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INVESTMENT SPENDING IN THE NETHERLANDS:

THE IMPACT OF LIQUIDITY AND CORPORATE GOVERNANCE

Abstract

This paper examines the relation between cash flow, corporate governance and fixed-investment spending. In perfect capital markets we expect no systematic relationship. However, Myers and Majluf's (1984) asymmetric information hypothesis and Jensen's (1986) managerial discretion hypothesis present imperfections and predict a positive impact of cash flow on investment in fixed assets. Aspects of corporate governance play an important role in both theories. We measure the impact of cash flow on investment for a set of Dutch firms and aim to distinguish between the asymmetric information hypothesis and the managerial discretion hypothesis. Our findings show that cash flow is an important determinant of investment expenditures. The impact of cash flow is largest for firms with low growth opportunities suggesting that the managerial discretion hypothesis is most at work in the Dutch setting. We also discern that the impact of governance characteristics on both investment and the cash flow-sensitivity of investment differ between firms having low and high growth opportunities. This implies that governance affects the managerial discretion and asymmetric information hypotheses differently.

1. Introduction

In perfect markets, we expect no systematic relationship between cash flow and investments in fixed assets or R&D expenditures. Investments should take place whenever they are expected to realize a positive net present value. The empirical literature starting with the seminal article of Fazzari, Hubbard and Petersen (1988), however, has well-documented substantial positive influence of cash flow on firms' investment spending. Later studies have confirmed this for R&D expenditures (see e.g. Himmelberg and Petersen (1994)). Initially, Myers and Majluf's (1984) asymmetric information hypothesis was accepted as the theoretical underpinning of these empirical regularities. According to this hypothesis, financing constraints due to asymmetric information causes the cash flow-investment relation. More recently, Jensen's (1986) managerial discretion hypothesis is found to provide an alternative underpinning, i.e. overinvestment due to free cash flow (see Vogt (1994)). Thus both theories provide an explanation for the positive influence of liquidity on firm's investment spending.

Both theories also predict that the mechanisms of corporate governance influence the cash flow-investment relation. The role of corporate governance in the conduct and performance of companies is an active area of debate. Corporate governance measures how stakeholders influence the decisions of firms. In perfect markets, corporate governance is not an issue. That is, owners or hired managers maximize shareholders' wealth and internal versus external funds have the same price. However, as a result of the asymmetric information problem and the managerial discretion problem, underinvestment and/or overinvestment problems may hinge on the firms' governance. As factors that describe a firm's governance structure, we consider shareholder concentration, board structure, insider shareholdings, dividends, leverage, bank relations and the market for corporate control.

The basis of our empirical investigation is a panel data set of Dutch non-financial firms. We focus on Dutch firms, as they operate in a setting where different corporate governance mechanisms are at work. In the Dutch institutional environment, firms are characterized by a two-tier board system, multiple bank relations, presence of large blockholders, and a multitude of takeover defenses. These characteristics provide a unique setting to test the influence of several governance mechanisms on investment. Due to the presence of multiple technical

takeover defenses in most of the Dutch firms, the market for corporate control is virtually absent. In addition, share ownership by insiders is relatively small in the exchange-listed firms. These characteristics induce the expectation that the managerial discretion hypothesis may be highly relevant in the Netherlands. However, it remains an empirical question to which extent alternative governance devices mitigate overinvestment and what the role of the asymmetric information hypothesis is.

In this paper we empirically discriminate between the asymmetric information hypothesis and the managerial discretion hypothesis for Dutch firms. Moreover, we analyze how corporate governance alleviates or sharpens both hypotheses. More specific, we investigate how corporate governance influences the impact of firms without good prospects and firms with good prospects (respectively, the managerial discretion hypothesis and the asymmetric information hypothesis). We expect that effective corporate governance reduces both underinvestment and overinvestment problems, i.e. reduces the magnitude of the cash flow-investment relation for both types of firms. Moreover, corporate governance may differentially impact underinvestment and overinvestment problems.

