5
Finland	16.5	0.22	0.27	0.06	0.02	0.13	625,059	70.3	3.58	0.13	0.39	0.18	3
France	16.5	0.15	0.29	0.06	-0.06	0.07	327,909	64.4	2.17	0.10	0.41	0.20	3
Hongkong	15.6	0.18	0.25	0.07	-0.04	0.09	398,613	44.9	2.31	0.33	0.05	1.28	5
India	13.5	0.13	0.25	0.09	0.12	0.12	29,886	37.3	3.42	0.20	0.06	0.13	5
Ireland	14.7	0.48	0.57	0.14	-0.11	0.10	29,635	72.0	4.04	0.21	0.04	0.27	4
Japan	16.0	0.24	0.32	0.06	0.00	0.08	101,851	50.3	1.96	0.05	0.30	0.73	4
Malaysia	13.5	0.20	0.33	0.07	-0.04	0.07	26,624	42.2	2.15	0.16	0.21	1.07	4
New Zealand	15.1	0.08	0.27	0.03	0.05	0.03	60,392	52.0	0.93	0.01	0.00	0.41	4
Norway	15.5	0.18	0.31	0.07	0.00	0.10	483,455	58.9	3.01	0.12	0.19	0.15	4
Pakistan	13.1	0.14	0.34	0.07	-0.07	0.10	47,270	37.0	1.58	0.16	0.00	0.09	5
Peru	13.0	0.19	0.18	0.05	-0.01	0.14	22,647	22.0	2.15	0.22	0.00	0.06	3
Philippines	15.0	0.12	0.39	0.07	-0.02	0.09	42,845	26.7	1.48	0.15	0.00	0.21	3
Portugal	15.7	0.06	0.41	0.07	-0.09	0.09	183,435	56.0	1.61	0.12	0.11	0.08	3
Singapore	15.2	0.29	0.25	0.08	-0.14	0.08	139,906	56.0	2.45	0.09	0.04	1.23	4
Spain	16.2	0.05	0.33	0.08	-0.07	0.10	334,769	49.7	1.85	0.18	0.09	0.18	4
Sweden	15.5	0.16	0.24	0.07	0.06	0.11	198,108	58.2	2.97	0.10	0.58	0.38	3
Taiwan	14.3	0.20	0.29	0.10	-0.03	0.11	92,897	28.2	2.14	0.29	0.00	0.49	3
UK	15.4	0.15	0.31	0.06	-0.08	0.08	373,222	67.0	3.29	0.10	0.14	0.76	5
US	15.4	0.23	0.27	0.07	0.02	0.11	240,864	68.5	3.92	0.14	0.53	0.58	5
Mean	**15.0**	**0.17**	**0.32**	**0.07**	**-0.03**	**0.09**	**192,677**	**48.2**	**2.32**	**0.40**	**0.15**	**0.41**	**3.9**

Means are reported by country grouped into high (anti-director index equal to three and above) and low (anti-director index equal to two and below) shareholder rights for non-financial firms (i.e. excluding firms operating in industries where the sic-code equals six) covered by the Worldscope database. The values shown are means over the period 1996 to 2006 and over all firms. Size refers to the natural logarithm of total assets minus cash. Cash refers to the ratio of cash plus short-term investments divided by net assets (total assets minus cash). Leverage stands for the ratio of long-term debt plus short-term debt divided by net assets. Capex is the abbreviation for capital expenditures and is simply the ratio of capital expenditures (as reported in the balance sheet) divided by net assets. Nwc refers to net working capital and is calculated as the ratio of current assets minus current liabilities minus cash in the nominator and net assets in the denominator. Fcf denotes free cash flow and is equal to ebitda minus dividends, taxes, and interest payments, divided by net assets. Div is equal to the dividend payments in dollar amounts. T is equal to the S&P Transparency and Disclosure index. The market-to-book ratio (mtb) is computed as total assets less book value of equity plus market capitalization of equity divided by net assets. Sales growth (salg1y) denotes the one year growth rate in sales. The two measures for the capital market development are mcap (equal to the stock market capitalization) and privateb (equal to total amount of outstanding domestic debt). The latter two variables are taken from Beck et al. (2000). Srights refer to the anti-director rights as reported by LLSV (1998).

3.2.2 Empirical Results

This section contains the main empirical results which for the ease of presentation are subsumed under three different subsections. The first empirical analysis focuses on the determinants of cash. In specific, the main question is whether firm-level and country-level governance mechanisms are influential factors in the determination of corporate liquidity holdings. This approach is based on the analysis by Kalcheva and Lins (2007) and Dittmar et al. (2003). The second part of the empirics directly measures the value consequences of liquid asset holdings. In the vein of Pinkowitz et al. (2006), it will be analyzed by how much a one-dollar increase in cash increases the market value of the firm. If there exists a wedge in the value between low and high governance firms, the agency hypothesis, i.e. managers waste cash on the consumption of private benefits, finds some more empirical justification and should be further scrutinized. Directly addressing this issue, the following subsection further explores whether low governance firms hold more excess cash and on which items they spend their cash. This empirical approach was inspired by the influential work by Opler et al. (1999) and Dittmar and Mahrt-Smith (2007).

3.2.2.1 Determinants of Cash

Following the main empirical literature in this area (see, for example, Opler et al., 1999; Dittmar et al., 2003), the log of cash is used as the dependent variable. As already outlined above, many control variables which previous studies (most notably, Opler et al., 1999) have found to be important are also included as well as the main variables of interest, i.e. the country- and firm-level governance measures. Furthermore, all regressions include industry and region dummies. Table 3.2 contains the empirical results from this subsection.

As a preliminary test, model (1) tries to retrieve the results from previous studies which only have governance data at the country-level at disposition. Thus, model (1) includes the anti-director rights index (*srights*) as main explanatory variable in addition to a battery of control variables. Interestingly, the results from extant cross-country studies can be corroborated. Like Dittmar et al. (2003), the influence of *srights* is negative, hence in countries where the shareholder protection is low, firms hold more cash. Dittmar et al.'s (2003) interpretation is that the level of cash in low investor protection countries is higher because that allows managers to spend more resources on pursuing their own ends, i.e. squandering cash on private benefits. This interpretation is also endorsed here and hence the empirical evidence is in line with *Hypothesis 1*. This managerial agency motivation is

further emphasized by the fact that although the *capital market development* is directly controlled for (*mcap and privateb*), the influence of *srights* is *still* significant (at the 1% level) and negative. All the signs of the control variables are in line with expectations with the exception of sales growth (*salg1y*) which is not statistically significant at conventional levels. Furthermore, the results are fairly robust across all specifications due to the fact that most variables do neither switch sign nor become insignificant.

Model (2) is similar to model (1) with the difference that now the focus is on the Transparency and Disclosure index (*t5*) which is rescaled to range until a maximum of five in order to be comparable to the LLSV (1998) anti-director rights index (*srights*). Again, the detected influence of *t5* is in line with prior *country* studies using some kind of measure for firm-level governance (e.g., Harford et al., 2006). The significant (at the 10% level), positive influence of *t5* on the log of cash means that firms with better governance practices in place use more cash. This effect is somehow counterintuitive to the negative relationship that was derived using country governance. With reference to *Hypothesis 2*, up to this point I found some preliminary evidence that the influence of firm-level governance is positive. Thus it is interesting to combine the two measures in one regression and examine whether they can coexist besides each other.

Model (3) includes the results from integrating both governance measures in one regression. As can be seen from Table 3.2, the influence of *srights* and *t5* remains negative and positive, respectively, and even slightly increases its economic significance. The effect of firm-level governance is a little bit stronger with a coefficient of 0.219 versus country shareholder protection having a coefficient of -0.199. This result is interesting as it deviates from the results obtained in the study by Kalcheva and Lins (2007) where country and firm-level governance does not remain individually significant if combined in one regression. Thus, the present results point to two independent effects which are working in the opposite direction. One interpretation of the firm-level governance results could be that good governance firms hold more cash simply because they are the ones being more profitable, hence generating higher free cash flow. This result could arguably be related to the endogeneity discussion of governance. Maybe it is not high governance that is driving performance, but firms that are more successful have higher governance standards because they can be implemented at relatively lower cost. Taken together, this effect would lead to the positive relationship between cash and governance. Thus it is essential to further investigate the agency motive of holding cash which will be pursued in the following subsection. At the country-level, there are at least two possible interpretations of the results that seem plausible. It could be argued that firms in low shareholder protection countries (low *srights*) accumulate cash because the shareholders

have essentially no say in those countries and cannot take actions against the decisions of the management. The argument could also be put differently as follows. Firms hoard cash in low shareholder protection countries as it is more difficult in this environment to raise external capital. However, the second interpretation seems to be more minor of nature as I directly take the capital market environment into consideration and still observe a significant influence between cash and external governance. Thus the first interpretation seems to be the more plausible in this context which is in line with *Hypothesis 1*.

One concern with model (3) of Table 3.2 is that the level of country governance and firm governance could be related. There are some similiar papers that pursue that direction. For example, Doidge et al. (2007, p. 3) put forward that "Countries matter because they influence the costs that firms incur to bond themselves to good governance and the benefits from doing so." Moreover, Harford et al. (2006, p. 4) state that "the effects of country-level granting and enforcing of shareholder rights dominates the effect of firm-level variation in the control of agency conflicts. In countries with poor shareholder protection, managers can hoard cash and pay low dividends with relative impunity." Testing this hypothesis, it was found that the correlation between *srights* and *t5* is about 49% in this sample. In order to address this issue, *t5* was regressed on country dummies and the error terms from this regression are calculated. The residuals can be interpreted as the part of the firm-governance score that is not influenced by country aspects, hence the correlation afterwards between *srights* and *spnocou5* (i.e. the country-cleared firm-level governance score) is equal to zero. In a second step, the same regression specification as in model (3) of Table 3.2 is chosen but instead of *t5*, the now derived anti-country firm-level score (*spnocou5*), is added to the model. The results from model (4) of Table 3.2 reveal that the coefficient of the firm-level score is insignificant after this modification. Yet the influence of the country-governance, *srights*, strengthens in economic and statistical significance. This result entangles the influence of country- versus firm-level governance and clearly shows that only the level of investor protection has an influence on cash holdings which is in line with the papers cited above. That means that *Hypothesis 1* could be further corroborated and concerning *Hypothesis 2*, the empirics point to no significant influence of firm-level governance.

Table 3.2: Determinants of Cash

Variable	(1) lncash	(2) lncash	(3) lncash	(4) lncash
size	-0.210***	-0.203***	-0.216***	-0.163***
	(-6.38)	(-6.15)	(-6.56)	(-5.38)
leverage	-1.251***	-1.254***	-1.268***	-1.341***
	(-5.42)	(-5.40)	(-5.50)	(-5.78)
capex	2.450***	2.266***	2.301***	2.602***
	(3.22)	(2.96)	(3.02)	(3.37)
nwc	-0.682***	-0.677***	-0.670***	-0.676***
	(-5.63)	(-5.56)	(-5.54)	(-5.52)
fcf	1.151***	1.154***	1.160***	1.176***
	(4.13)	(4.12)	(4.18)	(4.18)
salg1y	-0.053	-0.061	-0.056	-0.040
	(-1.10)	(-1.26)	(-1.16)	(-0.81)
divdum	-0.705***	-0.723***	-0.695***	-0.644***
	(-6.51)	(-6.65)	(-6.42)	(-5.91)
privateb	-0.336	-0.329	-0.465*	-0.165
	(-1.21)	(-1.17)	(-1.65)	(-0.75)
mcap	0.735***	0.680***	0.738***	1.012***
	(3.55)	(3.28)	(3.57)	(5.98)
srights	-0.180***		-0.199***	-0.261***
	(-3.38)		(-3.69)	(-6.68)
t5		0.164*	0.219**	
		(1.69)	(2.24)	
spnocou5				0.071
				(0.58)
Constant	1.570**	0.054	1.062	1.044**
	(2.57)	(0.09)	(1.63)	(2.26)
Adj. R^2	0.27	0.27	0.28	0.25
N	935	935	935	935

Regression estimates of the natural logarithm of cash as the dependent variable on external and internal governance variables of interest and controls. All specifications are for the year 2001 (publication date of the S&P Transparency and Disclosure index).In model (4) the S&P Transparency and Disclosure index (t) will be orthogonalized by firstly regressing t on country dummies and then proceeding only with the residuals of this equation. This procedure is done in order to clear t of any country effect. Then the residuals are scaled in order to range until a maximum of five (spnocou5) and included instead of t5. Cash refers to the ratio of cash plus short-term investments divided by net assets (total assets minus cash). Size refers to the natural logarithm of total assets minus cash. Leverage stands for the ratio of long-term debt plus short-term debt divided by net assets. Capex is the abbreviation for capital expenditures and is simply the ratio of capital expenditures (as reported in the balance sheet) divided by net assets. Nwc refers to net working capital and is calculated as the ratio of current assets minus current liabilities minus cash in the nominator and net assets in the denominator. Fcf denotes free cash flow and is equal to ebitda minus dividends, taxes, and interest payments, divided by net assets. Sales growth (salg1y) denotes the one year growth rate in sales. Divdum is a dummy variable and takes the value of one if the firm paid dividends in the year 2001 and is set to zero otherwise. The two measures for the capital market development are mcap (equal to the stock market capitalization) and privateb (equal to total amount of outstanding domestic debt). The latter two variables are taken from Beck et al. (2000). Srights refer to the anti-director rights as reported by LLSV (1998). T5 corresponds to the S&P Transparency and Disclosure index, however, the values are scaled to range only until five in order to be comparable srights. All models include industry dummies (defined at the two-digit sic-code) and region dummies (there are five regions: Europe; U.S., UK, Australia, New Zealand; Latin America; Asia; Japan, Singapore, Hongkong). T-values are reported in parentheses below the coefficients. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

3.2.2.2 Valuation Results

This subsection is based on the paper by Pinkowitz et al. (2006) which studies the valuation effects of governance and cash holdings. The authors propose that cash is valued at a discount in countries with low investor protection (low *srights*) because management enjoys more discretionary power in those countries and can use cash for pursuing their own interests.[9] They use the valuation regression of Fama and French (1998):

$$\begin{aligned} V_{i,t} = {} & \alpha_i + \beta_1 E_{i,t} + \beta_2 dE_{i,t} + \beta_3 dE_{i,t+1} + \beta_4 dA_{i,t} + \beta_5 dA_{i,t+1} + \beta_6 RD_{i,t} \\ & + \beta_7 dRD_{i,t} + \beta_8 dRD_{i,t+1} + \beta_9 I_{i,t} + \beta_{10} dI_{i,t} + \beta_{11} dI_{i,t+1} + \beta_{12} D_{i,t} \\ & + \beta_{13} dD_{i,t} + \beta_{14} dI_{i,t+1} + \beta_{15} dV_{i,t+1} + \varepsilon_{i,t} \end{aligned} \tag{3.2.1}$$

where $V_{i,t}$ refers to market value of the firm (measured as the sum of the market value of equity, long- and short-term debt); $E_{i,t}$ relates to earnings before extraordinary items plus interest, and tax credits; $A_{i,t}$ means total book value of assets; $RD_{i,t}$ refers to R&D expenditures; $I_{i,t}$ stands for interest payments; and finally $D_{i,t}$ measures dividend payments. Generally, all variables are deflated by total assets of the year t and in addition to the actual levels of the variables in year t, the lag and lead changes of the respective variables are also included as independent variables in the regression framework.

Pinkowitz et al. (2006) reformulate the previous equation and replace total assets by its two components: net assets ($NA_{i,t}$: total assets minus liquid assets) and liquid assets ($L_{i,t}$).

$$\begin{aligned} V_{i,t} = {} & \alpha_i + \beta_1 E_{i,t} + \beta_2 dE_{i,t} + \beta_3 dE_{i,t+1} + \beta_4 dNA_{i,t} + \beta_5 dNA_{i,t+1} + \beta_6 RD_{i,t} \\ & + \beta_7 dRD_{i,t} + \beta_8 dRD_{i,t+1} + \beta_9 I_{i,t} + \beta_{10} dI_{i,t} + \beta_{11} dI_{i,t+1} + \beta_{12} D_{i,t} \\ & + \beta_{13} dD_{i,t} + \beta_{14} dI_{i,t+1} + \beta_{15} dV_{i,t+1} + \beta_{16} dL_{i,t} + \beta_{17} dLi, t+1 + \varepsilon_{i,t} \end{aligned} \tag{3.2.2}$$

The hypothesis of Pinkowitz et al. (2006) is that the coefficient of the change in cash over the previous period (i.e. β_{16}) should be lower in countries with low investor protection as this sensitivity directly measures the effect of a change in cash (from the previous to the present period) on the market valuation of the firm. The authors use the econometric framework of Fama and MacBeth (1973) (hereafter FM) to estimate their regressions. According to Petersen (2006), the approach of FM allows the researcher to tackle a time effect (the residuals are correlated across different firms in one year), but FM is not appropriate in the case of a firm effect (the residuals of one specific company are correlated across different years).

[9] See also the discussion in section 4.3.2.1.

Table 3.3 contains the results of the valuation regressions. The period ranges from 1996 to 2006 as (1) it can be argued that over the medium-term governance does not change significantly and (2) the year 2001 (the publication date of the S&P Transparency and Disclosure index) is then surrounded by lead and lag terms of the FM regression framework to properly conduct the analysis.[10] In models (1) and (2) the sample is split according to the median of the S&P Transparency and Disclosure index. The results for the coefficient on the β_{16} term indeed point to a significant valuation discount for firms with low corporate governance. This result does not contradict the evidence from the previous section for the following reason. Although governance at the firm-level is ultimately not driving the level of liquidity, it still can be that corporate governance is responsible for how liquidity is deployed. This means that firms with low corporate governance are prone to wasting cash while firms with high corporate governance standards are using cash in the interest of shareholders. According to the empirical evidence a one dollar increase in cash accumulated over the last period leads only to a 0.879 increase in the market value of the firm. However, the market value of firms with high corporate governance standards increases by far more than one dollar, i.e. by 2.014 (significant at the 1% level). Model (3) and (4) address the same issue, however, they use the median of the LLSV (1998) anti-director rights index (*srights*) as criterion for splitting the sample. In line with the previous results, there exists a discount for low governance. The coefficient for low investor protection countries amounts to 0.859 while the value of cash in high investor protection countries amounts to 2.123. This empirical evidence is in line with Pinkowitz et al. (2006) as they also find a significant valuation discount for firms in countries with minor shareholder protection.

Table 3.3: Valuation Effects (Fama MacBeth)

Variable	(1) Low CG V(t)	(2) High CG V(t)	(3) Low SH V(t)	(4) High SH V(t)
E(t)	4.764***	7.662***	4.521***	7.887***
	(4.08)	(8.58)	(4.29)	(10.03)
dE(t)	-0.460	-1.305*	-0.719	-1.470**
	(-1.00)	(-2.22)	(-1.40)	(-3.17)
dE(t+1)	2.458***	3.707***	1.854***	3.782***
	(4.77)	(5.75)	(4.26)	(6.13)
dNA(t)	0.112	0.290	0.314	0.213
	(0.64)	(0.99)	(1.65)	(0.83)
dNA(t+1)	0.182	0.388*	0.120	0.356*

(continued)

[10] In order to mitigate the effect of outliers and following others in this literature, the sample is trimmed by dropping 1% in each tail of each variable.

Table 3.3: —*Continued*

Variable	(1) Low CG V(t)	(2) High CG V(t)	(3) Low SH V(t)	(4) High SH V(t)
	(1.15)	(2.30)	(0.68)	(2.07)
D(t)	7.840***	9.285***	10.441***	7.804***
	(4.46)	(5.03)	(7.00)	(5.00)
dD(t)	3.436	-0.994	-0.064	1.950**
	(0.80)	(-0.82)	(-0.07)	(2.31)
dD(t+1)	9.059***	-1.950	4.767*	2.628
	(3.87)	(-0.82)	(1.87)	(1.31)
dV(t+1)	-0.191	-0.212	-0.224	-0.197
	(-1.08)	(-1.38)	(-1.16)	(-1.37)
dL(t)	0.879**	2.014***	0.859**	2.123***
	(3.30)	(5.15)	(2.42)	(4.60)
dL(t+1)	1.490*	2.113***	1.546**	1.994***
	(2.11)	(4.06)	(2.62)	(4.12)
dI(t)	3.159	1.371	-0.548	7.142**
	(1.38)	(0.53)	(-0.39)	(2.50)
dI(t+1)	-4.798	-7.943*	0.432	-8.664*
	(-1.67)	(-2.04)	(0.23)	(-2.04)
I(t)	-10.596***	-13.539***	-4.919***	-14.486***
	(-5.34)	(-7.19)	(-4.70)	(-7.67)
dRD(t)	-11.951	9.687*	10.359**	9.672
	(-1.58)	(1.95)	(2.37)	(1.75)
dRD(t+1)	-0.278	14.739***	8.614***	16.198***
	(-0.03)	(4.52)	(3.47)	(4.42)
RD(t)	9.378**	7.165***	5.375***	7.474***
	(2.38)	(6.56)	(4.55)	(5.81)
Constant	0.576***	0.307**	0.320***	0.352***
	(7.37)	(3.12)	(3.38)	(4.34)
R^2	0.61	0.57	0.62	0.58
N	1,365	6,126	1,839	5,652
T	9	9	9	9

The regressions are estimated using the method of Fama and MacBeth (1973) for the period 1996 to 2006. The dependent variable in all specifications is V, the market value of the firm (measured as the sum of the market value of equity, long- and short-term debt). E relates to earnings before extraordinary items plus interest, and tax credits; A means total book value of assets. D is equal to the total dividend payments in a given year in U.S. dollar terms. Generally, all variables are deflated by total assets of the year t and in addition to the actual levels of the variables in year t, the lag and lead changes of the respective variables are also included as independent variables in the regression framework. The R^2 of the Fama MacBeth regression is the average value of the R^2 of the single years. T-values are reported in parentheses below the coefficients. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

Doidge et al. (2007) argue that firms might be limited in their possibilities to credibly commit to good corporate governance in countries where shareholder protection is low. In order to test this hypothesis in the context of cash holdings and disentangle the value effects of governance and shareholder protection (*srights*), Table 3.4 presents combined splits. The sample is initially split on the basis of the median of shareholder protection and subsequently according to the median of the governance score (*t5*). Interestingly, being in a low shareholder protection environment does not have any significant impact on the value of liquidity if the firm's corporate governance regime is strong. Similarly,

being in a high shareholder protection environment and having low corporate governance standards does not influence the market value of liquidity. This means that the casting vote is exercised by the governance rules and regulations at the country-level as for subsequent splits on the basis of firm governance only the groups are significant that are in line with the governance at the country-level. For example, if shareholder protection is low and firm governance is weak, the value of cash is equal to 1.050 (significant at the 5% level). Yet if shareholder rules at the country-level are sound, then being in the high firm governance regime is rewarded with a value of liquidity amounting to more than double (2.297) than that of the peer group. This result corroborates the hypothesis of Doidge et al. (2007) that governance at the country level is decisive and firm governance improvement might not credibly be communicated to shareholders.

Table 3.4: Valuation Effects (Fama MacBeth): Combined

	(1)	(2)	(3)	(4)
	Low SH		High SH	
Variable	Low CG V(t)	High CG V(t)	Low CG V(t)	High CG V(t)
E(t)	5.436***	2.436***	2.474***	8.168***
	(3.78)	(6.56)	(3.64)	(8.83)
dE(t)	-1.364**	-0.323	0.721	-1.567**
	(-2.42)	(-0.46)	(1.06)	(-2.64)
dE(t+1)	1.891**	0.781*	2.501**	3.989***
	(2.84)	(2.29)	(3.35)	(5.92)
dNA(t)	0.286	0.218	0.438	0.284
	(1.04)	(1.18)	(1.86)	(0.98)
dNA(t+1)	-0.000	0.346	0.440	0.448**
	(-0.00)	(1.42)	(1.68)	(2.52)
D(t)	5.934	16.969***	12.607***	9.427***
	(1.76)	(10.45)	(15.88)	(4.77)
dD(t)	1.591	0.173	-0.114	0.441
	(0.37)	(0.11)	(-0.02)	(0.36)
dD(t+1)	6.505	5.931*	9.770***	-0.711
	(1.80)	(1.96)	(4.41)	(-0.29)
dV(t+1)	-0.051	-0.402	-0.346*	-0.191
	(-0.25)	(-1.85)	(-2.11)	(-1.26)
dL(t)	1.050**	0.755	0.918	2.297***
	(2.44)	(1.43)	(1.59)	(4.98)
dL(t+1)	1.782**	1.948**	0.331	2.200***
	(2.53)	(2.32)	(0.45)	(4.76)
dI(t)	1.335	-0.124	0.722	3.460
	(0.38)	(-0.06)	(0.14)	(1.02)

(continued)

Table 3.4: —*Continued*

	(1)	(2)	(3)	(4)
	Low SH		High SH	
Variable	**Low CG V(t)**	**High CG V(t)**	**Low CG V(t)**	**High CG V(t)**
dI(t+1)	-3.446	6.521**	-5.358	-12.538**
	(-1.11)	(2.36)	(-1.03)	(-2.86)
I(t)	-9.619***	2.845	-6.462***	-15.275***
	(-5.14)	(1.67)	(-4.87)	(-5.84)
dRD(t)	-3.253	18.998*	-83.331	9.310
	(-0.45)	(2.14)	(-1.78)	(1.67)
dRD(t+1)	3.647	15.254***	8.563	15.754***
	(0.45)	(3.69)	(0.23)	(4.46)
RD(t)	1.143	7.140***	84.737**	6.908***
	(0.30)	(3.65)	(2.86)	(5.89)
Constant	0.472***	0.229**	0.617***	0.302**
	(4.20)	(2.73)	(9.63)	(3.01)
R^2	0.70	0.71	0.75	0.60
N	762	1,077	603	5,049
T	9	9	9	9

The regressions are estimated using the method of Fama and MacBeth (1973) for the period 1996 to 2006. The dependent variable in all specifications is V, the market value of the firm (measured as the sum of the market value of equity, long- and short-term debt). E relates to earnings before extraordinary items plus interest, and tax credits; A means total book value of assets. D is equal to the total dividend payments in a given year in U.S. dollar terms. Generally, all variables are deflated by total assets of the year t and in addition to the actual levels of the variables in year t, the lag and lead changes of the respective variables are also included as independent variables in the regression framework. The R^2 of the Fama MacBeth regression is the average value of the R^2 of the single years. T-values are reported in parentheses below the coefficients. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

3.2.2.3 Robustness Tests

One problem with the FM approach is that it is based on the assumption that all firms have the same cost of capital which is a fairly strong simplification. Also Fama and French admit this shortcoming in their paper (1998) by saying "our regressions impose the same slope on all firms. The response of value to profitability depends, however, on capitalization rates (costs of capital), which differ across firms. Since the regressions do not allow for differences in capitalization rates, there is a specification problem" (p. 827). Moreover, Pinkowitz and Williamson (2004, p. 13) note that "our implementation of the FM methodology may be problematic because it implicitly assumes that all firms have the same discount rate within a given year". Their solution to this problem is to compute fixed effects regressions in addition to the FM estimations. Thus this approach is also pursued here but in addition to firm-specific intercepts, time dummies are also added to the regressions in order to let the discount rate not only vary across firms but also across time.[11] The results from Table 3.5 show that if a fixed effects estimator is applied, the

[11] There is also a recent paper by Autore and Kovacs (2006) in which they argue that capitalization rates change over time.

value of cash changes somewhat in that it is generally lower. But the main inference holds true that there is a large valuation discount of the value of cash between high and low governance firms (external and internal governance).

Table 3.5: Valuation Effects (Fixed Effects with Time and Year Dummies)

Variable	(1) Low CG V(t)	(2) High CG V(t)	(3) Low SH V(t)	(4) High SH V(t)
E(t)	4.886***	5.427***	3.565***	5.880***
	(5.26)	(8.41)	(4.62)	(8.68)
dE(t)	-0.844**	-0.587**	-0.253	-0.876***
	(-2.30)	(-2.46)	(-1.07)	(-3.28)
dE(t+1)	2.520***	3.149***	2.040***	3.205***
	(7.01)	(8.58)	(6.07)	(8.36)
dNA(t)	0.036	0.398***	0.090	0.371***
	(0.33)	(3.28)	(0.94)	(2.83)
dNA(t+1)	0.515***	0.653***	0.536***	0.674***
	(3.76)	(5.66)	(5.31)	(5.27)
D(t)	-7.776**	4.209	-2.713	1.260
	(-2.04)	(1.36)	(-0.62)	(0.41)
dD(t)	1.747	-1.202	2.097	-0.306
	(1.42)	(-0.92)	(1.49)	(-0.30)
dD(t+1)	-0.723	-2.618	0.550	-1.652
	(-0.35)	(-1.55)	(0.28)	(-0.94)
dV(t+1)	-0.320***	-0.242***	-0.267***	-0.256***
	(-7.64)	(-7.70)	(-9.96)	(-7.80)
dL(t)	0.346	0.627**	-0.064	0.834***
	(0.83)	(2.37)	(-0.21)	(2.95)
dL(t+1)	0.628**	1.090***	0.323	1.210***
	(2.47)	(3.87)	(1.14)	(4.20)
dI(t)	2.442**	-3.286**	0.300	-0.488
	(2.03)	(-2.11)	(0.31)	(-0.24)
dI(t+1)	-4.838**	-13.584***	-4.743***	-14.140***
	(-2.44)	(-4.77)	(-3.05)	(-4.31)
I(t)	-8.081***	-8.057**	-8.709***	-8.152**
	(-3.23)	(-2.25)	(-4.13)	(-2.04)

(continued)

Table 3.5: —*Continued*

Variable	(1) Low CG V(t)	(2) High CG V(t)	(3) Low SH V(t)	(4) High SH V(t)
dRD(t)	-0.193	4.293	8.996	2.694
	(-0.05)	(1.60)	(1.63)	(1.00)
dRD(t+1)	-6.141	11.427***	-0.245	13.074***
	(-0.92)	(4.50)	(-0.05)	(4.82)
RD(t)	-5.584	9.698***	-6.319	12.575***
	(-0.46)	(2.83)	(-1.05)	(3.45)
Constant	1.305***	0.782***	1.424***	0.938***
	(8.67)	(5.50)	(10.77)	(6.45)
R^2	0.44	0.36	0.36	0.37
Groups	185	771	245	711
N	1,365	6,126	1,839	5,652

The regressions are estimated using a firm fixed-effects model including time dummies for the period 1996 to 2006. The dependent variable in all specifications is V, the market value of the firm (measured as the sum of the market value of equity, long- and short-term debt). E relates to earnings before extraordinary items plus interest, and tax credits; A means total book value of assets. D is equal to the total dividend payments in a given year in U.S. dollar terms. Generally, all variables are deflated by total assets of the year t and in addition to the actual levels of the variables in year t, the lag and lead changes of the respective variables are also included as independent variables in the regression framework. The R^2 of the fixed effects regression represents the R^2 of the within dimension.Robust standard errors are clustered at the firm-level. T-values are reported in parentheses below the coefficients. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

As a second robustness test, not the estimation methodology, but the estimation equation is modified. Pinkowitz et al. (2006) state that one concern with equation (2) is that an increase in cash might alter expectations about future growth opportunities as well. In principle, lead terms in the Fama and French model capture expectations, but in order to put this hypothesis under further scrutiny, Pinkowitz et al. (2006) replace the lead and lag of cash changes with the value of cash:

$$\begin{aligned} V_{i,t} = {} & \alpha_i + \beta_1 E_{i,t} + \beta_2 dE_{i,t} + \beta_3 dE_{i,t+1} + \beta_4 dNA_{i,t} + \beta_5 dNA_{i,t+1} + \beta_6 RD_{i,t} \\ & + \beta_7 dRD_{i,t} + \beta_8 dRD_{i,t+1} + \beta_9 I_{i,t} + \beta_{10} dI_{i,t} + \beta_{11} dI_{i,t+1} + \beta_{12} D_{i,t} \\ & + \beta_{13} dD_{i,t} + \beta_{14} dD_{i,t+1} + \beta_{15} dV_{i,t+1} + \beta_{16} L_{i,t} + \varepsilon_{i,t} \end{aligned} \tag{3.2.3}$$

Accordingly, the coefficient on the the level of cash, β_{16}, estimates the induced change in market value if the level of cash holdings changes by one dollar. Table 3.6 contains the results. For both splits, the estimation results reveal a significant valuation discount between high and low external and internal governance. This means that the previous results are further corroborated.

Table 3.6: Valuation Effects (Fama MacBeth): Cash-Level

Variable	(1) Low CG V(t)	(2) High CG V(t)	(3) Low SH V(t)	(4) High SH V(t)
E(t)	4.882***	7.699***	4.664***	7.917***
	(4.57)	(8.36)	(4.67)	(9.73)
dE(t)	-0.229	-1.187**	-0.540	-1.330***
	(-0.59)	(-2.52)	(-1.20)	(-3.57)
dE(t+1)	2.666***	4.060***	2.225***	4.083***
	(5.20)	(6.18)	(4.16)	(6.46)
dNA(t)	0.180	0.588**	0.405**	0.491*
	(0.99)	(2.50)	(2.33)	(2.13)
dNA(t+1)	0.158	0.312*	0.057	0.297
	(1.07)	(1.92)	(0.32)	(1.67)
D(t)	6.966***	9.415***	9.033***	7.376***
	(4.53)	(4.76)	(6.11)	(4.09)
dD(t)	2.926	-1.680	-1.244	2.071**
	(0.68)	(-1.05)	(-1.60)	(2.75)
dD(t+1)	8.830***	-3.208	2.972	2.192
	(4.28)	(-1.24)	(1.12)	(0.96)
dV(t+1)	-0.124	-0.176	-0.203	-0.160
	(-0.93)	(-1.30)	(-1.20)	(-1.25)
L(t)	0.904***	2.185***	1.841***	1.898***
	(4.04)	(8.49)	(7.20)	(7.62)
dI(t)	2.622	0.807	-1.180	5.627*
	(1.18)	(0.34)	(-0.92)	(2.25)
dI(t+1)	-5.934	-3.730	2.951	-6.643
	(-1.72)	(-1.04)	(1.29)	(-1.58)
I(t)	-10.226***	-6.885***	-3.651**	-8.857***
	(-6.38)	(-5.03)	(-3.19)	(-5.75)
dRD(t)	-7.723	11.083**	13.280**	11.442*
	(-0.95)	(2.36)	(2.36)	(2.12)
dRD(t+1)	1.138	13.984***	6.657*	15.675***
	(0.15)	(4.69)	(2.11)	(4.64)
RD(t)	9.190**	5.678***	4.122***	6.077***
	(2.43)	(5.22)	(3.70)	(4.45)
Constant	0.510***	0.015	0.136	0.115*
	(7.34)	(0.18)	(1.32)	(1.95)
R^2	0.59	0.58	0.63	0.58
N	1,371	6,120	1,845	5,646

The regressions are estimated using the method of Fama and MacBeth (1973) for the period 1996 to 2006. The dependent variable in all specifications is V, the market value of the firm (measured as the sum of the market value of equity, long- and short-term debt). E relates to earnings before extraordinary items plus interest, and tax credits; A means total book value of assets. D is equal to the total dividend payments in a given year in U.S. dollar terms. Generally, all variables are deflated by total assets of the year t and in addition to the actual levels of the variables in year t, the lag and lead changes of the respective variables are also included as independent variables in the regression framework. The R^2 of the Fama MacBeth regression is the average value of the R^2 of the single years. T-values are reported in parentheses below the coefficients. ***, ** and * indicate significance at the 1%, 5%, and 10% level, respectively.

3.2.2.4 Excess Cash

This subsection calculates the excess cash level as defined by Opler et al. (1999). It is based on a two-steps approach. The first step involves a regression where the natural log of cash is used as the dependent variable:

$$\begin{aligned} lnCash_i = \beta_0 + \beta_1 MTB_i + \beta_2 FCF_i + \beta_3 Size_i + \beta_4 NWC_i \\ + \beta_5 Rd_i + \beta_6 Divdum_i + \beta_7 Capex_i + \varepsilon_i \end{aligned} \tag{3.2.4}$$

In a second step, the residual of the previous equation is calculated. It is then taken to the exponential in order to arrive at the excess cash level. This notion defines cash which is not directly needed for the operations of the firm, but arguably accumulated for other purposes. Excess cash is calculated for all firms for the year 2001 and Table 3.7 contains the results. Additionally, Table 3.7 investigates the sources (EBITDA) and uses of cash (acquisitions, capital expenditures, R&D expense, dividends) over time.[12] In pursuing this approach, the sample is split in high and low internal governance firms (high and low t values) such that it can directly be observed whether low governance firms hold more excess cash and how the two groups differ according to their spending behavior.

Table 3.7 reports the results of this subsection. The empirical evidence reveals that there is no significant difference in means of excess cash between low and high governance firms which is in line with the results obtained in section 4.3.2.1. Yet according the the signs of the mean values, firms with high corporate governance hold negative excess cash and firms with low governance hold positive amounts of excess cash which is in line with expectations. Upon further examination of the results, the evidence exemplifies that high corporate governance firms on the one hand generate more cash (Ebitda is higher) but also spend more on items that are supposedly value increasing as their capital expenditures and R&D expenses are higher. They also return more cash back to shareholders as their dividend payments are higher and they spend more on acquisitions where it is debatable whether these expenses are value-enhancing or not. Taken together with the evidence from the previous subsection, it seems that investors value a one dollar increase in cash of high governance firms more for the reason that these firms use their liquid asset holdings for purposes that are beneficial for their shareholders. In the case of low governance firms, this subsection reveals one reason for the valuation discount of liquid asset holdings derived in the previous section. These firms keep excess cash in the company and do not employ these funds in ways that are congruent with shareholder wealth maximization.

[12] For related work, see, Dittmar and Mahrt-Smith (2007).

Table 3.7: Excess Cash

Means	High CG	Low CG	T-test (p-value)
excess cash	-0.25	0.10	0.205
netacquisitions	350,098	82,485	0.000
ebitda	2,040,650	1,093,513	0.000
capex	1,112,204	605,532	0.000
div	296,726	112,723	0.000
rdex	319,201	160,842	0.001

This table shows t-tests for equality of means for the year 2001 for all firms separated into low and high corporate governance groups (by defining high and low at the median of the S&P Transparency and Disclosure index). Excess cash is calculated similar to the paper by Opler et al. (1999). This variable is calculated in two-steps approach. The first stage involves a regression of the log of cash on many independent variables which are known to determine the level of cash. In a second step, the residual is calculated from the previous regression and taken to the exponential in order to obtain a ratio of excess cash divided by net assets. Netacquisitions refers to net assets from acquisitions as defined by Worldscope. Ebitda stands for earnings before interests, taxex, and depreciation. Capex is the abbreviation for capital expenditures and is simply the ratio of capital expenditures (as reported in the balance sheet) divided by net assets. Div is equal to the dividend payments in dollar amounts. Rdex refers to expenditures for research and development in U.S. dollar terms. A t-test for the equality of coefficients is performed and the p-values are reported in the fourth column.

3.3 Conclusion

Liquid asset holdings provide a natural way to study the relation between agency conflicts and the value consequences as cash can be relatively easy transformed into private benefits. As a rather novel approach, this work uses not only data about country governance (LLSV anti-director rights), but also incorporates an objective firm-level governance measure, the S&P Transparency and Disclosure index, into the analysis.

In this context, the first part of this paper uses external and internal governance data of 935 firms worldwide in order to analyze the effect on global corporate liquidity. The results reveal that country-level governance negatively influences the level of cash while firm-level governance has a positive effect on the cash holdings. This provides evidence that the results derived from research on either firm-level governance or country-level governance also hold if the two partial effects are combined in an integrated framework. However, very importantly, if the firm-level index is cleared of country effects, then the corporate governance index loses its significance and is no longer related to the corporate liquidity holdings. This provides, for the first time, evidence that its is crucial to disentangle the firm-index in "pure" corporate decisions and country-influenced corporate governance factors.

The second part of the paper directly examines the value consequences of cash in

different governance regimes. It is shown that there is a significant value discount attached to cash accumulated in low governance firms as well as in low shareholder protection countries. One dollar of additional cash built up over the last period increases the firm value by less than a dollar in those environments. However, in the case of high firm-level governance firms and firms operating in high shareholder protection countries, the value of one additional dollar of liquid asset raises the firm's market value by much more than the one dollar paid in. Importantly, as an robustness check, the results are also computed via a fixed-effects estimator and qualitatively the same results can be obtained.

Finally, after identifying these huge value differences the paper continues by investigating the sources of value creation/destruction. It is shown that although low-governance firms do not hold significantly more excess cash, they spend less on sources that are congruent with value maximization (e.g. using capital for research and development or capital expenditures).

Chapter 4

Governance and Fee Setting in the Mutual Fund Industry[1]

"The mutual fund industry is now the world's largest skimming operation - a $7 trillion through from which fund managers, brokers and other insiders are steadily siphoning off an excessive slice of the nation's household, college and retirement savings."[2] Before the decisive year of 2003, the world of mutual funds was relatively intact compared to the corporate landscape where Enron, WorldCom and their infamous alike took their toll on companies' reputations. However, in 2003 the tide turned and the mutual fund industry found itself implicated in scandals like "late trading" and "market timing".

In order to shed more light on these issues, this study undertakes an in-depth analysis of the structure and governance of mutual funds domiciled in Luxembourg. Of primary interest is the degree of vertical integration of mutual funds and the board composition. In order to provide a measure for the inherent conflict of interest, it relates these two governance aspects to funds' expenses, manually collected from funds' annual reports. This paper focuses on UCITS, the dominant form of mutual funds in Europe, which are based in one country, but can be sold across the whole European market. Luxembourg is the European Union's largest retail administration center by assets[3] and about 90% of all Luxembourg funds are set up as UCITS (see Figure 4.1).