A limited set of studies has investigated the relation between investment and governance characteristics (Hoshi, Kashyap and Scharfstein (1991), Vogt (1994), Hadlock (1998), Cho (1998), Gugler (1998) and Haid and Weigand (1998)). This paper advances the literature in at least three respects. First, we extend the empirical framework initiated by Vogt (1994). That is, we allow for varying degrees of asymmetric information problems and managerial discretion problems within groups of firms, having good and bad prospects respectively. Second, we elaborate on the impact of corporate governance separately on a group where we expect that managerial discretion to dominate and one where asymmetric information applies. We analyze how corporate governance alleviates or sharpens both hypotheses. Third, we provide evidence on the impact of governance on investment decisions for an economy in which a large capital market and international competition go together with managerial entrenchment and strong banks.

Our findings show that cash flow is an important determinant of investment expenditures. The impact of cash flow is significant for firms with bad prospects as well as firms with good

prospects. However, the impact of cash flow is largest for firms with a bad prospects, i.e. low Tobin's Q, suggesting that the managerial discretion hypothesis is most at work in the Dutch setting. In the sample of firms with low Tobin's Q, we find that larger insider shareholdings, a larger dividend payout ratio, priority shares and preferred shares augment investment-cash flow sensitivity, and worsen the managerial discretion problem. Managerial discretion problems are not affected by bank-equity holdings or bank interlocks. In the high Tobin's Q sample, effective governance mechanisms for asymmetric information problems are a higher dividend payout ratio and the legal board structure. We find that the mechanisms of governance vary between the asymmetric information and managerial discretion hypotheses, as governance differently affects investment in firms with good and bad prospects.

The remainder of the paper is organized as follows. In Section 2 we discuss the relation between investment and cash flow. Section 3 describes our data set, while section 4 presents the empirical analysis. Section 5 offers a discussion and section 6 concludes.

2. Investment and cash flow

In a perfect world firms' investment opportunities fully determine their investment. The empirical literature starting with the seminal article of Fazzari, Hubbard and Petersen (1988), however, has well-documented substantial positive influence of cash flow on firms' investment spending. Two explanations prevail for this evidence. First, Myers and Majluf (1984) argue that financing constraints due to asymmetric information causes the cash flow-investment relation. A second explanation is the managerial discretion hypothesis, i.e. the relation is caused by overinvestment due to free cash flow (see Jensen, 1986). In this section we will discuss these theories in detail, define testable hypotheses and review the empirical literature.

2.1. Underinvestment: the asymmetric information hypothesis

In the theory of Myers and Majluf (1984), insiders of the firm are better informed about firm value than capital markets are. The insiders aim to transfer wealth from new providers of capital to the existing shareholders. Due to the information asymmetry in comparison with insiders, providers of capital expect insiders to raise capital when this new capital is

overvalued. The implication of this adverse selection is that managers and firms face a premium on external financing. As external financing is expensive, firms will initially fund investments from internal sources. If the investment spending exceeds the internal funds, the premium on external financing may cause firms to reject positive net present value projects. This excessive cost of external financing causes a liquidity constraint for firms, such that cash flow becomes an important determinant of investment expenditures. In addition, firms may underinvestment if the cash flows are insufficient. Myers and Majluf (1984) show that firms' investment spending is not only affected by investment opportunities. The availability of internal funds also plays a role, as external funds are excessively costly.

The underinvestment theory of Myers and Majluf (1984) is based on two crucial assumptions. First, firms are assumed to have good prospects, i.e. valuable investment opportunities. For firms without investment opportunities the absence of liquidity cannot constrain investment. Thus, the underinvestment explanation for the relation between cash flow and investment is relevant for firms with investment opportunities. Moreover, the liquidity constraints are expected to increase with investment opportunities because investment opportunities induce information asymmetries.

The second crucial assumption concerns asymmetric information and disaligned interests. The liquidity constraints are due to the premium for external financing, and this premium increases with information asymmetry and disalignment of interests. A key source for the premium in Myers and Majluf (1984) is share ownership by managers. Internal shareholdings induce incentives to issue overvalued securities at the expense of new financiers by well-informed managers. For this reason the cash flow-dependence of investment is expected to be higher for firms with higher insider ownership. However, alternative governance mechanisms may induce asymmetric information and disalign interests, or mechanisms may have the reverse impact. For example, dividends are considered to transmit information, through the signaling role of dividends. Thus, dividends may reduce asymmetric information. Similarly, bank relations reduce information asymmetry between banks and firms. Large blockholders are expected to have the opposite effect, whereas these shareholders have the incentive to transfer wealth from new investors, in an interaction similar to insiders. In a firm's board structure, effective boards

may help to align interests and reduce informational problems. In similar vein, leverage[1] and the market for corporate control may serve as a disciplinary force. We hypothesize that insiders and blockholders increase the cash flow-dependence of investments, while effective mechanisms as dividends, bank relations, boards, leverage and the market for corporate control reduce the cash flow-constraints.