Funds are similar to corporations in the sense that they are also legal entities overseen by a board of directors. However, quite distinctively, funds do not have any staff of their own. They are set up by their initial sponsor (often also referred to as promoter). This

1 This chapter is based on a study of the same title by Hirschvogl (2007b).
2 Fitzgerald (2003), Testimony to The Senate Committee on Governmental Affairs, November 3.
3 The Economist (2006), "Progress of a sort", March 9.

entity, apart from launching the fund, also selects the initial board of directors. In turn, the board of directors typically selects the sponsor as investment adviser. Drawing further on the analogy to companies, that structure would compare to companies which are only legal shells and whose entire services are outsourced, most noteworthy to the investment adviser who receives a management fee. This cyclic appointment process can be best expressed by the old adage "Dance with the one that brought you", and it induces a perceived conflict of interest between the adviser (the U.S. term for management company) and their related funds. While the adviser wants to secure the highest possible management fee in order to maximize his own profits, it is in the interest of the fund holders to minimize the fee in order to maximize their net return, i.e gross return minus fees.

While in principle the fund's board should monitor the management company, its supervisory role is likely to be compromised as they are "captured" by the management company. Effectively, investment advisors are left to bargain with themselves when it comes to fees. Why should one expect that this is done at arm's length basis? Bogle (2005, p. 153) states it quite bluntly with "The more the manager *takes*, the less the owner *makes*". In this context, Freeman and Brown (2001) show that equity pension funds, with an average size of $0.4 billion, pay on average 28 basis points for advisory services while the average equity mutual fund, with an average asset size of $1.3 billion, pays an average fee rate of 56 basis points. In dollar terms, equity mutual funds pay on average six times as much as their pension fund counterparts. The key difference in terms of fee setting is that pension funds generally negotiate and "buy" advisory services on the free market while mutual funds are bound to their initial sponsor and hence never "shop around".

The latter fact matters. First, there is a growing literature that demonstrates that fees explain most of the differences in the cross-section of average fund returns. In this vein, Carhart (1997) finds that expenses have at least a one-for-one negative impact on fund performance, and that fund performance and load fees are strongly and negatively related due to higher total transaction costs for load funds. Second, a growing proportion of household savings are entrusted to mutual funds to finance retirement, housing, and children's education. According to figures from the ICI (Investment Company Institute) $22.72 trillion have been invested in mutual funds worldwide in the first quarter of 2007 with 52% in the Americas region, 36% in Europe and 12% in Africa and Asia-Pacific (Investment Company Institute, 2007c).

This paper contributes to the ongoing debate on the appropriate level of mutual fund fees and expenses by providing the first detailed analysis of governance structures

in the European Union. Measured by population (480,222), Luxembourg only takes the global rank of 163 (CIA, 2007). However, it hosts the second largest fund industry worldwide (after the U.S.) as 10% of world mutual fund assets are managed in Luxembourg (Khorana et al., 2005). This fact makes Luxembourg an ideal laboratory to compare it to well-known U.S. mutual fund structures as well as to established empirical evidence on U.S. mutual fund fees.

While the U.S. provides a natural benchmark as most evidence originates from this country, the U.S. mutual fund industry is currently trying to reorganize itself in the wake of the mutual fund scandals, and hence insights from other organizational structures could valuably contribute to this debate. This is all the more so as UCITS standards gain increasing popularity in other non-European countries: For example, UCITS can also be sold in countries as far as Hong Kong. Furthermore, while UCITS can be set up as either investment companies ("SICAV") or as contractual arrangements ("FCP") in Luxembourg, U.S. mutual funds can only be incorporated as investment companies. For example, by observing huge differences in fee ratios between U.S. and the UK, a recent book by Wallison and Litan (2007) calls for a reform of the regulatory structure of U.S. mutual funds and proposes as a solution "managed investment trusts" which are similar in spirit to FCPs. However, this study can provide a first set of answers to whether this structure would provide any comparative advantage.

Apart from being a first mover, another contribution of this paper is that it adapts the U.S. governance perspective to the European context. The discussion in the U.S predominantly focuses on the governance role of independent directors. This is rooted in the fact that the Investment Company Act of 1940 stipulates minimum thresholds for the number of independent directors on boards. Moreover, the independent directors are legally obliged to annually review the advisory and distribution contracts. Yet the notion of independent directors is not even defined in the legal setting of Luxembourg. In Luxembourg, oversight is either exerted by the depositary if the fund is organized in the contractual form or jointly by the depositary and the board of directors if funds are investment companies. Therefore, to reflect this different environment, the governance variables are not limited to the board of directors, but the the level of integration between the fund promoter, the management company, and the custodian is also investigated.

This paper studies the choice of the contract form, governance structure and the relative performance of Luxembourg UCITS in terms of their fee setting behavior. The analysis encompasses such governance elements as board composition and the degree of vertical integration. In particular, an extensive hand-collected database of fund governance in Luxembourg is constructed, covering all equity UCITS domiciled in Luxembourg

at the beginning of 2007. At the outset, the sample covers 2,230 equity UCITS. This information is supplemented for a random sample of 20% funds by manually collecting all actual expenses and other related data items, not available from any public data vendor, from the annual reports of UCITS. This is important as data on expense ratios does not even have to be published in funds' annual reports in Luxembourg.

The first part of the study reveals that 40% of all funds are vertically integrated and only 10% can be considered as standalone funds (i.e. no integration between sponsor, management company, and custodian). Furthermore, in 74% of all cases the management company dominates the fund board. The second part of the paper relates the governance measures to fund expenses in order to measure any existing conflicts of interest. The results reveal that *integration* is indeed beneficial for fund investors in that it decreases fund expense ratios. This result holds for varying definitions of expense ratios. However, the existence of *multiple promoters* increases fund expenses. This could be due to coordination or communication problems when more promoters are involved in organizing the fund (similarly to the arguments on board size, see Lipton and Lorsch (1992) or Jensen (1993)). Concerning the evidence on *board structure*, against all odds, board dominance of the management company also lowers expense ratios. Taken together, these results point to a value-enhancing role of the management company and any conflicts of interest-theory cannot be corroborated for the world of European mutual funds.

These findings are interesting as in contrast to the U.S., there is hardly any governance regulation imposed on funds in Europe. This means that European funds are left to optimize their governance structure and the results point to efficient contracting in the European governance industry. The results also shed light on the relative role of *integration* versus the *board structure* and the evidence shows that for effective contracting, board control of the management company has to go hand in hand with vertical integration, i.e. the two are complementary to each other. Furthermore, as a robustness test, the *legal choice* is modeled and in order to correct for a potential self-selection bias, a switching model with endogenous switching is performed. This method is applied as funds can either be set up as SICAVs or FCPs and this choice can arguably influence the level of expenses. By following this approach, all previous results can be confirmed.

The paper proceeds as follows: Section 4.1 describes the Luxembourg institutional environment with an emphasis on legal structures and fee setting. Section 4.2 reviews the main empirical literature. Section 4.3 introduces the estimation methodology and section 4.4 presents the results. Section 4.5 contains robustness tests and, finally, section 4.6 concludes.

4.1 The Luxembourg Fund Industry

Until the seventies, the "Grand Duchy" has been predominantly focused on steel production. However, since then Luxembourg prospered as a major hub of the asset management industry.[4] Table 4.1 depicts this trend by comparing total net assets (Panel A) and the number of mutual funds (Panel B) for the U.S., Europe, and Luxembourg for the years 1999 and 2006. Many interesting facts emerge. By the end of 2006, the U.S. was home to the largest mutual fund industry managing 48% ($10,414 bn.) of worldwide mutual fund net assets. Yet Luxembourg ranked already second with 10% ($2,188 bn.) of worldwide mutual fund assets under management. Although the U.S. could increase its mutual fund net assets over the period 1999 to 2006, its share of worldwide mutual fund net assets is decreasing. Luxembourg, in contrast, was able to increase its total net assets over the same period by 231% and almost doubled its share of worldwide mutual fund assets. Panel B shows the number of mutual funds in operation during the observation period. At the end of 2006, investors could choose between 7,919 different mutual funds offered in Luxembourg, a number which is almost identical to the U.S. (8,120). It is important to emphasize this fact. Although Luxembourg is only one fifth (Europe: 74%) of the U.S. market size (measured by total net assets), it nevertheless hosts an almost identical number of mutual funds.

Figure 4.1 shows the ten largest European fund markets as measured by total net assets (in $ bn.) for the end of June 2007. Luxembourg is European's largest fund domicile by assets, followed by France, Germany, and the UK.[5] Almost all Luxembourg funds (90%) are set up as UCITS (the EU's term for mutual funds that can be marketed Europe-wide, see section 4.1.1). Equally, this observation holds true for almost all other European fund markets except for Germany.[6]

[4] Khorana et al. (2005) state that the growth of the asset management industry in Luxembourg was enhanced in 1992 when Germany introduced a 25% withholding tax on interest income for investment assets. This fact fostered a flight of German banks to asset management companies domiciled in Luxembourg.

[5] Khorana et al. (2005) try to explain the size of the mutual fund industry on a country-basis and they find that larger fund industries correspond to better protected investor rights in line with the law and economics literature.

[6] Khorana et al. (2007) state another important difference between the U.S. and Europe. The U.S. effectively has closed borders in terms of foreign-domiciled funds; however, European fund markets are more integrated due to the existence of UCITS.

Table 4.1: Total Net Assets of Mutual Funds in U.S. Dollars for 1999 and 2006

Panel A. Total Net Assets

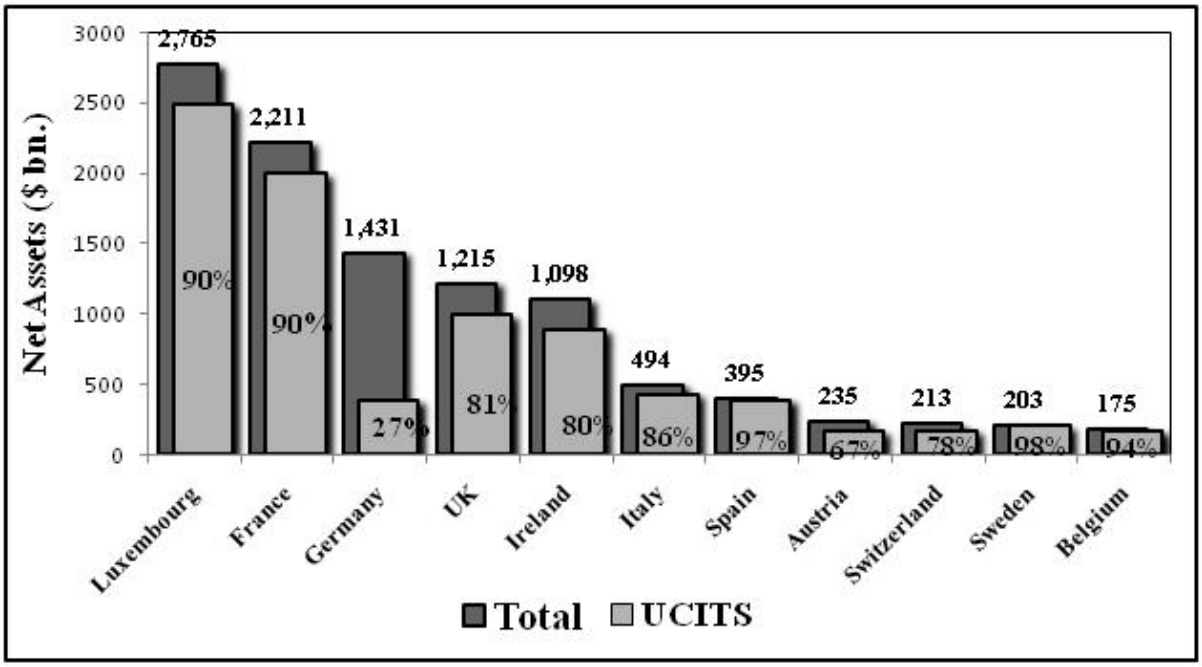
	1999		2006	
	Bn. $	% of World	Bn. $	% of World
U.S.	6,846	58.20	10,414	47.85
Europe	3,203	27.23	7,744	35.58
Luxembourg	661	5.62	2,188	10.05
Worldwide	11,762	100.00	21,764	100.00

Panel B. Number of Funds

	1999		2006	
	Number	% of World	Number	% of World
U.S.	7,791	14.77	8,120	13.20
Europe	22,095	41.89	32,800	53.33
Luxembourg	5,023	9.52	7,919	12.88
Worldwide	52,746	100.00	61,506	100.00

This table shows a comparison of the U.S., Europe, and Luxembourg for the year 1999 versus 2006. Panel A shows total net assets (in $ bn.) and Panel B considers the number of mutual funds.
Source: Investment Company Institute (2006), Annual Statistics, Worldwide Mutual Fund Totals.

Figure 4.1: Total Net Assets and Share of UCITS of the 10 Largest European Fund Markets



This figure shows a comparison of European fund markets. It depicts net assets ($ bn.) on the vertical axis. It further shows UCITS as a percentage of the local fund market.
Source: ALFI (Association of the Luxembourg Fund Industry), The European Investment Fund Industry at End June 2007, http://www.alfi.lu/index.php?id=191.

4.1.1 Regulation

Undertakings for Collective Investment in Transferable Securities (UCITS, European equivalent to U.S. mutual funds) are investment funds that are governed by a set of European Union directives.[7] The cornerstone was the 1985 UCITS Directive 85/611/EEC. Luxembourg was the first country to transpose this Directive (often referred to as "UCITS I") into national law in 1988. This first mover advantage secured Luxembourg the lead in terms of retail asset management. Generally, the 1988 Law governs UCIs (Undertakings for Collective Investments) and it contains two parts. UCITS are only "Part I" investment funds and "Part II" are other investment funds.

The main objective of the UCITS Directive was to create a unified funds market across Europe. This goal was achieved by the provision that a UCITS can apply for authorization in one member state, but upon approval, it can be marketed across all EU countries (only upon prior notification). This is generally expressed as UCITS having a "European passport". *UCITS I* mainly contains rules concerning investment policies, investment restrictions, as well as supervision of investment funds. In line with the definition of U.S. mutual funds, UCITS are also required to be open-end investment funds intended for sale to the general public. However, in contrast to the U.S. Investment Company Act of 1940, the EU Directive does not stipulate any threshold for the minimum number of independent directors (i.e. not affiliated with the management company, currently 50% in the U.S.) that have to be on the mutual fund board. In effect, European investment funds are free to decide on their governance choices without hardly any external regulation imposed on them.

The last amendment to *UCITS I* took place in 2001 by Directives 2001/107/EC (often called the "Management Companies Directive") and 2001/108/EC (often termed the "Products Directive"). These new Directives ("*UCITS III*") were implemented in Luxembourg in 2002 (Law of 20 December 2002, henceforth simply "the Law"). In line with *UCITS I*, *UCITS III* is also separated into two parts whereby Part I refers to UCITS with a European passport, and Part II defines other investment funds. Besides the Law which regulates funds sold to the general public, there is also the 1991 Law on Institutional UCIs.

[7] In order to clarify terminology, what the U.S. calls mutual funds is conceptually equal in Europe to UCIs (sold domestically), UCITS (sold across Europe) and on a pan-country level to what the IOSCO (International Organization of Securities Commissions) calls CIS ("Collective Investment Schemes").

4.1.2 Legal Fund Structures

Generally, funds can be established under three different legal structures in Luxembourg. First, funds can be set up as Common Funds ("Fonds Commun de Placement", FCPs). They are usually referred to as the "contractual model" as they are initiated by a contract between the management company and the investors. This means that these funds are not granted a separate legal identity, but they can only coexist with their management company. Furthermore, this implies that they do not have a board of directors. Importantly, this structure does not exist in the U.S., where mutual funds have to be incorporated. Apart from Luxembourg, the contractual model is the common form in Europe and it is also called FCP in Belgium, and France and it is denoted "Kapitalanlagefonds" in Austria, Germany, and Switzerland (refer also to OECD, 2001; IOSCO, 2006). U.S. mutual funds find their European equivalents in the next legal structure.

Investment companies with variable capital ("Société d'Investissement à Capital Variable, SICAVs) are investment funds that are proper legal entities. They have a board of directors and mutual fund investors are directly shareholders of these investment companies. Under the Law, SICAVs have the option to either appoint an eligible management company (has to fulfill certain minimum capital requirements) or to designate several directors of the board (self-managed investment company) as managers. The important feature of SICAVs is that their share capital is variable and fluctuates with the number of subscriptions or redemptions in the fund as shareholders are allowed to redeem their shares any time at NAV (net asset value, i.e. total assets minus liabilities divided by shares outstanding).

The final legal structure that is provided for in Luxembourg are investment companies with fixed capital ("Société d'Investissement à Capital Fixe", SICAFs). SICAFs are also investment companies but their capital is fixed and they are traded on stock exchanges, hence their share price is determined by supply and demand of fund shares. But as UCITS have to be open-ended, they cannot be set up as SICAFs and in general the role of SICAFs is limited.

After deciding on the legal structure, UCITS can either be set up as a fund family consisting of different funds with the legal entity being defined at the fund family level, or they can be incorporated as single funds. Figure 4.2 depicts the legal choice being offered in Luxembourg.

Figure 4.2: Legal Structures in Luxembourg

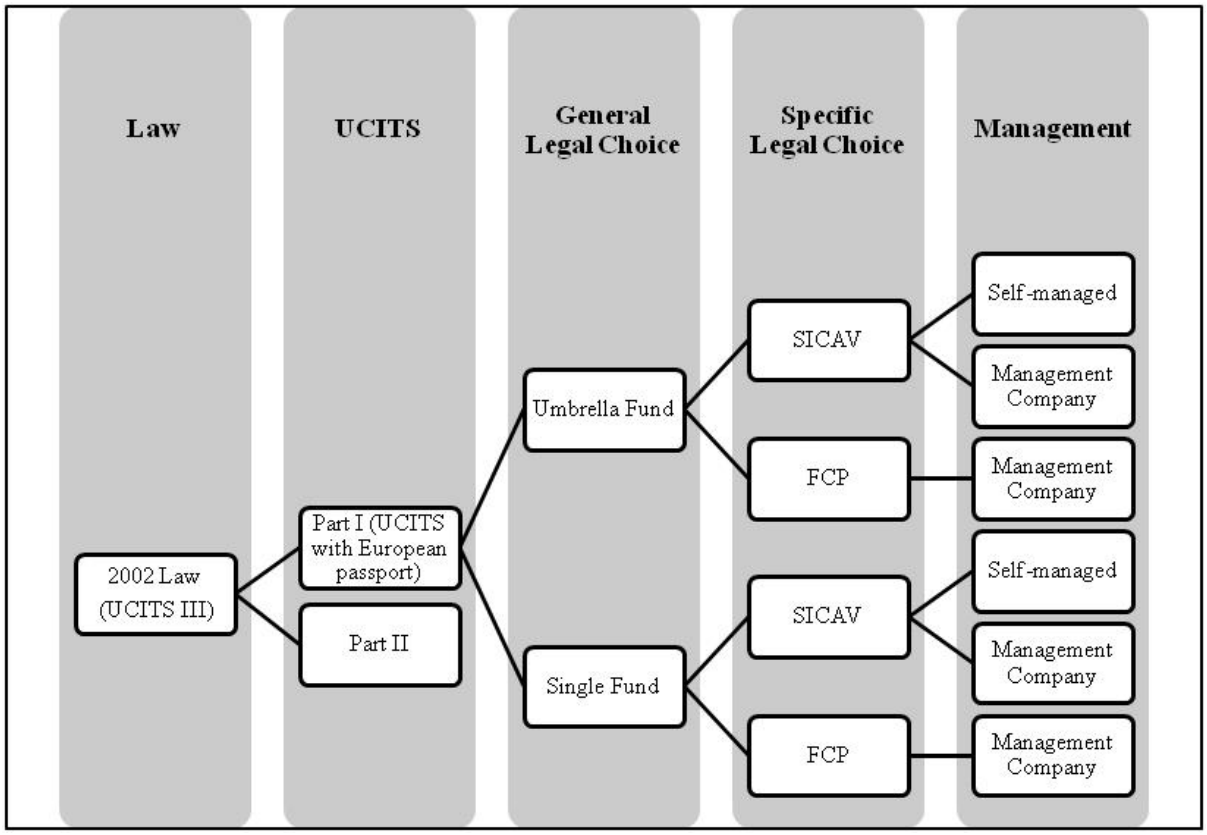


Table 4.2 shows the number of UCIs (Panel A) as well as net assets (Panel B) of UCIs registered in Luxembourg as of end August 2007. The total number amounts to 2,460 different funds[8] whereby the majority of those funds are set up as UCITS (1,538). Out of the 1,538 UCITS, 62.7% are established under the contractual model (FCPs) and 37.3% in the form of investment companies (SICAVs). According to net assets depicted in Panel B, about 65% of UCITS are SICAVs and only 35% belong to the FCP group. This means that SICAVs are generally larger in terms of size (net assets) than FCPs.

[8] Of those 2,460 different funds 1,518 are fund families containing 9,394 different funds and 942 are single funds. This means that altogether 10,336 (= 9,394 + 942) different funds are registered in Luxembourg.

Table 4.2: Breakdown of Luxembourg UCIs by Number and Net Assets

Panel A. Number of UCIs

	Part I (UCITS)		Part II		Institutional UCIs		Total	
	No.	*in %*	*No.*	*in %*	*No.*	*in %*	*No.*	*in %*
FCPs	965	*62.7*	202	*34.5*	191	*56.7*	1,358	*55.2*
SICAVs	573	*37.3*	374	*63.9*	144	*42.7*	1,091	*44.3*
Others	0	*0*	9	*1.5*	2	*0.6*	11	*0.4*
Total	1,538	*100*	585	*100*	337	*100*	2,460	*100*

Panel B. Net Assets (in bn. EUR)

	Part I (UCITS)		Part II		Institutional UCIs		Total	
	Bn. EUR	*in %*	*Bn. EUR*	*in %*	*Bn. EUR*	*in %*	*Bn. EUR*	*in %*
FCPs	574.3	*34.8*	108.8	*37.7*	61	*63*	744.1	*36.6*
SICAVs	1,075.5	*65.2*	177.4	*61.4*	35.7	*36.9*	1,288.6	*63.3*
Others	0	*0*	2.5	*0.9*	0.1	*0.1*	2.6	*0.1*
Total	*1,649.8*	*100*	*288.7*	*100*	*96.8*	*100*	*2,035.3*	*100*

This table shows the number of UCIs (Undertakings for Collective Investments) registered on the official list in Luxembourg as of 30 August 2007. Panel A contains the number of UCIs and Panel B shows UCIs on basis of their net assets in EUR billion. FCPs are contractual funds and SICAVs are incorporated investment funds with variable capital. Part I of the 2002 Law refers to UCITS (UCIs with European passport) and Part II refers to all other UCIs sold to the general public. Institutional UCIs are only sold to institutional investors.
Source: Commission de Surveillance du Secteur Finance (CSSF) (2007), Statistiques mensuelles sous format Excel, Août 2007, http://www.cssf.lu/index.php?id=135.

The last paragraph introduced the choice set concerning legal structures that is available in Luxembourg. However, regardless of whether funds are set up as FCPs or SICAVs, they are only legal shells and all the services are delivered by external agents. Generally, the fund's assets must be entrusted to a custodian (also called depositary bank or simply depositary). By definition, FCPs must have a management company but SICAVs have the option to either designate a management company (in the U.S. often called investment adviser) or to be self-managed. Chapter 13 of the Law stipulates that the management company requires at least two executives who must be of "sufficiently good repute".[9]

In contrast to FCPs, SICAVs must have a board of directors as they constitute a separate legal entity. The minimum number of directors serving on the board is three; however, the Law does not contain any provisions concerning the number of independent directors. Funds are initiated by a promoter/sponsor who selects the initial board. Generally, in turn, the board of directors appoints the promoter to assume the function of the management company. Furthermore, if a management company has been designated,

[9] Self-managed funds must also designate at least two executives from their board of directors. The minimum initial capital of management companies amounts to EUR 125,000.

then it *can* outsource investment management, administration, and distribution to external parties. If no management company has been designated, then these three roles *have* to be outsourced to other legal entities.

Figure 4.3 depicts the structure of FCPs under UCITS III, Figure 4.4 that of SICAVs with a designated management company, and Figure 4.5 shows the organizational setup of self-managed SICAVs.

Figure 4.3: Structure of FCP under UCITS III

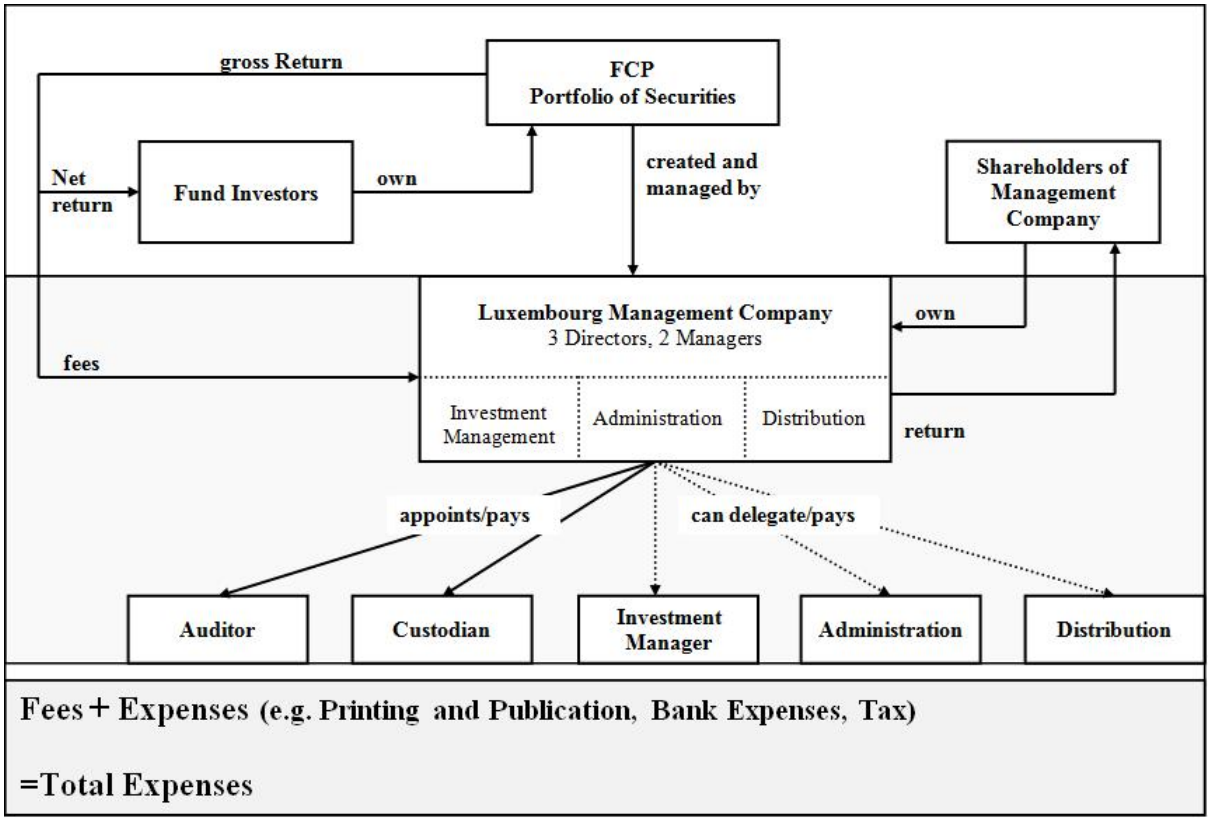


Figure 4.4: Structure of SICAV designating a Management Company under UCITS III

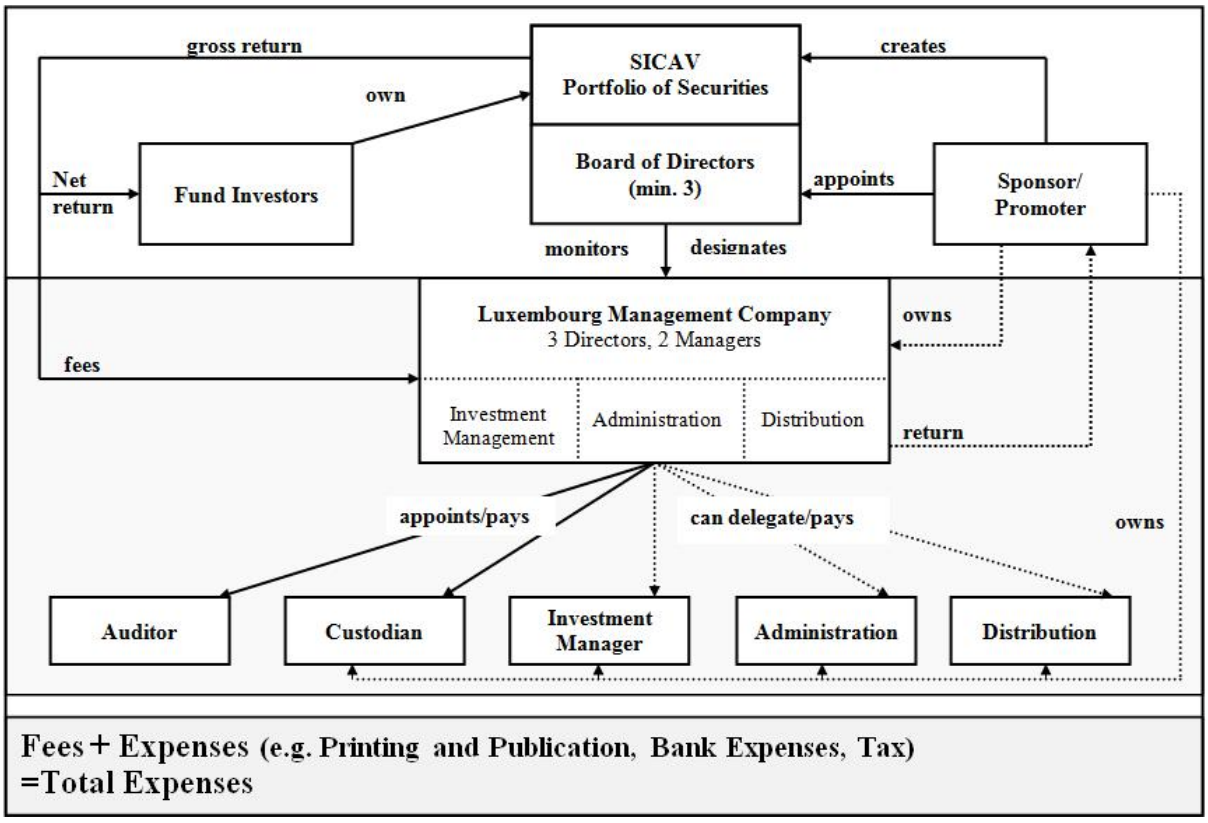
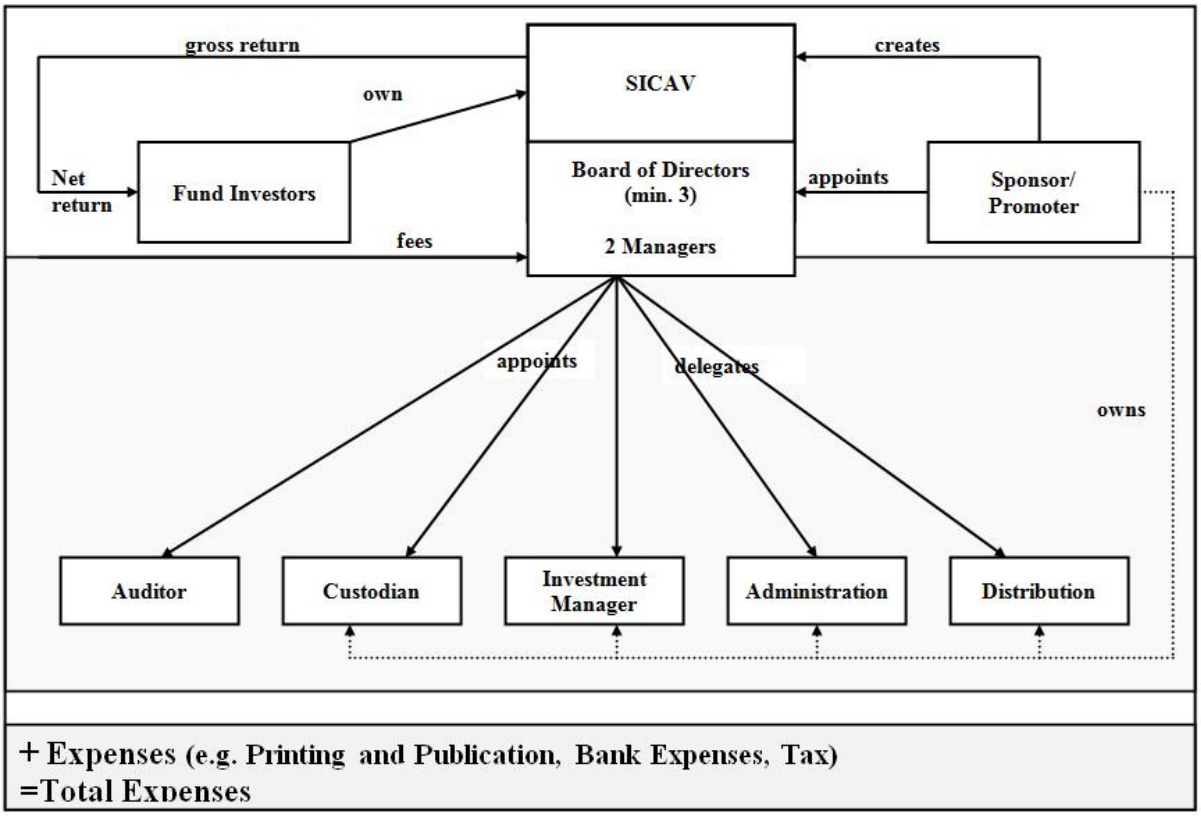


Figure 4.5: Structure of Self-Managed SICAV under UCITS III



4.1.3 Fund Governance under UCITS III Directive

In the U.S., all mutual funds are organized in the corporate form with a board of directors. Much of the effort to strengthen governance of U.S. mutual funds has focused on independent directors.[10] Currently the Investment Company Act of 1940 stipulates that 50% of the directors have to be independent. The duty of independent directors includes that they annually have to negotiate and approve the advisory and distribution contracts.[11] This means that by law independent directors in the U.S. have a key role in the determination of fund expenses.

[10] Most notably, the SEC has focused its regulatory activities on the role of independent directors. In a recent speech, SEC Commissioner Annette Nazareth argued that funds do not compete on fees as investors predominantly only consider past performance when deploying their funds (see Nazareth, 2007). This view is also shared by Trzcinka (1998) who puts forward that competition is imperfect in the mutual fund industry as many fees are hidden or charged in a complicated manner. Furthermore, redemptions may not be an effective disciplining device as many funds charge load fees which dissuade investors from redeeming their funds (see Chordia, 1996).

[11] An overview of the duties of independent directors under the Investment Company Act of 1940 can be found in Tate (2000).

The governance environment in Luxembourg is different. As outlined in the last section 4.1.2, funds can either be set up in the contractual form, FCPs, or in the form of investment companies, SICAVs. This means that in order to analyze the governance environment in Luxembourg, one has to distinguish between these two legal forms. In the case of FCPs, Article 14 of the Law stipulates that the management company has to manage the fund in the interest of the fund holders. Furthermore, Article 20 says that the management company and the depositary "must act independently and solely in the interest of the unitholders". In the case of SICAVs, Article 38 of the Law requires that the depositary "must act solely in the interest of the shareholders". This means that in the case of FCPs, the oversight role is generally assumed by the custodian as there is no board of directors while in the case of SICAVs, the oversight role is deferred to the board of directors as well as to the custodian. Yet in contrast to the U.S., the Law does not contain any rules concerning independent directors.

4.1.4 Fee Structure

At the most general level, fees and expenses can be categorized into two broad groups:[12]

- Fees that are paid directly by investors (shareholder fees)
- Fees and expenses that are deducted from the assets of the fund (annual operating expenses).

Table 4.3 groups the various fees by the above categorization and lists all different fees and expenses that belong to these two groups. Further, it shows the fee payer, the recipient, and the frequency of fee payment. Shareholder fees, the first category, can be further divided into load charges and other charges. Loads (on purchases or redemptions) are primarily used to reimburse brokers or financial advisers if fund shares are offered through those service providers.[13] Loads on purchases are often called "front-end sales loads" and deferred loads are usually referred to as "back-end sales loads". Aside from load charges, there can also be redemption, exchange or purchase fees. These fees do not represent loads as they are not used to reimburse brokers, but they are credited to the fund for charges in association with redemption or purchases of fund shares.

The second broad category, annual operating expenses, can be further divided into fees and expenses that are related to the management of fund assets and fees that are

[12] The presented material follows closely the information provided on the SEC homepage: http://www.sec.gov/answers/mffees.htm.

[13] Mahoney (2004) states that the fund usually determines the level of the load, but it is subsequently credited to the broker for investment advice.

paid to other service providers as well as general operating expenses, e.g. printing and publication of annual reports or taxes. The structure of management fees and expenses can best be explained by referring to Figure 4.3, 4.4, or 4.5, depending on the legal structure of the fund. If a management company has been designated (Figure 4.3 and 4.4), then a management fee will be paid to that party. Then, if the management company appoints further service providers for investment management, investment advisory or distribution of fund assets, it directly reimburses those third party service providers out of its own management fee. If the management company does not assume the role of the distributor or administrator, then the fund also pays fees for the distribution or administration of its assets. Furthermore, the investment manager, adviser or the management company could be granted a performance fee that depends on some performance hurdles to be met.[14] If the fund has no designated management company, but has appointed at least two managing directors from the board (Figure 4.5), then it usually appoints external parties for providing investment management and/or investment advisory services, distribution, and fund administration activities.

Service providers that have to be appointed and remunerated are custodian, auditor, registrar, and transfer agent. Other expenses relate to, e.g. the printing and publication of annual reports, bank expenses, or taxes ("taxe d'abonnement" in Luxembourg, currently 0.05% of total net assets, payable quarterly).

TERs (called "Total Expense Ratios" in Europe and "Expense Ratios" in the U.S.) are calculated by summing up all expenses, except for transaction costs (charges incurred for buying and selling fund securities) as they represent capital costs and not operating expenses, and then dividing this sum by average net assets. It is important to stress that TERs do not have to be reported in funds' annual reports in Luxembourg. This means it is rather difficult for fund investors to gather information about actual fund expenses. Fund investors can only refer to a funds' prospectus. Yet it is very cumbersome for investors to estimate the fee level from this document. First, the prospectus only includes fees as a percentage of net assets. Second, sometimes fees are even given as a step function of net assets. Third, performance fees depend on many parameters that cannot be determined ex ante. Fourth, fund expenses are not covered as they cannot be estimated ex ante.

A recent study by the ICI (Investment Company Institute) shows that U.S. mutual fund fees have been steadily declining since the eighties and hit a new record low at the end of 2006 (Investment Company Institute, 2007a). In 2006, U.S. investors paid on average 107 basis points in fees and expenses for owning equity mutual funds. This figure can be split in 19 basis points incurred on loads and 88 basis points incurred on

[14] For more information on incentive fees in mutual funds refer to Das and Sundaram (1998).

all other expenses (see above). The ICI reports that fees and expenses for stock mutual funds have dropped by 50% since the eighties. Bond mutual funds incur costs of 83 basis points and money market mutual funds charge on average 40 basis points. By analyzing an international cross-section of 46,580 mutual fund share classes in 18 different countries for the year 2002, Khorana et al. (2007) find that on average Canadian equity mutual funds have the highest TER with 2.56%. The mean TER for all countries amounts to 1.29% and Luxembourg with a TER of 1.70% is situated in the upper range.[15] At the lower end of the spectrum is the U.S. with a TER of only 1.11%. In the U.S., distribution expenses are called 12b-1 fees after SEC rule 12b-1 that permits mutual funds to cover distribution and marketing expenses out of fund assets.[16]

Table 4.3: Fee Structure

	Paid by whom?	**To whom?**	**Paid how often?**
1. Shareholder Fees			
Loads			
Sales Charge (Load) Purchases	Investor	Broker	one time
Deferred Sales Charge (Load)	Investor	Broker	one time
Redemption Fee	Investor	Fund	one time
Exchange Fee	Investor	Fund	one time
Purchase Fee	Investor	Fund	one time
2. Annual Operating Expenses			
Management-Related			
Management Fees	Fund Assets	Management Company	Periodically
Investment Management Fees	Fund Assets	Investment Manager	Periodically
Investment Adviser	Fund Assets	Investment Adviser	Periodically
Performance Fee	Fund Assets	Management Company Investment Manager Investment Adviser	Periodically
Distribution Fees (U.S.: 12b-1 Fees)	Fund Assets	Management Company Distributor	Periodically
Administration Expenses	Fund Assets	Management Company Administrative Agent	Periodically

(continued)

[15] This result runs counter to the authors' presumption that offshore funds may have lower fees because their centralized operation and their international distribution would allow them to benefit from significant economies of scale.

[16] Siggelkow (2004) writes that the reasoning behind the introduction of 12b-1 fees was that the marketing and distribution costs would be equalized because of increased economies of scale. However, in reality, many funds use 12b-1 fees in order to defray these costs on fund shareholders as they usually do not decrease their non-marketing expenses. Mahoney (2004) considers two other hidden mutual fund costs which are "direct brokerage" and "soft-dollar commissions".

Table 4.3: *—Continued*

	Paid by whom?	**To whom?**	**Paid how often?**
Custodian Fees	Fund Assets	Custodian	Periodically
Transfer Agent Fees	Fund Assets	Transfer Agent	Periodically
Registrar Fees	Fund Assets	Registrar	Periodically
Auditor Expenses	Fund Assets	Auditor	Periodically
Director Fees	Fund Assets	Directors	Periodically
Other Expenses (Printing and Publication, Bank Expenses, Tax)	Fund Assets	Various	Periodically

This table groups mutual fund fees in shareholder fees and annual operating expenses. It lists all different fees belonging to these two categories. Furthermore, this table depicts the fee payer, the recipient, and the frequency of fee payments. Source: Funds'annual reports.