For firms with profitable investment opportunities, investments enhance firm value (see Cho, 1998). For this reason, firms under the regime of Myers and Majluf (1984) may be able to increase value by investing. This implies that effective governance devices, i.e. mechanisms aligning interests and reducing information problems, will increase investment. We hypothesize that investment increases with insider and block ownership, dividends, bank relations, boards, leverage and the market for corporate control.

2.2. Overinvestment: the managerial discretion hypothesis

A second and competing explanation for a positive correspondence between cash flow and investment expenditures relates to the free cash flow hypothesis of Jensen (1986). According to Jensen, managers maximize other objectives than shareholders do. Managers aim to increase firm size, because this increases their pay, status and power. The objective to maximize firm size conflicts with shareholders' interests in case firms have no valuable investment opportunities. The cash flows that are at the discretion of managers, after valuable investments are carried out, is free cash flow. Managers are likely to waste this free cash flow. Managers impute projects at the expense of the welfare of shareholders, resulting in overinvestment. That is, the available free cash flow is invested in projects increasing firm size but with negative net present value. Cash flow and investment may therefore be positively correlated.

Similar to the asymmetric information hypothesis, two assumptions underlie the managerial discretion hypothesis. First, for firms to overinvest, valuable investment opportunities are assumed to be absent. The overinvestment explanation for the cash flow-dependence of investments is relevant for firms without investment opportunities.[2]

[1] See Grossman and Hart (1982). Besides, Ross (1977) argues that leverage signals firm value. For this reason, leverage may have an effect similar to the signaling role of dividends.

[2] Note that in the asymmetric information regime, we expected the constraint to increase with investment opportunities. A similar interaction is not expected in the managerial discretion regime.

The second assumption in the managerial discretion hypothesis is that monitoring and incentive structures are imperfect. If the managers were monitored perfectly, or if their interests were perfectly aligned with shareholders' interests, managers would not be able to overinvest. We hypothesize that insiders, blockholders, dividends[3], debt, bank relations, boards and the market for corporate control reduce overinvestment, i.e. the impact of cash flow on investment spendings.

It is obvious that in firms without profitable investment opportunities, investments will reduce firm value. This implies that effective governance devices will reduce investment. We hypothesize that investment decreases with insider and block ownership, dividends, debt, bank relations, boards and the market for corporate control.

2.3. Underinvestment or overinvestment?

The discussions of the underinvestment and overinvestment problems show that in both theories investment opportunities, cash flows, and governance characteristics interact and determine investment spending. The investment opportunities are important because they determine which of the two hypotheses may explain the cash flow-dependence. It should be noted the theory concerns the marginal growth opportunities. Using Tobin's Q as an approximation we observe average investment opportunities. However, a firm with Q above one may have no valuable investment options, while a firm with Q below one may come across a valuable investment option. Apart from this caveat, Q allows us to separate firms with a potential underinvestment problem from firms that are likely to overinvest. In this paper we will test whether the cash flow-dependence and the impact of governance mechanisms differ between the two groups of firms.

2.4. Empirical literature

The best known empirical study analyzing the importance of financing constraints is that by Fazzari, Hubbard and Petersen (1988). They linked firm-specific characteristics as dividend

[3] In the asymmetric information hypothesis dividends serve as a mechanism to signal information. In the managerial discretion hypothesis, dividends serve as a disciplinary mechanism because it subjects firms to the disciplining by the market for external funds (see Easterbrook (1984)).

payout and firm size, with the impact of cash flow on fixed investment in the US. Other studies have replicated and extended this approach.[4]