4.2 Related Literature

Investors (principals) want managers (agents) to maximize expected returns on their investments. Yet this objective may not necessarily correspond to the managers' interests as managers, in fact, serve two masters. Apart from mutual fund investors, the management company usually has its own shareholders who expects the management company to generate as much profit as possible. This latter objective corresponds to maximizing the management fee. Clearly, these two objectives are diametrically opposed to each other as mutual fund investors are interested in net returns, i.e. gross returns minus fees.

This paper focuses on two very central issues arising from this agency problem. First, if fund advisers sit on the mutual fund board, they are effectively able to negotiate their own compensation package. From the discussion above, there is reason to suspect that managers would try to set their advisory fee as high as possible. The remedy proposed in the U.S. was to get independent oversight on boards by requiring that a certain percentage of board seats have to be assumed by independent directors. However, such a rule is absent in Europe where rule-makers focused on the role of the custodian, the independent entity safeguarding the fund's assets. In the U.S., the 1940 Investment Company Act requires that at least 40% of the fund's board of directors has to be independent and that fund boards must approve advisers' fees and expenses. In 2001, the SEC tightened the rules and required that the majority of the fund board must be independent. Due to the inherent conflict between advisers and investors, the SEC believed that fees are too high. The SEC assumed that more stringent independence rules would enhance the effectiveness of boards when it comes to negotiate fees with their advisers. Yet in 2004, after the unraveling of scandals like "late trading" and "market-timing", the SEC tried to increase board independence even further to 75%. However, in 2004 the U.S. Chamber of Commerce sued the SEC on the grounds that it does not have the necessary authority to impose these amendments and in 2005, the new amendments were repealed by the

court. However, the debate on this subject continues.[17]

Second, if the management company belongs to a financial complex, like Goldman Sachs, they usually succumb to other interests. Vertical integration means that different service providers belong to the same complex. Therefore, service fees are not negotiated at arm's length basis, but are rather determined within different entities of the same financial complex. As they belong to a bigger financial institution with its own shareholders, there is reason to believe that fees are not set at competitive levels but rather to maximize the profits of the complex.

In the U.S., the exception to this rule is Vanguard. This fund is set up in such a way that the fund itself owns all common shares of Vanguard Inc., the management company. Fees are charged at cost-basis as no outside entity is involved in generating profits. If Vanguard employs outside managers,[18] it negotiates with them fiercely on the management fee. The other well-known management company in the U.S. that is privately held is Fidelity. Together, these two companies have the reputation of being low-cost providers.[19] More than fifty years ago, all management companies have been privately held in the U.S.[20] However, in 1958, the SEC lost a pivotal court case and since then a trend towards organizing funds as public companies prevailed. Nowadays, 36 out of the 50 largest fund advisers in the U.S. are owned by big financial groups.[21]

The most important empirical evidence on independent directors and vertical integration will be presented in the following two sections.

[17] In 2006, the SEC invited public comment on two studies conducted by its Office of Economic Analysis (OEA). The first is the "Literature Review" (Office of Economic Analysis, 2006a) and the second is the "Power Study" (Office of Economic Analysis, 2006b). See also the response by the ICI (2007) "A Review of the SEC Office of Economic Analysis Board Independence Studies" (Investment Company Institute, 2007b) and Coates (2007) who was hired by Fidelity Investments for responding to the SEC rules.

[18] Freeman and Brown (2001) report that actual fees paid to Vanguard external managers amount to 13.2 basis points which is less than the value weighted average management fee.

[19] For example, Edward C. Johnson 3d, the Chairman of Fidelity, describes the mission of Fidelity "to always act in the best interests of shareholders and customers. It should govern our thinking in everything we do", see http://personal.fidelity.com/myfidelity/InsideFidelity/, "A Letter from the Chairman".

[20] Coates and Hubbard (2006) argue that internal managed funds have been less cost efficient and therefore reorganized itself to external management.

[21] See "Mutual Funds: Trading Practices and Abuses that Harm Investors", November 3, 2003, The Senate Committee on Governmental Affairs Hearing.

4.2.1 Independent Directors and Fees

This section considers the literature on the structure of boards and mutual fund fees.[22] Fee negotiations are among the most direct tasks that a board has to fulfill and hence their effectiveness therein can easily be established.[23] Carhart (1997) finds for his sample of U.S. equity funds over the 1962 to 1993 period that expenses exert a one-to-one negative drag on performance (see also, Jensen, 1968; Elton et al., 1993). He states that a 100 basis point increase in expense ratios has a negative impact of 154 basis points on annual abnormal performance.

The literature on fees and the structure of the board[24] is not as extensively researched as the literature on mutual fund performance[25] The paper by Tufano and Sevick (1997) was one of the first in this vein. The authors focus on the effect of board structure on the fee level in the U.S. Their sample consists of the 50 largest sponsors in 1992 and they restrict their sample to open-end mutual funds. The authors argue that fund sponsors typically appoint the initial slate of board directors who are then supposed to monitor their sponsors. Tufano and Sevick (1997) find that this organizational setup is problematic for the following reasons: (i) why should the sponsor have an incentive to appoint its own vigilant watchdog, (ii) if independent directors serve on many boards, they, supposedly, compromise their independence and could become loyal to the sponsor, (iii) Tufano and Sevick (1997) are only aware of three instances where the board appointed another adviser than the initial sponsor.[26] They find evidence that lower fee rates are

[22] There is an ongoing debate on whether price competition is also an important factor for influencing fee levels. While Sirri and Tufano (1998), Freeman and Brown (2001), as well as Barber et al. (2005) find no evidence, Khorana et al. (2007) reveal that families gain a higher market share by charging lower fees relative to other families. This means that investors take fee levels in consideration when they deploy their funds.

[23] The following papers study independent directors in connection with different aspects. Khorana et al. (2006) focus on fund mergers. Zitzewitz (2005) considers market timing and late trading. Ding and Wermers (2005) analyze mutual fund performance. For related papers, see: Cremers et al. (2006) deals with incentives in the mutual fund industry. Stoughton et al. (2007) study the effects of intermediation. Dangl et al. (2006) put forward a continuous-time model on market discipline and internal governance in mutual funds. Ippolito (1992), Brown et al. (1996), Gruber (1996), Chevalier and Ellison (1997), Goetzmann and Peles (1997), Sirri and Tufano (1998), Busse (2001), Del Guercio and Tkac (2002), and Nanda et al. (2004) focus on the performance-flow relation. Berk and Green (2004) develop a model on mutual fund flows and performance. Kacperczyk et al. (2005) study the portfolio concentration versus fund performance.

[24] For the related discussion of companies' boards, see Hermalin and Weisbach (1991), Lipton and Lorsch (1992), Weisbach (1988), or Yermack (1996).

[25] For papers on mutual fund performance, see, for example, Sharpe (1966), Treynor (1966), Jensen (1968), Sharpe (1992), Hendricks et al. (1993), Grinblatt et al. (1995), Brown and Goetzmann (1995), Malkiel (1995), Elton et al. (1996), Gruber (1996), Wermers (2000).

[26] Similarly Kuhnen (2005) shows that funds rarely renegotiate their contracts or change their adviser. This is despite the fact that the author also shows that contractual rearrangements would be in the interest of shareholders as changing the adviser leads to a positive impact on performance.

set by funds having the following characteristics: a smaller board, more independent directors serving on the board, and if board members sit on multiple boards for the same sponsor. Moreover, they could detect a positive relation between director remuneration and the advisory fee.

Del Guercio et al. (2003) also focus on the effectiveness of boards as monitors. However, Del Guercio et al. (2003) focus on closed-end investment companies in contrast to open-end funds.[27] Their sample consists of a cross-section of 476 closed-end funds in 1996. As measure of board effectiveness, Del Guercio et al. (2003) employ the fund expense ratio and they find that boards with low expense ratios have smaller boards, more independent directors, and lower director compensation. The first two results are in line with the evidence retrieved for the open-end fund universe by Tufano and Sevick (1997) but this is not the case for the last result.

In contrast to the previous two studies, Ferris and Yan (2007) do not find any evidence for their cross-section of 448 fund families in 2002 that board independence and an independent chairman are related to lower fees:[28] However, their analysis reveals that board size and the number of funds overseen by each independent director have a positive impact on expense ratios.

In contrast to the previous authors, Meschke (2007) uses a panel data set of 91 sponsors for the period 1994 to 2005. He argues that the time dimension is important in order to ascertain whether independent directors take decisions because of their independence or because the derived relationship is an outcome of optimal contracting.[29] He finds that independent chairs are associated with lower fees, but the relation between independent directors and fees varies with the time period. In the 1995 to 2001 period, the fraction of independent directors is positively related to fees and from 2002 onwards this relationship is reversed.

From the discussion above, it is not clear how independent directors relate to the level of fees as, first, only the earlier studies, i.e. Tufano and Sevick (1997) and Del Guercio et al. (2003), find a negative relationship between fees and independent directors and the more recent studies, i.e. Ferris and Yan (2007) and Meschke (2007), do not find any

[27] The important governance difference between closed-end funds and open-end funds is that the latter are continuously obliged to redeem shares at NAV (net asset value). Accordingly, Fama and Jensen (1983) argue that open-end fund shareholders have an effective disciplining device as they can withdraw assets from managers and therefore punish them.

[28] However, Ferris and Yan (2007) note that they may fail to find a significant relationship between board independence and fees as the median fund in their sample employed already 76% independent directors and the cross-sectional variation was rather low.

[29] This is in line with Deli (2002). For the same reasoning on corporate ownership refer to Demsetz and Lehn (1985).

conclusive evidence. Second, the legal environment in Luxembourg is completely different from the U.S. as there is no stipulated threshold for the minimum number of independent directors in Luxembourg as well as the role of independent directors in fee negotiations is not as emphasized in the European context as it is in the U.S. It is left to the empirical part to shed more light on this issue.

4.2.2 Effects of Vertical Integration

Coates and Hubbard (2006) state that mutual funds can either be externally managed, being the base case in the U.S., or they could be internally managed with investment management being carried out by internal officers. They argue that in a vertically integrated organization, fee levels (internal transfer prices) should be set competitively as otherwise resources within the entity would get misallocated.

This paper focuses on two dimensions of this aspect. First, it considers the degree of vertical integration of different external service providers to the fund. To be specific, I investigate to which extent sponsor, management company, and custodian are related at the financial group level. The particular structure of the legal system in Luxembourg also allows analyzing vertical integration in the original proposed sense, i.e. it is possible to shed light on the extent that funds are internally managed and what the consequences on fee rates are. This is the case as Luxembourg allows self-managed funds under UCITS III (section 4.1.3) which are structured like vertically integrated funds. The following discussion presents papers that also focus on the affiliation of different entities at the complex level.

In this vein, Massa and Rehman (2005) analyze whether the information generated by the lending branch of a financial institution is provided to the asset management arm of the same institution. This behavior would clearly violate Chinese walls. To put this into perspective, Massa and Rehman (2005) do not analyze the family affiliation,[30] but they focus on the complex level. They argue that many mutual funds not only belong to families of funds, but also to broader financial conglomerates that also engage in other activities, such as banking and insurance. Between 1990 and 2004 approximately 40% of mutual funds belonged to financial conglomerates in the U.S. This means that the fund manager is employed by a broader financial institution, having potentially differing interests from those of fund shareholders. Massa and Rehman (2005) test two opposing hypotheses: (i) mutual funds are used in support of the overall policy of the financial

[30] This was very prominent before in respect to cross-subsidization (see, for example, Massa, 2003; Gaspar et al., 2006).

group ("group support"); (ii) group affiliation helps funds that belong to the group because they receive inside information ("fund support"). Only the latter hypothesis is in line with shareholders' interests but both are beneficial for the group as a whole. Their results corroborate the second hypothesis, i.e. that funds benefit from the use of information from affiliated banks. They show that a bank-affiliated fund achieves a superior performance of about 1.8% per year. Taken together, the results reveal that funds affiliated to banks can benefit from their informational advantage by better discriminating among investment opportunities.

Another recent paper by Ritter and Zhang (2007) is conceptually related to the present subject. Ritter and Zhang (2007) investigate the relation between initial public offerings (IPOs) and mutual funds that are related to the lead underwriter that is also a large investment bank (i.e. Goldman Sachs). In line with Massa and Rehman (2005), they study two contradictory hypotheses. The "dumping ground hypothesis" says that IPOs are allocated to affiliated mutual funds in order to complete the deals if demand is not up to expectations. The "nepotism hypothesis" predicts a positive motive of investment banks in that they allocate hot IPOs to affiliated mutual funds in order to support the funds' performance. Their evidence predominantly supports the nepotism hypothesis, especially during the internet bubble. Taken together, Ritter and Zhang (2007) and Massa and Rehman (2005) find positive effects of mutual fund affiliation to large financial complexes.

Kuhnen (2007) also focuses on the conflicts of interest inherent in the mutual fund industry. Although her scope is different as she studies the connections between firm advisers and directors, her hypotheses can be applied to the current context. The author argues that business ties could either lead to efficient information transfer or they could also lead to unduly favoritism between agents. Accordingly, advisory contracts will not be determined at an arm's length basis and the board will abstain from intensive monitoring. Kuhnen (2007) finds evidence for the favoritism hypothesis. Her results show that funds where the board is more related to the adviser also have higher expense ratios as well as they compensate their advisers more handsomely.

To sum up, the extant literature does not allow to form any explicit expectations on vertical integration. In line with the authors above, I assume that the relationship between vertical integration and fund expenses can go in either two directions. Either the fund is nurtured with better information from the affiliated financial institution, and hence it can economize on its own research expenses. Alternatively, the fund could also be used by the affiliated institution in ways that are not congruent with maximizing the funds' returns.

4.3 Empirical Methodology

4.3.1 Database Construction

CCLux is the electronic reporting system of the Luxembourg stock exchange and the Luxembourg fund industry. More than 99% of UCITS domiciled in Luxembourg and registered with the Luxembourg Securities Regulator (CSSF) comply with their initial and ongoing disclosure obligations by filing electronically with CCLux. The bulk of the information in the database is contained in portable document format files (pdf), but a number of variables have been coded and can be retrieved in tabulated form. I analyze both types of data for the population of equity funds reporting through CCLux in the first half of 2007.

I analyze the CCLux database looking at different promoters, fund families and individual funds within the family. The analysis is limited to equity funds. I initially collect data on the geographical origin of the fund promoter, the geographical composition of the fund portfolio, the strategy, the launch date of the fund as well as the organizational type (SICAV or FCP).

Concerning the governance variables, I measure the degree of vertical integration by looking at five different dimensions. Generally, integration is determined by considering the owners of the concerned entity. For example, if the sponsor owns the management company, then this would be referred to as vertical integration. First, the fund is labeled "Fully Integrated Fund" (*FIF*) if the fund manager, the depository bank and the promoter belong to the same financial complex. Second, the fund is called "Partially Integrated 1" or "2" if either the fund manager and the promoter belong to the same group (*PI1*) or the depository bank and the promoter are related at the complex level (*PI2*). The fund is referred to as "Standalone Fund" (*SF*) if these three entities are not related at the complex level. These four different levels only pertain to funds with one sponsor. If a fund is launched by more than one promoter, then this group forms a separate category called "Funds with Multiple Promoters" (*MP*) versus "Funds with Single Promoters" (*SP*). As a second governance dimension, I also measure the proximity between the fund and the management company by investigating the composition of the fund's board. If a majority of the directors are directly affiliated with the management company, I consider the fund board and the management company as closely related.[31] For the definition of all governance variables refer to Table 4.4.

[31] I do not intend to measure director "independence".

Table 4.4: Fund Governance Variable Definitions

Fund Governance	Acronym	Definition
Organizational Type		
Investment Company	SICAV	Fund organized as an investment company
Contract Form	FCP	Fund organized via a contract
Vertical Integration		
Fully Integrated Fund	FIF	The fund manager and the depository bank belong to the same business group as the fund promoter typically a large international universal bank.
Partially Integrated 1	PI1	The fund manager belongs to the same group as the fund promoter, but not the depository bank.
Partially Integrated 2	PI2	The depository bank belongs to the same group as the fund promoter, but not the fund managers.
Standalone Fund	SF	The fund manager and the depository bank do not belong to the same group as the fund promoter. This includes cases where the fund manager and the depository bank belong to the same group.
Funds with Multiple Promoters	MP	Funds which are launched by more than one promoter form a distinct group
Proximity of Fund Board and Manager		
Management Company Majority	MCM=Yes	The majority of directors on the board of the fund are employees of the management company.

This table contains a brief description of the governance variables used in this study as well as the variables on the organizational type.

At the outset, I gather information on all equity funds registered with CCLux as of the first quarter of 2007. The initial number of funds comprises 2,670 equity funds. However, as the intention is to study UCITS, I have to clear the data from non-UCITS funds. This means that I have to exclude 63 specialized investment funds and 121 other equity funds that do not qualify as UCITS. Accordingly, the final sample of equity UCITS consists of 2,486 individual funds. Table 4.5 characterizes the 2,486 equity UCITS. Panel A shows that the overall number of UCITS can be grouped into 527 fund families and on average a fund family contains five UCITS. There are 338 different fund promoters offering at least one equity UCITS and the number of promoter fund family combinations amounts to 614 as promoters can offer more than one fund family as well as some fund families are offered by multiple promoters. Panel B contains descriptive statistics for the structure

of the fund's board. The overall number of directors ranges from a minimum number of three, corresponding to the legal minimum, to a maximum number of 21 directors. Fund boards have on average eight board members (the median is six). Panel C reports statistics for the universe of non-affiliated directors (i.e. not related to the management company). In total, 4,296 board seats are assumed by non-affiliated directors. However, only 531 different persons fill that total number of non-affiliated board seats. On average, one non-affiliated director sits on eight boards.

Table 4.5: Sample Characteristics

Summary		**Statistics**
Panel A. Equity UCITS Population		
Number of individual equity UCITS		2486*
Number of fund families containing at least one UCITS equity fund		527
Average number of UCITS equity fund per family		5
Number of UCITS equity fund promoters		338
Number of Promoter fund family combinations		614
Panel B. Board Structure**		
Minimum number of directors		3
Median number of directors		6
Mean number of directors		7.3
Maximum number of directors		21
Panel C. Non-affiliated Directors**		
Total number of non-affiliated directors' seats		4,296
Number of persons filling seats		531
	Mean	8.1
	Std. Dev.	12.6
Seats per person	Minimum	1
	Median	4
	Maximum	118

This table shows summary statistics for the population of Luxembourg registered equity funds that reported through the CCLux database in the first half of 2007. The total number of equity UCITS is 2,486. In Panel A, funds with multiple promoters are counted more than once. Panel B describes the board structure in Luxembourg for the 2,230 unique equity UCITS. Panel C contains an analysis of the non-affiliated directors (i.e. are not affiliated to the management company) represented on equity UCITS boards of the 2,230 unique UCITS.
*funds with more than one promoter are counted multiple times, once per promoter
**the analysis is only conducted for the 2,230 unique funds

Table 4.6 ranks the 338 different promoters according to their country of domicile. The majority of fund promoters are from Switzerland (70%), followed by Luxembourg itself, and Germany. Yet among the rank of the ten most represented promoter countries, there are not only European countries, the U.S. is also present with rank eight (6% of all promoters come from the U.S.).

Table 4.6: Breakdown of Promoters by Country of Incorporation

Rank	Promoter Country	No Promoters	Percent
1	Switzerland	70	20.71
2	Luxembourg	67	19.82
3	Germany	34	10.06
4	Italy	31	9.17
5	France	25	7.40
6	Belgium	22	6.51
7	Great Britain	21	6.21
8	U.S.	20	5.92
9	Spain	12	3.55
10	Sweden	8	2.37
	Sub Total	**310**	**91.72**
	Sum All Promoters	**338**	**100**

This table shows the breakdown of the 338 different equity UCITS promoters by their country of incorporation. Countries are ranked according to the number of promoters and only the 10 most popular countries are shown.

Table 4.7 shows the number of funds by their central governance characteristics. It shows the data for the entire equity UCITS population as well as for the 20% random sample that will be considered for analyzing the fee levels. Panel A reports the degree of vertical integration. The vast majority of funds are integrated at the management level, with the fund manager and the fund promoter belonging to the same group. 40% of the funds are fully integrated (random sample: 42%) and in another 47% of all cases (random sample: 45%) only the depository bank does not belong to the same group. Only 10% of Luxembourg equity UCITS are standalone funds.[32] If one also considers the 179 funds with multiple promoters, the number of all unique equity UCITS amounts to 2,230.

Panel B reports the proximity of the fund and its manager at the board level. In 74% (random sample: 75%) of all cases, the majority of fund board members are affiliated to the management company. This result is consistent with the evidence reported in Panel A.

[32] Note that even this might be an overestimate, because in some cases I might have failed to trace the ownership or control link between the fund promoter's business group and the fund management company.

Table 4.7: Number of Funds by Integration and Board Structure

Panel A. Degree of Vertical Integration

		UCITS Population		20% Random Sample	
		No. Obs.	Percent	No. Obs.	Percent
Funds with Single Promoter					
Fully Integrated Fund	FIF	815	40%	177	42%
Partially Integrated 1	PI1	971	47%	187	45%
Partially Integrated 2	PI2	55	3%	11	3%
Standalone Fund	SF	210	10%	41	10%
Subtotal		2,051	92%	416	85%
Funds with Multiple Promoters	MP	179	8%	74	15%
Total		**2,230***	**100%**	**490***	**100%**

Panel B. Proximity of Fund Board and Manager

		UCITS Population		20% Random Sample	
		No. Obs.	Percent	No. Obs.	Percent
	Yes	1,645	74%	367	75%
	No	585	26%	123	25%
Total		**2,230***	**100%**	**490***	**100%**

Panel A shows the frequency distribution of Luxembourg registered UCITS by the different degrees of vertical integration. Panel B reports the proximity of the fund board and the manager. All categories are defined in Table 4.4. The number of standalone funds is likely to be an overestimate as I might have failed to identify a parent-subsidiary relationship between the fund promoter and the management company or depository bank, especially when they have different names.
*funds with multiple promoters are included once

Apart from the unique dataset on the governance of UCITS, I also manually collected information on actual fund expenses. This was done by drawing a 20% random sample resulting in a final data set of 490 funds. For these funds, the annual reports closest to the financial year 2006 were retrieved. I collected information on the actual expenses of the various funds from their income statement contained in their annual report. Hence the data comprises all actual expense items (in the respective currency) that the fund reported. Furthermore, data on net assets (assets minus liabilities) for the current and the previous financial year was also taken from the annual statements.

4.3.2 Estimation Methodology

The regression analysis estimates the following cross-sectional model:[33]

$$Fee = f(\text{governance}, \text{fund size}, \text{fund family size}, \text{fund age}, \text{number of funds per promoter}, \text{performance}, \text{legal choice}, \text{portfolio region dummies}, \text{investment style dummies})$$

The variables are explained in the following sections. Concerning the estimation technique, the coefficient estimates are estimated by ordinary least squares (OLS) but with fixed effects for the legal choice. The reason is that the Law treats each fund as a separate legal entity, but many fund variables are determined at the fund family level inducing cross-sectional correlation between the funds. Therefore, pooled regression is likely to understate the standard errors and accordingly overstate the statistical significance of the model. Accordingly, the statistical significance will be determined on the basis of robust standard errors that are clustered at the fund family-level. This method takes into account that individual funds within a fund family may not be independent. In untabulated results, I also used two other estimation specifications that are not reported for the sake of brevity.[34]

4.3.2.1 Dependent Variables

As one of the primary responsibilities of the board is to negotiate fee levels, I use expense ratios as a measure of board effectiveness and consequently as an indicator for the governance conflict inherent in the mutual fund industry (see, also, Tufano and Sevick, 1997; Del Guercio et al., 2003; Ferris and Yan, 2007). Specifically, I use four different measures

[33] One of the main conclusions of the two OEA Memorandums "Literature Review on Independent Mutual Fund Chairs and Directors" and "Power Study as Related to Independent Mutual Fund Chairs" was that there is a lack of a sound structural model to isolate a given effect in this area. However, I try to do the next best thing and base my model on empirical models that have been established in the literature so far (see, for example, Tufano and Sevick, 1997; Del Guercio et al., 2003; Ferris and Yan, 2007; Khorana et al., 2007; Meschke, 2007). Furthermore, the SEC proposed in 2000 an empirical model for estimating fund fees ("Report on Mutual Fund Fees and Expenses") from which I also draw on.

[34] Furthermore, I estimated a variation of the Fama and MacBeth (1973) approach. I first estimate cross-sectional regressions for each legal choice (FCP, SICAV with management company, SICAV self-managed) and then average over those cross-sectional estimates. This is done in order to control for differences across different legal organizational forms and it represents an alternative to including dummies for fixed effects. As a last estimation method, I ran regressions based on averages for sponsors. This means that the dependent and independent variables represent averages based on fund-level variables. This estimation methodology corrects for the overstated statistical significance that is potentially present in the pooled regressions. The qualitative results are similar.

of expense ratios. The first is the fund's total expense ratio (TER) which is calculated as the sum of all fees and expenses divided by average net assets.

$$TER = \frac{Sum(\text{fund expenses})}{\text{Average net assets}}$$

The second, MER, is the management expense ratio. It is calculated as the sum all fees for the management of fund assets divided by average net assets. It is important to stress that this figure is not available in any database and only the nature of the self-collected data allowed me to compute this variable. In order to make this figure comparable across funds, I calculate it as the sum of fees for the management company, investment adviser, investment manager, and also fees for central administration and distribution. These latter two items have to be included in order to arrive at a common denominator as some funds provide these services in-house and some contract it to external providers.

$$MER = \frac{Sum(\text{management expenses})}{\text{Average net assets}}$$

The third, *TER(Nw.)*, is very similar to the first measure except that it does not include a potential fee waiver that the management company may have granted. This means that this variable actually depicts all the fees and expenses incurred by the fund over the reporting period.[35]

$$TER(Nw.) = \frac{Sum(\text{fund expenses} - \text{fee waiver})}{\text{Average net assets}}$$

The last expense ratio measures total shareholder costs as it not only includes the fund expenses, but also direct expenses that shareholders have to pay when entering and exiting a fund. This means that TSC also includes loads that are amortized over five years as a five year holding period is commonly assumed (see, Khorana et al., 2007).

$$TSC = \text{TER} + \frac{\text{Initial load}}{5} + \frac{\text{Back-end load at five years}}{5}$$

4.3.2.2 Control Variables

In addition to the governance variables that have been presented in section 4.3.1., I also control for a number of other variables that might influence fee levels. The entire popula-

[35] TER (Nw.) is calculated for showing the effect of the fee waiver on reducing fund fees and hence it is only included in the summary statistics part. For the sake of brevity, it will not be considered as dependent variable in the regression analysis.

tion of control variables is calculated similarly to Tufano and Sevick (1997), Del Guercio et al. (2003), Ferris and Yan (2007), and Meschke (2007).

First of all, *fund and fund family size* are computed as the logarithm of total net assets in euros. These two variables control for economies of scale in fund management. *Fund age* is also included as a control variable as there might arguably be significant fee differences between young start-up funds or well established funds (see, also, Tufano and Sevick, 1997; Del Guercio et al., 2003; Meschke, 2007). Furthermore, *fund performance*, calculated as the change in fund NAV (asset-weighted share classes) over the period, is also controlled for in the regressions. The reason is that higher fees might have their justification if they are coupled with higher performance. As there also might be positive spill-over effects between funds of the same sponsor, the *number of funds* offered by a sponsor is also included. In terms of dummies, the analysis controls for the primary region where the fund invests and for the style of the fund (income, growth, blend). Furthermore, the regressions contain dummies for the legal choice (FCP, SICAV with management company, SICAV self-managed).

4.3.3 Descriptive Statistics

Table 4.8 groups net assets in quintile and shows for each quintiles how much of total fees and expenses is spent on management, fees, and expenses. The table reveals that the majority of expenses is credited to the management company and that the management fee rate increases with assets under management. This relationship is reversed for fees (e.g. for custodian, transfer agent, and registrar) and expenses (e.g. printing and publication expenses) which decrease with increasing assets. Fees and expenses together consume only 12% of total fund expenses whereas the management fee rate constitutes 88% of fund expenses.

Table 4.8: Split of Fund Expenses by Net Assets

Net Assets Quintile	Net Assets Range (in EUR 000)	No. Obs.	Management (Percent)	Fees (Percent)	Expenses (Percent)
1	0 - 13	98	65.20	6.74	28.07
2	14 - 34	98	71.61	12.59	15.80
3	35 - 92	98	77.99	10.20	11.81
4	93 - 236	98	80.57	6.29	13.58
5	237 - 90,300	98	88.89	5.98	5.40
Total	**0 - 90,300**	**490**	**87.59**	**6.15**	**6.38**

This table is grouped into quintiles of net assets. It shows how much of the total fees and expenses is spent on the management of the fund, on various fees, and on general expenses. "Management" encompasses the management company fee/advisory fee/investment management fee and central administration and distribution. "Fees" contains the payments to various service providers, like the custodian, transfer agent, registrar. "Expenses" encompasses bank expenses, expenses for the auditor, tax payments, printing and publication expenses.

Table 4.9 contains summary statistics as well as pair-wise correlations on key fund characteristics to profile the sample. Panel A shows that the average fund is seven years old and has a *TER* of 2.04%. The fund total net assets (in thousands) amount on average to EUR 433 while the fund family total net assets (in thousands) are equal to EUR 9,776. Furthermore, on average 27% of the board seats are taken by non-affiliated directors. Panel B presents correlations for the variables considered in Panel A. It reveals that *TER* and *family TNA* are significantly negatively correlated. This result points to economies of scale at the fund-family level. It also shows that *fund TNA* and *family TNA* are significantly positively correlated as one would expect. This table also reveals that there is a significant positive correlation between performance *perf. (%)* and *family TNA*. Furthermore, *family TNA* and *perf. (%)* are negatively and *TER* positively correlated with the percentage of non-affiliated directors (*% NA*).

Table 4.9: Summary Statistics and Correlations

Panel A. Summary Statistics

	Obs.	Mean	Median	Standard Deviation	10th Percentile	90th Percentile
TER (%)	489	2.04	1.87	1.14	0.98	3.01
Fund TNA	490	433	55	4117	6	604
Family TNA	490	9,776	2,475	16,700	75	26,600
Perf. (%)	483	18.80	17.10	16.00	1.65	39.00
Fund Age	490	6.99	6.25	4.98	1.59	13.20
% NA	490	0.27	0.25	0.29	0.00	0.67

(continued)

Table 4.9: —*Continued*

Panel B. Correlations

	TER (%)	Fund TNA	Family TNA	Perf. (%)	Fund Age (Years)	% NA
TER (%)	1.00					
Fund TNA	-0.02 (0.697)	1.00				
Family TNA	-0.12* (0.009)	0.17*** (0.000)	1.00			
Perf. (%)	-0.07 (0.131)	-0.02 (0.698)	0.20*** (0.000)	1.00		
Fund Age (Years)	-0.04 (0.337)	-0.01 (0.771)	0.12* (0.009)	0.07 (0.145)	1.00	
% NA	0.30*** (0.000)	-0.02 (0.596)	-0.19*** (0.000)	-0.09** (0.046)	-0.03 (0.569)	1.00

This table presents summary statistics (Panel A) and correlations (Panel B) for selected variables. TER means Total Expense Ratio and is defined as the sum of all expenses divided by average net assets for that year. Fund TNA refers to fund total net assets (assets minus liabilities) taken from the annual reports of 2006 and converted to Euros (in thousands). Family TNA is the sum of all total net assets of the respective family where the fund belongs to. It is also calculated in thousand Euros. Perf. stands for Performance and is calculated as the percentage change in NAV (net asset value) over the reporting period. Fund Age covers the period from inception of the fund until the end of the reporting period. % NA is the percentage of non-affiliated directors and it is calculated by investigating which directors of the fund's board are not affiliated to the management company. Panel A shows the summary statistics for those variables. Panel B shows pairwise correlations. P-values are reported in parentheses below the various coefficients. ***, **, and * denote significance levels of 1%, 5% and 10% respectively.

Table 4.10 considers the same set of variables as Table 4.9; however, it shows their means grouped by the two governance dimensions. Several relations are noteworthy. It reveals that *FIF* and *SF* funds are relatively comparable concerning fund size as well as fund family size. Also there is not much performance difference between *FIF* and *SF* funds. However, *SF* funds have a higher percentage of non-affiliated directors. On average, *SF* fund boards contain 63% of non-affiliated directors while only 13% of the directors on boards of *FIF* funds can be considered as non-affiliated. This means that vertical integration also leads to greater management affiliation at the board level. Panel B considers board proximity. The following interesting facts emerge. Boards that are dominated by the management company are bigger in size at the fund as well as the fund family level. The average performance as well as age are relatively similar for funds where the management company dominates the board against their counterparts.

Table 4.10: Summary Statistics by Degree of Vertical Integration and Board Proximity

Panel A. Summary Statistics by Degree of Vertical Integration

	FIF	PI1	PI2	SF	SP	MP	Total
TER (%)	1.87	1.83	2.71	2.45	1.93	2.67	2.04
Fund TNA	325	743	33	218	494	90	434
Family TNA	11,700	11,900	284	10,900	11,400	596	9,776
Perf. (%)	19.10	20.50	13.90	17.40	19.40	15.30	18.80
Fund Age (Years)	6.93	7.26	4.35	6.80	7.00	6.94	6.99
% NA	0.13	0.21	0.71	0.63	0.23	0.5	0.27

Panel B. Summary Statistics by Board Proximity

	MCM Yes	MCM No	Total
TER (%)	1.93	2.37	2.04
Fund TNA	508	212	434
Family TNA	11,000	6,109	9,776
Perf. (%)	18.70	19.30	18.80
Fund Age (Years)	6.98	7.03	6.99
% NA	0.14	0.65	0.27

This table shows means for selected variables. Panel A reports means by degree of vertical integration (abbreviations are described in Table 3). Panel B shows means by board proximity (see Table 4.4). TER means Total Expense Ratio and is defined as the sum of all expenses divided by average net assets for that year. Fund TNA refers to fund total net assets (assets minus liabilities) taken from the annual reports of 2006 and converted to Euros (in thousands). Family TNA is the sum of all total net assets of the respective family where the fund belongs to. It is also calculated in thousand Euros. Perf. stands for Performance and is calculated as the percentage change in NAV (net asset value) over the reporting period. Fund Age covers the period from inception of the fund until the end of the reporting period. % NA is the percentage of non-affiliated directors and it is calculated by investigating which directors of the fund's board are not affiliated to the management company.

Table 4.11 summarizes mean fees on the basis of the governance variables. Panel A shows that among funds with single promoters, *PI1* funds have the lowest expense ratios in terms of *TER*, followed by *FIF* funds and *PI2* funds. *SF* funds have on average the highest expense ratios with 2.45%, compared to 1.83% for *PI1* funds. Yet multiple promoters represent the most expensive group with *TERs* of 2.67%. On average, Luxembourg equity UCITS have a *TER* of 2.04%. Panel B contains splits by proximity of the fund board and the manager. Funds where the majority of board directors are affiliated with the management company have lower *TERs* (1.93%) compared to their peer group (2.37%).

Table 4.11: Fee Structure by Vertical Integration and Proximity

Panel A. Degree of Vertical Integration						
		Obs.	**TER**	**MER**	**TER (Nw.)**	**TSC**
Funds with Single Promoter	SP					
Fully Integrated Fund	FIF	177	1.87	1.26	1.88	2.79
Partially Integrated Fund I	PI1	187	1.83	1.41	1.90	2.77
Partially Integrated Fund II	PI2	11	2.71	1.65	2.71	3.44
Standalone Fund	SF	41	2.45	1.58	2.47	3.20
Subtotal	*SP*	*416*	*1.93*	*1.37*	*1.97*	*2.84*
Funds with Multiple Promoters	*MP*	*73*	*2.67*	*1.73*	*2.70*	*3.60*
Total		**489**	**2.04**	**1.42**	**2.08**	**2.95**
Panel A. Degree of Vertical Integration						
		Obs.	**TER**	**MER**	**TER (Nw.)**	**TSC**
Management Company Majority	Yes	367	1.93	1.35	1.97	2.83
Management Company Majority	No	122	2.37	1.64	2.41	3.31
Total		**489**	**2.04**	**1.42**	**2.08**	**2.95**

This table shows means for the different fees by degree of vertical integration (Panel A) and proximity of fund board and manager (Panel B). The governance variables are defined in Table 4.4. TER means Total Expense Ratio and is defined as the sum of all expenses divided by average net assets for that year. MER refers to all expenses for management services (adviser, investment manager, management company) divided by average net assets. TER (Nw.) is similar to TER but the former variable does not include a fee waiver. TSC stands for Total Shareholder Costs and is calculated as TER plus one fifth of the subscription or redemption fee.

Table 4.12 presents t-tests for the equality of means between *TERs* of different governance groups. It further shows non-parametric Wilcoxon-Mann-Whitney tests for difference in median fee levels. As can be seen from Panel B, there is a significant difference in fees between *PI2* funds and *FIF* funds with *FIF* funds having lower *TERs* than *PI2* funds. Panel C also reveals that there exist significant fee differences between *SF* and *FIF* funds. Like in Panel B, *FIF* funds have lower TERs than *SF* funds. Furthermore, Table 4.13 contains the same set of tests as Table 4.12 but considers different groups. Panel A analyzes the fee differences between funds with single promoters versus funds with multiple promoters. Generally, the fees of those two groups are significantly different from each other with *TERs* for single promoter funds being lower. In Panel B, the fee difference between funds where the majority of the board directors is affiliated with the management company and funds where this is not the case is considered. The results show that there exist significant fee differences between those two groups with the latter having lower *TERs* than the former.

Table 4.12: Differences in Fee Structure by Degree of Integration

Panel A. Partially Integrated 1 vs. Fully Integrated Fund

	Obs.	**Diff. Mean**	**T-Test 2 Sample Test** (p-values)	**Diff. Median**	**Wilcoxon 2 Sample Test** (p-values)
TER	364	-0.043	0.640	0.023	0.781
MER	364	0.144	0.102	**0.210**	0.041
TER (Nw.)	364	0.016	0.888	0.035	0.657
TSC	364	-0.018	0.863	0.015	0.586

Panel B. Partially Integrated 2 vs. Fully Integrated Fund

	Obs.	**Diff. Mean**	**T-Test 2 Sample Test** (p-values)	**Diff. Median**	**Wilcoxon 2 Sample Test** (p-values)
TER	188	**0.842**	0.008	**0.494**	0.014
MER	188	0.389	0.133	**0.535**	0.021
TER (Nw.)	188	**0.828**	0.010	**0.494**	0.015
TSC	188	**0.651**	0.059	0.471	0.308

Panel C. Standalone vs. Fully Integrated Fund

	Obs.	**Diff. Mean**	**T-Test 2 Sample Test** (p-values)	**Diff. Median**	**Wilcoxon 2 Sample Test** (p-values)
TER	218	**0.583**	0.001	**0.222**	0.002
MER	218	**0.314**	0.033	**0.284**	0.016
TER (Nw.)	218	**0.581**	0.001	**0.279**	0.002
TSC	218	**0.409**	0.020	**-0.031**	0.042

This table presents univariate results for the different fee categories: TER means Total Expense Ratio and is defined as the sum of all expensed divided by average net assets for that year. MER refers to all expenses for management services (adviser, investment manager, management company) divided by average net assets. TER (Nw.) is similar to TER but the former variable does not include a fee waiver. TSC stands for Total Shareholder Costs and is calculated as TER plus one fifth of the subscription or redemption fee. Panel A considers the differences in fees of Partially Integrated Funds 1 (the management company belongs to the same group as the promoter) and Fully Integrated Funds (the management company, promoter, and custodian belong to the same group). Panel B focuses on the differences between Partially Integrated 2 (the promoter and the custodian belong to the same group) versus Fully Integrated Funds. Panel C reports the results for Standalone (custodian, promoter, and manager do not belong to the same business complex) versus Fully Integrated Funds. Differences in Mean and Median are calculated. A two independent sample T-test for the equality of means as well as a non-parametric Wilcoxon-Mann-Whitney test are performed. For both tests the p-values are reported.

Table 4.13: Differences in Fee Structure by Number of Promoters and Management Company Majority

Panel A. Funds with Multiple Promoters vs. Funds with Single Promoter					
	Obs.	**Diff. Mean**	**T-Test 2 Sample Test** (p-values)	**Diff. Median**	**Wilcoxon 2 Sample Test** (p-values)
TER	489	**0.743**	0.000	**0.473**	0.000
MER	489	**0.360**	0.001	**0.114**	0.015
TER (Nw.)	489	**0.729**	0.000	**0.464**	0.000
TSC	489	**0.766**	0.000	**0.543**	0.000
Panel B. Management Company Majority No vs. Yes					
	Obs.	**Diff. Mean**	**T-Test 2 Sample Test** (p-values)	**Diff. Median**	**Wilcoxon 2 Sample Test** (p-values)
TER	489	**0.434**	0.000	**0.342**	0.000
MER	489	**0.287**	0.002	**0.247**	0.000
TER (Nw.)	489	**0.437**	0.001	**0.357**	0.000
TSC	489	**0.478**	0.000	**0.311**	0.000

This table presents univariate results for the different fee categories: TER means Total Expense Ratio and is defined as the sum of all expensed divided by average net assets for that year. MER refers to all expenses for management services (adviser, investment manager, management company) divided by average net assets. TER (Nw.) is similar to TER but the former variable does not include a fee waiver. TSC stands for Total Shareholder Costs and is calculated as TER plus one fifth of the subscription or redemption fee. Panel A considers the differences in fees of funds with multiple promoters versus funds that are only launched by one promoter. Panel B focuses on the differences of funds where the board is not dominated by the management company (more than half of the board is not affiliated to the management company) and funds where the opposite is the case. Differences in Mean and Median are calculated. A two-independent-samples T-test for the equality of means as well as a non-parametric Wilcoxon-Mann-Whitney test are performed. For both tests the p-values are reported.