The contributions most relevant for our paper are Hoshi, Kashyap and Scharfstein (1991), Vogt (1994), Hadlock (1998), Cho (1998), Gugler (1998), and Haid and Weigand (1998). Most of these papers investigate cash flow sensitivities of US firms. Vogt (1994) empirically discriminates between the managerial discretion theory and the asymmetric information hypothesis by including an interaction term between Tobin's Q and cash flow in the regression equation. For his sample of US-firms, he finds strong evidence for the presence of managerial discretion while the influences of asymmetric information cannot be dismissed. Dividend is found to reduce both problems. Hadlock (1998) studies the impact of insider ownership on the cash flow-sensitivity of investment. The interaction term of cash flow and insider ownership is found to be positive for insider ownership below 5% and negative above this threshold. Cho (1998) investigates whether ownership structure influences investments directly, i.e. without considering the interaction between cash flow and ownership. The author finds a non-monotonic relation between insider ownership and investment for US Fortune 500 firms.[5] Because the US governance structures differ substantially from the structures of firms in Japan or the European continent, it is interesting to consider determinants of investment under alternative structures. Hoshi, Kashyap and Scharfstein (1991) investigate the cash flow-sensitivities for a sample of Japanese firms, which is divided into group and non-group firms. The non-group firms, characterized by relatively weak ties with banks, have a higher cash flow-coefficient. Hoshi et al. (1991) spot the importance of overinvestment by allowing a differential impact of cash flow for firms with good and bad prospects. They find no evidence for overinvestment. Gugler (1998) analyzes Austrian investment spending and corporate

[4] Examples for the dividend approach are Fazzari and Petersen (1993), Bond and Meghir (1994), Gilchrist and Himmelberg (1995), Hubbard, Kashyap and Whited (1995) and Gugler (1998). Examples of firm size are Gertler and Gilchrist (1994), Himmelberg and Petersen (1994) and Gilchrist and Himmelberg (1995). Other proposed sample splits are young versus old firms (Hubbard, Kashyap and Whited (1995) and Schaller (1993)), leverage (Whited (1992)), bank-affiliated versus other firms (Hoshi, Kashyap and Scharfstein (1991) and Van Ees and Garretsen (1994)), science-based versus other firms (Weigand and Audretsch (1999)) and R&D-intensive versus other firms (Brown (1997)). The general findings are that the increases in size and dividend reduce cash flow-sensitivity of investment.

[5] A positive relation between insider ownership and investment is found for ownership below 7% and above 38%, while the relation is negative for the remaining firms. In an additional analysis, the author applies simultaneous equation regression in order to controls for endogeneity of ownership and Tobin's Q (approximation for firm value). These regressions reveal that investment influences Tobin's Q and Tobin's Q influences insider ownership, but not vice versa.

governance, and empirically investigates whether the validity of the asymmetric information hypothesis and managerial discretion hypothesis depends on the ownership structure of the firms. He applies sample splits and interacts the liquidity variables with the governance variables. His findings suggest that investment of bank-controlled firms is not positively related to cash flow. Asymmetric information problems prevail in family-owned firms, while overinvestment is more prominent in state-controlled firms and pyramidal groups. Haid and Weigand (1998) focus on investment spending and corporate governance in Germany. Using sample splits, they report that liquidity positively affects investments in owner-controlled firms, while management-controlled firms show no cash flow-constraints.

Kaplan and Zingales (1997) have criticized the approach suggested by Fazzari, Hubbard and Petersen (1988) by making the point that, when examining in greater detail their data used, the results do not support the presence of financing constraints. Firstly, they argue that for these apparently financially constrained firms, firms could have augmented their use of cash and lines of credit at a particular moment in time. Secondly, the firms that according to their classification are most financially constrained show the lowest sensitivity of investment to liquidity. In addition to Kaplan and Zingales' (1997) criticism, there are other problems with the empirical implementation of the Q-theory of investment. Only under specific assumptions, average Tobin's Q equals marginal Tobin's Q. Moreover, market expectations may differ from the insiders' valuations of opportunities (Fazzari, Hubbard and Petersen (1996)). The resulting implication could be that cash flow captures investment opportunities. In the empirical implementation, we apply the solution offered by Fazzari and Petersen (1993) by introducing changes in net working capital to the regression equation, to verify whether cash flow captures liquidity or investment opportunities.