4.4 Empirical Results

Table 4.14 contains the regression results of fund expense ratios on measures of integration (1-2), board proximity (3-4), and the combined effects (5-7). All regressions are OLS regressions including dummies for the legal structure. Robust standard errors are clustered at the fund family-level. Panel A shows the results for *TERs*. Concerning the evidence on the measures of vertical integration, model (1) shows that standalone funds (*SF*) and partially integrated 2 (*PI2*) funds are significantly, relatively more expensive than fully integrated funds (*FIF*).[36] However, there is no statistical evidence that partially integrated 1 (*PI1*) funds charge relatively higher *TERs*. This latter result is

[36] It is important to emphasize that since the dummy for fully integrated funds is excluded from the regressions (to avoid the "dummy variable trap", i.e. perfect multicollinearity), all results concerning integration have to be interpreted by taking fully integrated funds as the base case.

consistent with the univariate results presented in Table 4.11 that also showed minor differences in fee levels between *PI1* and *FIF* funds. Taken together, the results show that funds that are not integrated with respect to their management company and the fund promoter, i.e. *SF* and *PI2*, have significantly higher fund expense ratios than funds that are fully integrated, i.e. *FIF* funds. Or to put it differently, as the results on the level of integration have to be interpreted by taking the *FIF* funds as the base case, the following implication can be drawn: Vertical integration with respect to the management company is beneficial for fund holders as these funds exhibit lower expense ratios after including a battery of control variables. This result is consistent with Massa and Rehman (2005) and Ritter and Zhang (2007) who also find positive effects of mutual affiliation to financial complexes. It could either result from the fact that management companies that belong to a financial complex have access to better information or that these funds can realize greater economies of scale because of positive spill-over effects from the group affiliation.

This result also lends credence to another, yet more benign interpretation based on competition. Vertically integrated funds tend to belong to big financial complexes that that offer many standardized funds where in their respective category competition is high. Yet *SF* funds are usually very peculiar funds with not as much competition in their category as *FIF* funds. This argument is consistent with the theoretical and empirical results by Luo (2002) that reveal that a significant portion of the fee is due to the mark-up that funds add if they are offered in a less competitive market category.

The control variables are in line with expectations. *Fund and fund family assets* are significantly, negatively related to fund expense ratios which is in line with economies of scale (Tufano and Sevick, 1997; Meschke, 2007; Khorana et al., 2007; Del Guercio et al., 2003). Yet there is no significant effect of *fund age* and *fund performance*. However, Tufano and Sevick (1997) and Khorana et al. (2007) also find no consistent evidence that these variables should matter and Del Guercio et al. (2003) do not even control for performance. One other interesting result to point out is that the legal choice seems not to be related to fund expenses. Model (2) does not control for the degree of vertical integration per se but controls for fee differentials arising from the existence of multiple promoters. This model clearly shows that multiple promoters significantly increase fund expense ratios. One possible explanation is that funds with more than one promoter have to serve differing interests and there could be coordination and communication problems between these promoters.

Model (3) and (4) present the results for the second governance mechanism, board proximity. According to model (3), funds that are dominated by their management com-

pany tend to have lower expense ratios. The flip side of this result is exemplified by model (4) which shows that non-affiliated directors are strongly associated with higher expense ratios. This result is in stark contrast to U.S. evidence and seems to be particularly surprising in light of the discussion in the U.S. which focuses on the role of independent directors as watchdogs for funds. However, in the context of Luxembourg, this result is not as startling for the following reasons. In the U.S., at least 50% of the directors have to be independent by law, while in the present sample of Luxembourg funds (see Table 4.9) on average only 27% of the directors are not affiliated to the management company. This means that independent directors of Luxembourg funds do not have a casting vote and hence their governance role is limited. Furthermore, the Investment Company Act of 1940 explicitly stipulates that independent directors have to renegotiate annually the advisory and distribution contracts. This legal duty is not given in Luxembourg. Yet this reasoning would be in line with independent directors having no influence on fund expenses, but the significantly positive correlation between independent directors and fees is an unresolved issue and future research is necessary to investigate this effect further.

With all the the necessary caveats in mind, one possible explanation of this results could be related to the evidence by Tufano and Sevick (1997) that well-paid independent directors approve higher fees. In the U.S., remuneration for independent directors is disclosed in the "Statement of Additional Information", however, in Luxembourg directors' fees are not disclosed separately,[37] but are rather put in the expense item "Other Expenses". Therefore, I am unable to test for this conjecture.

Importantly, Meschke (2007) also finds no consistent evidence of board independence and fund fees for the U.S. and Ferris and Yan (2007) also do not find evidence that funds with more independent directors charge lower fees. Only the earlier studies on this subject, i.e. Tufano and Sevick (1997) and Del Guercio et al. (2003) find a relation between independent directors and lower fees. Taken together, According to model (3) fund managers who also serve on the board are not prone to any conflicts of interest and consequently strive for lower fund expenses. This result is in line with the Law as it states that management companies have to act in the best interest of the fund holders.

The results contained in the last three columns of Table 4.14 combine the effects of vertical integration and board proximity in one model. According to model (5), if the two governance aspects are combined in one regression, only the positive effect of *SF* remains marginally significant. As the results change by combining the single governance aspects in one framework, this present model shows that the effects of board proximity and vertical integration are related. It could either be that they are complements or

[37] Only one fund in the sample provided information on directors' fees in its annual report.

substitutes. Yet this is the first preliminary evidence that the discussion in the U.S. is only applicable to a limited extent in Europe. The ongoing debate in the U.S. focuses on the microstructure of the funds. It deals with issues such as the optimal board composition of investment companies. But according to the present evidence, it is important to take a wider view and incorporate additional dimensions such as the affiliation of the management company and the custodian.

In order to disentangle the complementarity versus substitutability of the two governance aspects, model (6) and (7) present splits based on management company majority and additionally contain the variables on vertical integration. Model (6) is estimated for the subsample where the management company does not represent the majority on the board, i.e. *MCM* is equal to zero. In this case, no significant evidence for any fee effect of integration can be found. Model (7) restricts the population to funds where the management company dominates the board, i.e. *MCM* is equal to one, and in this instance, vertical integration is significantly and positively related to expense ratios. In line with model (1) for the entire population, model (7) reveals that standalone funds (*SF*) and funds that are partially integrated 2 (*PI2*) have significantly higher expense ratios than fully integrated funds. Taken together, strong management representation on the board goes hand in hand with tight relations between the management company and the promoter, and this combined effect leads to lower expense ratios. This means that it is crucial to take an integrated approach when studying the governance environment of mutual funds and the restriction to study only one dimension does not reveal the full picture. But it also means that the results so far do not lend credence to any conflicts-of-interest story, but rather to optimal contracting (for the same argument in the U.S. context refer to Almazan et al., 2004).

Panel B reports the results for the management expense ratio (*MER*). For the degree of vertical integration, a similar picture emerges as for *TER* from before. Partially integrated 2 (*PI2*) funds are more expensive (after controlling for various factors) than fully integrated funds (*FIF*) while for standalone funds (*SF*) no significant evidence can be found. Although management expenses are the most direct evidence on how the potential conflict of interest between funds and the management company can be measured, affiliation of the management company to the creator of the fund, the sponsor, does not seem to have any adverse effects on fund expenses. Put differently, large financial complexes do not seem to exploit their affiliated mutual funds by setting advisory rates as high as possible in order to maximize the income of the financial complex, rather the results suggest that affiliation to a large complex is beneficial for funds. Vertically integrated funds are comparable to family firms as they are set up and owned by the ones who also

manage them and this "family effect" seems to be advantageous for funds. In line with Panel A, multiple promoters increase fund expense ratios. Concerning the evidence on board proximity, the dominance of the management company is related to lower fees, but this evidence is not statistically significant. Again this result does not give any credence to potential agency conflicts embroiled in the mutual fund industry, since in that case we would have expected to find that board control of the management company leads to higher, not lower fees. Yet as before, non-affiliated directors are related to higher management fees. This evidence runs counter to any discussion on the effectiveness of independent directors in negotiating lower fees. Models (5) to (7) combine the two governance dimensions into one framework and are in line with the evidence presented for Panel A.

Panel C contains the results for total shareholder costs (TSC) representing all costs that a shareholder has to bear when investing in the fund. Several interesting observations can be made. Affiliation to a complex is again value-enhancing and board dominance of the management company is related to lower fees. Interestingly, according to model (6), if the management company does not dominate the board, then affiliation of the custodian to the promoter lowers total shareholder costs. This result reveals that there is a strong role for the custodian if the management company is weak. Model (7) sheds more light on the effects of integration and shows that standalone funds (SF) are significantly positively related to total shareholder costs for the subsample where the management company controls the board. Furthermore, a fund organized in the form of the contract model charges significantly higher fees than a fund with its own legal personality. This fact has to be emphasized. A contract form is closely related to the structure of, e.g., Vanguard, meaning that the fund is associated to the management company and not separated from the management company through the fund's own legal identity. Critics of the U.S. fund industry have put forward that the very structure of mutual funds, i.e. contracting out services, leads to agency conflicts and that it could be resolved if funds were internally managed. A recently published book by Wallison and Litan (2007) proposes a new legal structure for mutual funds called "managed investment trust" (MIT).[38] This structure would allow investors to buy units in a trust that are held by a bank and the portfolio is managed by an investment adviser. Yet this structure would not allow for a board of directors. This "new" legal structure is equivalent to FCPs in Luxembourg. And from the results of this study, no comparative advantage vis-a-vis existing investment companies (i.e. SICAVs) emerges.

[38] The authors argue that in the present organizational form of mutual funds, fee setting is done like in regulated industries and that this new MIT structure would allow advisers to set their own compensation and drive down costs.

Table 4.14: Regressions of Fund Expense Ratios on Measures of Integration and Board Proximity

Panel A. TER

	Integration		Board			Combined	
						MCM=0	MCM=1
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PI1	-0.004				0.002	-0.532	0.051
	(-0.03)				(0.01)	(-1.15)	(0.33)
PI2	0.721*				0.627	-0.901	2.001***
	(1.66)				(1.37)	(-1.64)	(5.61)
SF	0.473**				0.395*	-0.440	0.586*
	(2.18)				(1.70)	(-0.84)	(1.73)
Multiple promoters		0.563*					
		(1.94)					
MCM			-0.342**		-0.183		
			(-2.17)		(-1.03)		
Independent directors				1.223***			
				(4.46)			
Board size				-0.011			
				(-0.66)			
Log of fund assets	-0.129***	-0.133***	-0.132***	-0.104***	-0.128***	-0.101	-0.121***
	(-4.46)	(-4.53)	(-4.40)	(-3.74)	(-4.46)	(-1.19)	(-4.11)
Log of family assets	-0.123***	-0.110**	-0.125***	-0.137***	-0.122***	-0.448***	-0.090**
	(-2.68)	(-2.38)	(-2.61)	(-2.98)	(-2.66)	(-2.79)	(-2.04)
Log of fund age	0.026	0.018	0.036	0.020	0.026	-0.040	0.046
	(0.35)	(0.24)	(0.47)	(0.28)	(0.35)	(-0.23)	(0.55)
Log of number of funds	0.112	0.087	0.097	0.151*	0.113	0.514*	-0.006
	(1.17)	(0.92)	(1.04)	(1.65)	(1.18)	(1.96)	(-0.06)
Performance	-0.000	-0.001	-0.001	0.001	-0.001	-0.015**	0.005
	(-0.13)	(-0.25)	(-0.33)	(0.21)	(-0.18)	(-2.49)	(1.56)
FCP	0.113	0.163	0.170		0.156	0.129	0.395**
	(0.63)	(0.92)	(0.93)		(0.84)	(0.24)	(2.06)
Sicav self-managed				-0.229		0.064	
				(-1.22)		(0.14)	
Sicav management-company	-0.175	-0.165	-0.155	-0.301	-0.158		-0.022
	(-1.08)	(-1.02)	(-0.90)	(-1.64)	(-0.94)		(-0.13)
Distributor dummy	0.102	0.090	0.010	0.143	0.103	-0.069	0.338
	(0.54)	(0.50)	(0.05)	(0.85)	(0.55)	(-0.22)	(1.54)
Constant	5.082***	5.058***	5.540***	4.765***	5.163***	9.325***	4.293***
	(6.82)	(7.58)	(7.53)	(7.17)	(6.85)	(4.41)	(6.24)
Adjusted R^2	0.159	0.159	0.150	0.206	0.161	0.271	0.144
N	483	483	483	483	483	119	364

(continued)

Table 4.14–*Continued*

Panel B. MER

	Integration		Board			Combined	
						MCM=0	MCM=1
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PI1	0.106				0.111	-0.247	0.154
	(0.81)				(0.85)	(-0.74)	(1.03)
PI2	0.597**				0.527*	-0.525	1.742***
	(2.59)				(1.93)	(-1.36)	(4.56)
SF	0.272				0.214	-0.379	0.475*
	(1.52)				(1.14)	(-0.91)	(1.89)
Multiple promoters		0.376*					
		(1.80)					
MCM			-0.207		-0.137		
			(-1.62)		(-0.93)		
Independent directors				0.834***			
				(3.88)			
Board size				-0.010			
				(-0.67)			
Log of fund assets	-0.042	-0.044	-0.044	-0.025	-0.041	0.037	-0.061
	(-1.28)	(-1.35)	(-1.30)	(-0.76)	(-1.24)	(0.68)	(-1.60)
Log of family assets	-0.034	-0.023	-0.033	-0.040	-0.033	-0.176**	-0.033
	(-1.08)	(-0.74)	(-1.06)	(-1.29)	(-1.05)	(-2.33)	(-0.91)
Log of fund age	-0.014	-0.026	-0.014	-0.025	-0.014	0.064	-0.025
	(-0.21)	(-0.38)	(-0.21)	(-0.39)	(-0.22)	(0.51)	(-0.32)
Log of number of funds	-0.042	-0.060	-0.054	-0.016	-0.041	0.211*	-0.088
	(-0.55)	(-0.82)	(-0.73)	(-0.22)	(-0.54)	(1.73)	(-0.92)
Performance	0.002	0.001	0.001	0.002	0.002	-0.009**	0.006
	(0.55)	(0.43)	(0.38)	(0.76)	(0.51)	(-2.28)	(1.61)
FCP	-0.080	-0.085	-0.086		-0.048	0.176	0.000
	(-0.49)	(-0.53)	(-0.49)		(-0.28)	(0.52)	(0.00)
Sicav self-managed				0.044		-0.192	
				(0.27)		(-0.61)	
Sicav management-company	0.024	-0.001	0.004	0.114	0.036		0.025
	(0.17)	(-0.01)	(0.02)	(0.73)	(0.25)		(0.16)
Distributor dummy	0.044	0.025	-0.031	0.063	0.045	-0.034	0.219
	(0.28)	(0.16)	(-0.20)	(0.43)	(0.28)	(-0.18)	(0.98)
Constant	2.534***	2.586***	2.905***	2.183***	2.595***	3.591***	2.849***
	(4.52)	(5.04)	(5.43)	(3.83)	(4.66)	(2.73)	(4.44)
Adjusted R^2	0.046	0.050	0.042	0.087	0.047	-0.004	0.090
N	483	483	483	483	483	119	364

(continued)

Table 4.14–*Continued*

Panel C. TSC

	Integration		Board			Combined	
						MCM=0	MCM=1
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
PI1	0.025				0.036	-0.591	0.120
	(0.15)				(0.22)	(-1.31)	(0.67)
PI2	0.713				0.553	-1.229**	2.389***
	(1.33)				(0.97)	(-2.06)	(4.25)
SF	0.422*				0.290	-0.649	0.560*
	(1.97)				(1.24)	(-1.29)	(1.89)
Multiple promoters		0.682**					
		(2.15)					
MCM			-0.425**		-0.311		
			(-2.39)		(-1.54)		
Independent directors				1.322***			
				(4.13)			
Board size				-0.013			
				(-0.68)			
Log of fund assets	-0.122***	-0.125***	-0.123***	-0.094***	-0.120***	-0.108	-0.104***
	(-3.83)	(-3.89)	(-3.81)	(-3.05)	(-3.81)	(-1.08)	(-3.28)
Log of family assets	-0.116**	-0.099**	-0.117**	-0.130***	-0.114**	-0.482***	-0.080
	(-2.34)	(-2.02)	(-2.32)	(-2.71)	(-2.31)	(-2.78)	(-1.63)
Log of fund age	0.000	-0.016	0.005	-0.011	-0.001	0.001	-0.001
	(0.00)	(-0.18)	(0.06)	(-0.13)	(-0.01)	(0.01)	(-0.01)
Log of number of funds	0.143	0.119	0.132	0.189*	0.144	0.698**	-0.027
	(1.21)	(1.07)	(1.19)	(1.79)	(1.24)	(2.61)	(-0.21)
Performance	0.000	-0.000	-0.000	0.001	0.000	-0.014**	0.006*
	(0.09)	(-0.02)	(-0.11)	(0.43)	(0.01)	(-2.26)	(1.72)
FCP	0.063	0.120	0.132		0.136	-0.008	0.454**
	(0.31)	(0.59)	(0.61)		(0.63)	(-0.02)	(2.03)
Sicav self-managed				-0.181		0.033	
				(-0.82)		(0.08)	
Sicav management-company	-0.286	-0.279	-0.266	-0.361*	-0.257		-0.115
	(-1.54)	(-1.48)	(-1.32)	(-1.82)	(-1.34)		(-0.57)
Distributor dummy	0.109	0.129	0.034	0.171	0.111	-0.112	0.469**
	(0.54)	(0.68)	(0.17)	(0.94)	(0.55)	(-0.34)	(2.11)
Constant	5.859***	5.732***	6.317***	5.407***	5.996***	10.462***	4.982***
	(7.33)	(8.02)	(7.87)	(7.57)	(7.38)	(4.73)	(6.69)
Adjusted R^2	0.122	0.137	0.127	0.180	0.129	0.282	0.140
N	483	483	483	483	483	119	364

This table reports results of fund expense ratios on measures of vertical integration and board proximity. All models are ordinary least squares regressions including fixed-effects for the legal choice. The regressions use three sets of independent variables: (1) total expense ratios - panel A; (2) management expense ratios - panel B; and (3) total shareholder costs, i.e. total expense ratios plus annualized front- and/or back-end loads assuming a 5-year holding period. Standard errors are clustered at the fund-family level. The variables for integration and board proximity are described in Table 3. Log of fund assets is computed as the logarithm of fund total net assets (assets minus liabilities) taken from the annual reports of 2006 and converted to Euros. Log of family assets is calculated as the sum of all total net assets of the respective families where the fund belongs to. Log of fund age is the logarithm of the number of years the funds has been in existence. Log of number of funds is the logarithm of the number of funds per promoter. FCP, Sicav self-managed and Sicav management company are dummy variables for whether the fund is set up as FCP or an investment company that is either self-managed or has designated a management company. Performance is calculated as the percentage change in fund NAV (net asset value) over the reporting period. The models further include dummies for style of the fund (blend, growth, value) and dummies for the region where the fund mainly invests (Europe, Global, and Emerging Markets). Furthermore, dummies for the distribution are included, i.e. whether the principal distributor belongs to the sponsor. Statistical inference is based on robust standard errors clustered at the fund family-level. T-statistics are reported below the coefficients. ***, **, and * denote significance levels of 1%, 5% and 10% respectively.

4.5 Robustness Tests

Although the regressions contained in Table 4.14 control for the legal structure of the mutual fund, i.e. whether the fund is set up as a contract (FCP) or an investment company (SICAV) that is either self-managed or appoints a management company, the choice to actually organize the mutual fund in any of these forms could be endogenous with respect to fund expense ratios. For example, it could be that bigger funds are generally organized as SICAVs and bigger funds have also lower total expense ratios. Therefore, as a first robustness test, I examine the choice of the legal form by estimating the following logit regression:

$$\begin{aligned} FCP_i^* = \beta_0 &+ \beta_1 lnna_i + \beta_2 lnfamna_i + \beta_3 lnage_i + \beta_4 perf_i \\ &+ \beta_5 dis_i + \beta_6 nofund_i + \beta_7 mshares_i + \beta_8 promco_i \\ &+ \beta_9 gover_i + \beta_{10} areadum_i + \beta_{11} styledum_i + \nu_i \end{aligned} \tag{4.5.1}$$

where $lnna_i$ refers to log of fund net assets; $lnfamna_i$ denotes log of family net assets; $lnage_i$ is equal to log of fund age; $perf_i$ proxies for performance; $gover_i$ refers to the governance variables *PI1*, *PI2*, *SF*, and *MCM*; dis_i is the distributor dummy; $nofund_i$ is equal to number of funds per promoter; $areadum_i$ refers to the portfolio area dummies; $styledum_i$ is equal to the style dummies. All these variables were also contained in the regressions in Table 4.14, but two additional variables are added as instrumental variables. $Mshares_i$ is equal to one if the fund has multiple share classes and $promco_i$ is equal to one if the promoter is from European Union origin. FCP_i^* denotes a continuous latent variable that proxies for the probability of organizing a fund in the contractual form (FCP) versus an investment company ($SICAV$). FCP is equal to one if FCP_i^* is above zero and it is equal to zero in any other case. The results are contained in Table 4.15. As expected, the size of the fund significantly influences the choice of the legal structure.