3. Data

Our data set contains information on the investments in fixed assets, the financial, asset, and the governance structure of the Dutch non-financial firms listed at the Amsterdam Stock Exchange from 1993 until 1998. The data for the investments and the financial and asset structure are obtained from a data set of Statistics Netherlands (*Centraal Bureau voor de*

Statistiek), which contains data on listed firms, including the financial annual report data. The ownership structure data is obtained from the leading Dutch financial daily newspaper, *Het Financieele Dagblad*, which publishes each year a list of exchange-listed firms and the stakeholders[6]. Because the Dutch Law on Disclosure of Shareholdings requires the notification of shareholdings when thresholds of 5%, 10%, 25%, 50%, or 66,7% are passed, we do not have information of shareholdings below 5%. For this reason, a blockholder is defined as a shareholder that owns at least 5% of the shares. Technical takeover defenses are from the yearly overviews of all securities listed at the Amsterdam Stock Exchange (*Gids bij de Officiële Prijscourant van de Amsterdamse Effectenbeurs*). The data for board members of the non-financial and financial firms are from the Yearbook of Dutch Firms (*Jaarboek Nederlandse Ondernemingen*). The data on the structured regimes for 1997 is obtained from the Monitoring Report 1998 (which contains data over 1997) and the firm's annual reports for 1992.[7] In order for a firm-year to be included in our set, we require that data is available for all items we discussed.[8] Our final data set contains an unbalanced panel of 132 firms, and 697 firm-years of data.

For the replacement value of fixed assets and total assets we use the approximation described by Perfect and Wiles (1994). In the Netherlands, firms either present replacement values directly in their annual reports, or they present historical costs. If replacement values are presented, the replacement values equal the book values. In case of historical costs we have to adjust the value to approximate the replacement value. This is relevant for plant and equipment. We assume that in a base year the replacement value equals the historical costs. For each subsequent year we adjust this replacement value by adding new investments and corrections for the growth in capital good prices and subtracting depreciation. Growth in capital good prices is based upon the price index of investment goods, as provided by Statistics

[6] The notifications mandatory according to the Wet Melding Zeggenschap (WMZ). This Law on Disclosure of Shareholdings (*Wet Melding Zeggenschap*) went into effect in 1992 and is the Dutch implementation of the EU Transparency Directive 88/627.

[7] In case we found a difference between 1992 and 1997, we investigated all annual reports over 1992-1997. The annual reports allowed us to investigate (1) whether the supervisory board established (*vaststellen*) or approved (*goedkeuren*) the annual accounts, and (2) whether the firms met the criteria for the structured regime. Under the structured regime, the supervisory board establishes the annual accounts. In cases of inconsistency, we contacted the firm.

[8] Because we include lagged variables, the data for each year consists of data that year and the previous year. Firm-years are excluded when the firm is not included in one of our sources. This may be due to a merger, delisting or absence of data.

Netherlands. The replacement value of the (fixed) assets is the book value of (fixed) assets plus the difference between the replacement value and historical value of plant and equipment.[9]

The definitions of our variables and summary statistics for the full sample are presented in Table 1.

[Please insert Table 1 here]

The summary statistics in Table 1 emphasize several characteristics that are relevant in the Dutch institutional setting.[10] On average firms have a dividend ratio of 33% and the long term debt ratio is 13%. In continental European countries a major role in corporate governance is attributed to banks. In the Netherlands, we find that the relative number of interlocking directorates is 11.4%. Interlocking directorates are boardmembers of the firms who are also a board members with one of the four leading Dutch banks (Abn-Amro, ING, Rabo and Fortis). The number of interlocking directorates is measured relative to the total number of board members. Banks own on average 7.7% of the firm's equity.

The ownership structure of Dutch firms reveals the presence of substantial blockholdings. The average largest blockholder owns 25.9% of the firm's equity. The median largest blockholding is 18.9%.

The boards of Dutch firms are two-tier boards, i.e. a managerial (*Raad van Bestuur*) and a supervisory board (*Raad van Commissarissen*) is present. According to Dutch company law, supervisory board members have to be independent from the management and serve the firm's interest, which includes all stakeholders. This implies that the monitoring role of the supervisory board does not necessarily benefit the shareholders' interests. Besides, several firms have adopted the structured regime, which provides the supervisory board with additional powers and limits shareholders' influence. Examples are establishing the annual accounts, election of management, election of supervisoary board and authority over major

[9] The impact of the adjustment of replacement values is modest. For example, the correlation between the replacement value of fixed assets and the book value of fixed assets is 0.99.

[10] See Kabir, Cantrijn and Jeunink (1997) and De Jong, DeJong, Mertens and Wasley (2000) for detailed descriptions of the Dutch corporate governance setting.

decisions by the management. Table 1 shows that the average board size is eight persons and that relative number of supervisory board members is 66%, which implies that on average the supervisory board outnumbers the management. Besides, 70% of the Dutch firms are under the structured regime. Ownership by members of both boards is on average low, on average 6%.

Many Dutch firms have legal arrangements that serve as a protection against hostile takeovers. These takeover defenses may disturb the market for corporate control. Even in case of the absence of a takeover threat, the arrangements disable the influence of shareholders on the management. Before, we discussed the structured regime. Priority shares are issued by 39% of the firms and consist of a small number of shares that carry superior voting rights. Besides, 63% of the firms have preferred shares, i.e. the management is allowed to issue preferred shares without further approval of shareholders and for which only 25% of the nominal value has to be paid up. In case of a takeover attempt, the firm can place these shares with a befriended party and pay for the shares with new debt. The dilution creates an effective takeover defense. For the 37% of the firms with certificates, the shareholders own certificates that only carry the cash flow-rights. The voting rights remain with a trust office that owns the shares and issued the certificates. Normally, the management controls the trust office.

We define subsamples based on the firm's Tobin's Q. We use the average value of Tobin's Q over the years for which we have observations in order to avoid a bias towards observations in years with higher market values. First, we divide the full sample into firms with an average Tobin's Q below the median of all average Q's and firms with average Q equal to or above the median. We also make 33% subsamples based on average Q. The characteristics of the subsamples are in the Appendix. If we consider the summary statistics for the 50% subsamples in Panel A of the Appendix, we find that the high Q sample has higher investment, cash flow and size. These firms have less debt, relatively smaller supervisory boards, are less likely to be structured regime firms and have less bank shareholdings (only 1-% significance level). In Panel B, we find that Q is positively related to cash flow and negatively related to the structured regime (significance levels 1% to 10%).

4. Regression results

Our regressions analyze several aspects of potential cash constraints. In a first subsection, we check whether liquidity is important in explaining investments in fixed assets or not. The second subsection tries to separate between two alternative theories explaining the potential influence of cash flow on investment, i.e. the asymmetric information hypothesis and the managerial discretion hypothesis. The third section discusses how governance affects the importance of liquidity in explaining fixed investment, and investigates how governance shapes the importance of the asymmetric information hypothesis and the managerial discretion hypothesis.

4.1. Is liquidity important in explaining investment?

We begin this section by reporting conventional regressions of fixed-investment expenditures on cash flow and control variables for growth opportunities. Many recent papers have examined finance constraints on fixed investment with an equation similar to the following:

$$I_{it} = a + bQ_{it} + gCF_{it} + m_t + l_i + v_{it} \qquad (1)$$

The variable I_{it} represents investment in plant and equipment investment for firm i during year t, scaled by the firm's beginning of period replacement value of fixed assets. Tobin's Q at the beginning of year t (Q_{it}) controls for changes in investment demand due to investment opportunities. The impact of cash flow (CF) on investment is reflected by the coefficient g. Both investment (I) and cash flow (CF) are scaled by the firm's beginning of period replacement value of fixed assets, to neutralize potential heteroskedasticity. In all specifications, we allow for time-fixed effects (m_t) and firm-fixed effects (l_i). The coefficient estimates for various specifications of equation (1) are reported in Table 2.

[Please insert Table 2 here]

In column (1) we report the results of an OLS regression of equation (1). The results show that the cash flow-coefficient is positive and significantly different from zero at the 1-% level,

conform results reported in other studies. The coefficient of Tobin's Q also is significantly positive, at the 1% level.

In spite of the well-developed microfoundations of the Q-theory of investment, other variables typically have explanatory power for investment in Q-equations. Table 2 reports the results for additional regressions including other variables. A first variable is the change in working capital (working capital investment) scaled by the replacement value of fixed assets. Fazzari and Petersen (1993) argue that firms may draw down their working capital (current assets minus current liabilities) to smooth fixed investments. Including the change in the net-working-capital ratio scaled by fixed assets allows to isolate the liquidity effect from the informational part of cash flow (see also Haid and Weigand (1999)). In other words, a negative coefficient accompanied with an increase in the cash flow-coefficient suggests that cash flow does not capture investment opportunities. The results reported in column (2) of Table 2 are not contradicting this: the change in net working capital (ΔNWC) has the predicted negative coefficient (though not significantly different from zero) and the cash flow-coefficient increases slightly. [11] A second variable often significant in investment equations is current sales scaled by beginning-of-year replacement value of fixed assets. As in Fazzari and Petersen (1993), we apply two-stage least squares regresssion (2SLS) in order to instrument the change in the net working capital ratio with the working capital stock at the beginning of the period scaled by beginning-of-year fixed assets. The firm's choice of working-capital investment should depend negatively on the size of the initial stock because the marginal valuation of working capital falls as its stock rises. Also sales has been instrumented by its lagged value to take care of potential endogeneity problems. As reported in column (3) of Table 2, the coefficient of working-capital investment is in all regressions negative and highly significant.[12] In the remainder of this paper we choose to report the results of the 2SLS regressions, containing fixed time-effects and firm-effects, in which we instrument the change in the net-working-capital ratio with the level of the working capital at the beginning of the period, and sales with its lagged value.