In order to correct for a potential self-selection bias and validate the results from the previous section, it is important to model the choice of the legal form in a first step and then relate it to fund expense ratios.[39] This is done by applying a switching model with endogenous switching.[40] In general terms, the model is set up as follows:

[39] Furthermore, in untabulated tests the second legal choice which is a self-managed SICAV versus a SICAV that appoints a management company is studied under the same framework. The same qualitative results apply. For the sake of brevity the results are not presented here.

[40] For an overview of self-selection models, see Li and Prabhala (2006). For a detailed discussion of this model, see Maddala (1983) and for more recent material, see Woolridge (2002) and Greene (2008). For applications of this model in the financial context, see Dunbar (1995) and Fang (2005).

$$FCP_i^* = \gamma_i Z_i + \nu_i \tag{4.5.2}$$

$$TER_{sicav,i} = \beta_0 X_i + \epsilon_{0i} \tag{4.5.3}$$

$$TER_{fcp,i} = \beta_1 X_i + \epsilon_{1i} \tag{4.5.4}$$

Equation (4.5.2) is usually referred to as the selection equation and Z_i is defined by the variables contained in equation (4.5.1) from before. This models controls for self-selection as funds select the legal form based on private information. The latter concept is absorbed in these models via the "Inverse Mills Ratio" (for more details, refer to the Appendix). Consistent estimation of the expense equations requires the inclusion of this private information as otherwise an omitted variable bias would arise. The selection equation determines the regime (*SICAV* or *FCP*) to which the fund belongs. In the second step, the outcome equation, the fund is put into the group based on the regime determined in step one. To be specific, the two second stage regressions, (4.5.3) and (4.5.4), are equal to:

$$\begin{aligned} TER_i^* = \beta_0 + \beta_1 lnna_i + \beta_2 lnfamna_i + \beta_3 lnage_i + \beta_4 perf_i + \beta_5 dis_i \\ + \beta_6 nofund_i + \beta_7 gover_i + \beta_8 areadum_i + \beta_9 styledum_i + \epsilon_i \end{aligned} \tag{4.5.5}$$

Equation (4.5.5) contains all the variables that were also used to estimate the results in Table 4.14.[41] Importantly, $mshares_i$ and $promco_i$ are used as instrumental variables (see equation 4.5.1) and the system is estimated by applying the full information method to simultaneously estimate continuous and binary parts of the model.

The results are contained in Table 4.15 whereby columns (3) and (4) refer to vertical integration and columns (5) and (6) to board proximity.[42] Column (3) and (5) correspond to equation (4.5.3) from above and column (4) and (6) to equation (4.5.4). The last line in Table 4.15 present the p-values of the likelihood ratio test. It tests whether the errors from the choice equation (4.5.2) are related to the errors of the outcome equation, the equation determining fund expenses (4.5.3 and 4.5.4). The values are insignificant for all models which means self-selection bias arising from the legal choice does not pose any problems in this study. Generally speaking, after controlling for a potential self-selection bias, the results for the governance variables, the degree of vertical integration and board proximity, are still significant and in line with the results presented in Table 4.14.[43]

[41] Baum (2006) writes that set of explanatory variables, Z_i, contained in the selection equation must be a superset of the variables in the outcome equation, X_i.

[42] For the sake of brevity, the remaining governance variables, *multiple promoters* and *independent directors* are not included in the present model. Yet the same qualitative results apply.

[43] Although in this instance, the inclusion of the Inverse Mills Ratio is not necessary, it does not pose any problems in the sense that the estimates do not become biased, but it increases the standard errors. However, as all the variables are still in line with the results from previous section 4.4, this

Table 4.15: Robustness Tests

	Integration	Board	Integration		Board	
			FCP=0	FCP=1	FCP=0	FCP=1
	(1)	(2)	(3)	(4)	(5)	(6)
PI1	-0.971***		0.032	0.033		
	(-3.29)		(0.25)	(0.12)		
PI2	-1.223*		1.088***	-0.562		
	(-1.66)		(3.57)	(-0.83)		
SF	-1.065***		0.371*	0.582*		
	(-2.66)		(1.86)	(1.76)		
MCM		1.351***			-0.368***	-0.180
		(3.98)			(-2.97)	(-0.53)
Log of fund assets	0.216***	0.195**	-0.108***	-0.221***	-0.108***	-0.209***
	(2.58)	(2.36)	(-2.84)	(-3.48)	(-2.83)	(-3.23)
Log of family assets	0.015	-0.005	-0.139***	-0.049	-0.159***	-0.039
	(0.21)	(-0.07)	(-3.71)	(-0.86)	(-4.27)	(-0.68)
Log of fund age	0.067	0.115	0.071	-0.109	0.075	-0.124
	(0.44)	(0.76)	(1.06)	(-0.70)	(1.13)	(-0.79)
Log of number of funds	0.142	0.256*	0.055	0.072	0.070	0.053
	(0.98)	(1.86)	(0.78)	(0.54)	(1.05)	(0.42)
Multiple share classes	-1.787***	-1.836***				
	(-6.26)	(-6.44)				
Performance	-0.006	-0.005	0.001	-0.002	-0.000	-0.003
	(-0.74)	(-0.58)	(0.14)	(-0.24)	(-0.04)	(-0.49)
Promoter country	1.677**	2.127***				
	(2.13)	(2.64)				
Constant	-3.397**	-5.416***	4.981***	5.897***	5.633***	6.018***
	(-2.29)	(-3.76)	(8.63)	(7.07)	(10.22)	(7.32)
N	477	477	350	130	350	130
Pseudo R^2	0.168	0.178				
LR-test			0.6945	0.695	0.755	0.755

This table shows robustness tests for the previous results. Models (1) and (2) are logit regressions and models (3) to (6) are switching regressions with endogenous switching. The dependent variables in the first two columns is a dummy for the legal choice which is equal to zero in the case of SICAV and equal to one if the fund is organized as FCP. The last four columns use the TER as independent variable. The variables for integration and board proximity are described in Table 3. Log of fund assets is computed as the logarithm of fund total net assets (assets minus liabilities) taken from the annual reports of 2006 and converted into Euros. Log of family assets is calculated as the sum of all total net assets of the respective families to which the fund belongs to. Log of fund age is the logarithm of the number of years the fund has been in existence. Log of number of funds is the logarithm of the number of funds per promoter. FCP, Sicav self-manged and Sicav management company are dummy variables for whether the fund is set up as FCP or an investment company that is either self-managed or has designated a management company. Performance is calculated as the percentage change in fund NAV (net asset value) over the reporting period. The models further include dummies for style of the fund (blend, growth, value) and dummies for the region where the fund mainly invests (Europe, Global, Emerging Markets). Furthermore, dummies for the distribution are included, i.e. whether the principal distributor belongs to the sponsor. Multiple share classes is a dummy and equal one if the fund uses more than one share class. Promoter country is also a dummy and set equal to one if the promoter is of European origin. P-values of the likelihood ratio test for joint independence is reported in the last row. It tests the significance of the error terms in the selection and outcome equation. T-statistics are reported below the coefficients. ***, **, and * denote significance levels of 1%, 5% and 10% respectively.

lends additional credence to my results.

4.6 Conclusion

This paper studies the governance environment of the Luxembourg fund industry, which is the second largest fund domicile worldwide. I hand-collect unique data on a comprehensive sample of all equity UCITS (European equivalent of U.S. mutual funds) for the first quarter of 2007. Overall this study comprises 2,230 equity UCITS for which two key governance elements are investigated. First, the degree of vertical integration is examined, i.e. to which degree are fund promoter, management company, and custodian related at the fund complex level. This study finds that in the vast majority of all cases (90%), at least the custodian or the management company belong to the promoter. Put differently, only 10% of all funds in the sample are not vertically integrated. Second, I also investigate the board structure of equity UCITS and find that in 74% of all funds the management company is dominating the board, i.e. the majority of directors are affiliated to the management company.

Furthermore, I draw a 20% random sample and collect unique data on all dimensions of actual fees from the funds' annual reports. This data allows me, among other things, to compute expense ratios that are permanently the battle ground of regulators in the U.S. and are considered by scholars to represent a measure of governance effectiveness. Concerning univariate evidence, I find that the average equity UCITS charges a total expense ratio of approximately 2% and that funds that exhibit some degree of integration with their management company charge lower fees. On average, the most expensive funds are those with multiple promoters with a *TER* of 2.67%. Moreover, if more than half of the board is affiliated to the management company, expense ratios are lower.

I further investigate the relation between governance characteristics and expense ratios by applying a multivariate setting and controlling for a host of other fund characteristics. By applying three different expense ratio measures, I find consistent evidence that standalone funds, i.e. funds that are not integrated, are more expensive than funds that are fully integrated. Furthermore, the evidence reveals that expense ratios are lower for funds where the management company dominates the board.

As a robustness test, I examine the choice of the legal structure. Funds in Luxembourg can choose to organize themselves in the contract model (FCP) or as an investment company (SICAV). First, I examine the variables that determine that choice and then argue that that choice could be endogenous to the fee levels. In order to correct for this self-selection bias, I apply a switching model with endogenous switching. In this setting, most of the results hold and I cannot find any evidence for a self-selection bias.

Taken together, these results point to a value-increasing role of the management company in Luxembourg and do not corroborate any form of a conflicts-of-interest hypothesis. Rather the results point to an optimal contracting environment in Luxembourg. This result is interesting in light of the fact that there is hardly any governance regulation imposed on Luxembourg funds. Therefore, there is reason to assume that the legal freedom that Luxembourg funds enjoy leads to optimal contracting in the mutual fund industry.

As a fruitful extension to this work, it would be interesting to examine the role of competition in the present context. Future research could be directed at shedding some more light on the importance of competition and governance in the fee setting process. Luxembourg is the ideal place for this kind of study as the governance environment is fixed for one country (i.e. Luxembourg), but funds are generally distributed to many different countries within Europe having different levels of competition.

Appendix

This appendix outlines the endogenous switching model in more detail.[44] One problem with the model contained in 4.3.2 is that *TER* depends on the choice made by the firm, i.e. whether to organize the fund as *FCP* or *SICAV*. Arguably, this choice is not done randomly, but in respect to variables that also determine fund expenses, like size of the fund. This means that the error terms, i.e. ν_i, ϵ_{0i}, ϵ_{1i} in equations (4.5.2) to (4.5.4) are correlated. In order to correct for this bias, the following model is applied:

$$\text{Regime 1:} \quad TER_{fcp,i} = \beta_1 X_i + \epsilon_{1i} \quad \text{iff} \quad FCP_i = 1 \iff \gamma_i Z_i + \nu_i > 0 \tag{A.1}$$

$$\text{Regime 2:} \quad TER_{sicav,i} = \beta_0 X_i + \epsilon_{0i} \quad \text{iff} \quad FCP_i = 0 \iff \gamma_i Z_i + \nu_i \leq 0 \tag{A.2}$$

Under the following assumptions:

- (ϵ_{1i},ν_i), (ϵ_{0i},ν_i) are independent of (X_i,Z_i) with a zero mean
- $\nu_i \sim N(0,1)$
- E($\epsilon_{1i}|\nu_i$)=$\theta_1\nu_i$, E($\epsilon_{0i}|\nu_i$)=$\theta_0\nu_i$

Equations (A.1) and (A.2) can be written in expected terms as:

$$\begin{aligned} E[TER_{fcp,i}|X_i, \gamma_i Z_i + \nu_i > 0] &= \beta_1 X_i + E[\epsilon_{1i}|\gamma_i Z_i + \nu_i > 0] \\ &= \beta_1 X_i + \theta_1 E[\nu_i|\gamma_i Z_i + \nu i > 0] \\ &= \beta_1 X_i + \theta_1 \underbrace{\left(\frac{\phi(\gamma_i Z_i)}{\Theta(\gamma_i Z_i)}\right)}_{\text{Inverse Mills Ratio}} \end{aligned} \tag{A.3}$$

And

$$\begin{aligned} E[TER_{sicav,i}|X_i, \gamma_i Z_i + \nu_i \leq 0] &= \beta_0 X_i + E[\epsilon_{0i}|\gamma_i Z_i + \nu_i \leq 0] \\ &= \beta_0 X_i + \theta_0 E[\nu_i|\gamma_i Z_i + \nu_i \leq 0] \\ &= \beta_0 X_i + \theta_0 E[\nu_i|\nu_i \leq -\gamma_i Z_i] \\ &= \beta_0 X_i - \theta_0 E[\nu_i|\nu_i > \gamma_i Z_i] \\ &= \beta_0 X_i - \theta_0 \underbrace{\left(\frac{\phi(\gamma_i Z_i)}{1 - \Theta(\gamma_i Z_i)}\right)}_{\text{Hazard Rate}} \end{aligned} \tag{A.4}$$

[44] This short description is based on lecture notes by Whited (2007) and the book by Maddala (1983).

In order to correct for the sample selection bias, the Inverse Mills Ratio $\left(\frac{\phi(\gamma_i Z_i)}{\Theta(\gamma_i Z_i)}\right)$ and the Hazard Rate $\left(\frac{(\phi\gamma_i Z_i)}{1-\Theta(\gamma_i Z_i)}\right)$ are added to equations (4.5.4) and (4.5.3) as independent variables:

$$TER_{fcp,i} = \beta_1 X_i + \theta_1 \left(\frac{\phi(\gamma_i Z_i)}{\Theta(\gamma_i Z_i)}\right) + \epsilon_{1i}$$

and

$$TER_{sicav,i} = \beta_0 X_i + \theta_0 \left(\frac{\phi(\gamma_i Z_i)}{1-\Theta(\gamma_i Z_i)}\right) + \epsilon_{0i}.$$

The estimations are estimated using the full information likelihood procedure.

Chapter 5

Summary

Broadly speaking, this thesis is about corporate governance. However, it is not confined to the governance of firms, but it also integrates the governance of investment companies, that is mutual funds. This study tries to contrast the existing literature on corporate governance and finance by selecting issues that allow to exemplify the most important concepts or that have hitherto not gained enough attention in the literature. Potential corporate governance problems are studied empirically by using three different datasets that have their own specific virtues. The first two chapters focus on corporate finance issues and in this context on the firms' cash holdings. The last chapter departs from the pure corporate finance perspective and embarks on the governance of mutual funds.

The second chapter focuses on the value of cash holdings in connection with firm-specific and time-varying information asymmetry. This topic was motivated by the fact that extant studies only focused on the value of cash with respect to some governance measure. This chapter employs an extensive dataset covering more than 40 countries over 10 years. As measure of firm-specific information asymmetry, it proposes the standard deviation of analysts' earnings forecasts. The advantage of this metric is that it is available in a large cross-country context while most corporate governance measures are only supported on a country-basis. It contrasts the pecking order theory by Myers and Majluf (1984) with the free-cash flow theory by Jensen (1986). It finds predominant support for the latter theory in the sense that the value of liquidity is lower when information asymmetry is higher. This result is reinforced when the sample is split according to measures for financing constraints and governance measures. Furthermore, the evidence holds by performing a host of robustness tests.

The third chapter also focuses on corporate cash holdings, but it approaches this topic from a different angle. It contributes to the literature by clarifying an empirical irregularity. Previously, studies either focused on the corporate governance environment of one country and found that the level of cash holdings increases with governance. Another strain of the literature concentrated on cash holdings in a cross-country context by employing shareholder protection measures and these studies usually documented that cash holdings decrease with country governance. Importantly, this chapter integrates both approaches into one empirical analysis and finds that the previous relationships can be corroborated. Yet if the firm-score is properly adjusted by extrapolating the country influence, the influence of firm-level governance vanishes. This means that country-governance dominates firm-governance, at least with respect to corporate cash holdings. The second part of this chapter reveals that low governance firms incur a valuation discount.

The last chapter of this thesis focuses on the governance of mutual funds. It employs a manually collected unique dataset that covers many aspects that are not available from any public data vendor. This chapter essentially focuses on the governance of European mutual funds, but draws many corollaries to the U.S. environment. The governance conflict in the mutual fund area arises as it is in the fund investors' interest to minimize fund expenses, yet fund expenses are mostly composed of the advisory fee which represents the compensation for the management company. Clearly, it is in the management company's interest to maximize its income, hence its management fee. In order to provide a measure for this perceived conflict of interest, fund expenses are collected from funds' annual reports. The analysis shows that standalone funds where the fund promoter, management company, and custodian are not related at the financial complex level, are more expensive than funds which are fully integrated. It furthermore reveals that funds where the management company dominates the board have lower expense ratios than their counterparts. These results even hold after controlling for a self-selection bias as mutual funds can choose the legal form they want to incorporate as and the chosen type might arguably influence fund expenses.

Taken together, this thesis provides a wide perspective on governance, in that it covers the governance of corporations as well as the governance of mutual funds. For future research, it would be potentially interesting to go further down this route and provide additional evidence of the governance environment of fund companies as this research area is so for mostly neglected, especially in the European context.

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Deutscher Abstract

Diese Dissertation behandelt die Unternehmensführung ("Corporate Governance") von Unternehmen sowie von Investmentfonds. Das erste Kapitel dieser Arbeit enthält eine empirische Studie, die den Wert von Liquidität unter Berücksichtigung von Informationsasymmetrie untersucht. Der Panel-Datensatz besteht aus 7.474 Firmen aus 45 Ländern im Zeitraum von 1995 bis 2005 und die Ergebnisse zeigen, dass der Wert von Liquidität geringer ist wenn die Informationsasymmetrie zwischen Unternehmen und Kapitalgebern höher ist.

Das zweite Kapitel beschäftigt sich auch mit Liquidität, der Schwerpunkt der Untersuchung liegt aber darin zu erörtern, wie firmenspezifische Corporate Governance und Anlegerschutz auf Länderebene den Liquiditätsbestand von Firmen beeinflussen. Die Ergebnisse zeigen, dass Firmen weniger Liquidität halten wenn der Anlegerschutz schlechter ist, aber mehr Liquidität halten wenn die firmenspezifische Corporate Governance besser ist. Wird jedoch der Corporate Governance Score um den Länder-Einfluss bereinigt, ist nur noch der Anlegerschutz auf Länderebene entscheidend für den Liquiditätsbestand von Firmen. Weiters wird gezeigt, dass der Wert von Liquidität geringer ist, wenn die Governance schlechter ist.

Das letzte Kapitel dieser Arbeit behandelt die Governance-Strukturen von Investmentfonds in Europa. Es wird die gesetzliche Umgebung vorgestellt, sowie viele Vergleiche zu Investmentfonds in Amerika gezogen. Die Analyse beschränkt sich auf alle Aktienfonds, die in Luxemburg im ersten Quartal 2007 aktiv waren. Die Governance von Fonds wird anhand des Ausmaßes der vertikalen Integration, das heißt inwiefern gehören der Promotor, die Kapitalanlagegesellschaft, und die Depotbank zur gleichen Finanzgruppe und anhand der Struktur des Aufsichtsrats gemessen. Die Ergebnisse zeigen, dass die meisten Fonds vertikal integriert sind, das heißt die Kapitalanlagegesellschaft, die Depotbank und der Promotor gehören zur gleichen Finanzgruppe. Weiters bestehen die Aufsichtsräte fast ausschließlich aus exekutiven Direktoren. Es wird gezeigt, dass Fonds, die nicht vertikal integriert sind, teurer sind als diejenigen, die vertikal integriert sind.

Curriculum Vitae

Simone Hirschvogl kam am 4. Mai 1979 in Gunskirchen, Österreich, als Tochter von Helga und Herbert Hirschvogl zur Welt. Nach Abschluss der Matura mit Auszeichnung an der Handelsakademie Wels, studierte sie Internationale Betriebswirtschaftslehre an der Universität Wien. Während ihres Magisterstudiums verbrachte sie ein Jahr an der University of Birmingham, Großbritannien, als Austauschstudentin. Das Studium schloss sie im Jahr 2004 mit Auszeichnung ab und begann anschließend mit dem CCEFM ("Center for Central European Financial Markets") Doktoratsprogramm an der Universität Wien sowie dem "Postgraduate Programm in Quantitative Finance" am Institut für Höhere Studien in Wien. Ein Jahr später wurde sie Wissenschaftliche Mitarbeiterin am Institut für Finanzwirtschaft, Lehrstuhl Professor Zechner, an der Universität Wien. Im Jahr 2006 wurde sie Mitglied des "European Corporate Governance Training Networks" und wechselte als "Early Stage Researcher" an die Université Libre de Bruxelles, Belgien, wo sie heute noch als Wissenschaftlerin tätig ist. Simone Hirschvogl verfasste ihre Dissertation über "Essays in Corporate Governance and Finance" unter Betreuung von Professor Marco Becht (Université Libre de Bruxelles) und Professor Josef Zechner (Universität Wien).