[11] Note that working capital investment may be endogenous, as it is a decision variable of the firm. Later on, we instrument the change in net-working-capital ratio.

[12] Even after controlling for other factors often being important in explaining investment, we run the risk that these proxies are less than perfect for investment opportunities. These proxy measures may introduce measurement bias; that is a positive estimated coefficient of cash flow may indicate shifts in investment demand

4.2. Asymmetric information and/or managerial discretion?

In order to discriminate between the Asymmetric Information Hypothesis (AIH) and the Managerial Discretion Hypothesis (MDH), we apply the strategy initiated by Vogt (1994). The author develops a theoretical model and shows that discriminating between these two hypotheses is possible by investigating the interaction between Tobin's Q and cash flow. We include the term beginning-of-year Q times cash flow (Q*CF). A positive sign of the coefficient implies that firms with a higher Tobin's Q have a higher cash flow-coefficient. This compares with higher liquidity constraints which is in line with the AIH. A negative coefficient is in line with MDH, as the cash flow-coefficient for lower Q-firms becomes higher. Column (4) of Table 2 summarizes the results of this first exercise. The coefficient for Q*CF is slightly negative, though not statistically different from zero. This implies that for our sample of firms this technique does not help in discriminating between AIH or MDH.

Table 3 further explores the issue of MDH versus AIH, by applying an exercise inspired by Hoshi, Kashyap and Scharfstein (1991). The overinvestment theory predicts that firms with poor prospects should be more sensitive to liquidity than the investment of firms with good prospects. In addition to the variables used in the previous regressions, we introduce in column (1) of Table 3 two interaction terms (1) cash flow times a dummy variable which equals one if Q is above median and (2) cash flow times a dummy variable if Q is below median. The cash flow-coefficient for low Q is higher (though not statistically significant) than the one for high Q. Column (2) combines the modelisations of Vogt (1994) and Hoshi et al. (1991). That is, we allow for 2 separate intercepts for the cash flow-coefficient as in Hoshi et al. (1991) and interact Q*CF for both groups (LQ50*CF*Q and HQ50*CF*Q).

[Please insert Table 3 here]

In Table 3, both coefficients of the interaction terms LQ50*CF*Q and HQ50*CF*Q are negative but not statistically significant. They nevertheless suggest the importance of overinvestment, as the LQ50*CF is significantly higher than the HQ50*CF. Columns (3) and (4) of Table 3 further eluminate the distinction between managerial discretion and asymmetric

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and future profitability, and not pointing at financing constraints. However, this concern should not be exaggerated, as shown by the results of introducing net-working capital in our regressions.

information, but include the lowest 33 percentile Q-firms, the median Q-firms and the highest 33 percentile Q-firms. The cash flow-coefficient of the lowest Q-firms (LQ33*CF) in column (3) is 0.584, which is significantly higher than the one of the other firms (0.127 and 0.195). No significant difference results between the median and high Q-group. This result implies that in the Netherlands the managerial discretion hypothesis is highly relevant, in comparison with the asymmetric information hypothesis. The interaction terms with Q in column (4) are not significant and an F-test rejects their joint significance.[13] As the cut-off value of Tobin's Q between the low 33 percentile firms and the other firms (median and high group) is approximately one, we decide to focus on two groups, i.e, the group of LQ33 firms and the other (medium and high group). Moreover, Vogt (1994)'s theoretical model suggests these cut-off values for discrimination between MDH and AIH.

4.3. Does governance influence investment and the cash flow-sensitivity of investment?

In the previous analysis we concluded that two different agency problems are at work in the two subsamples. Consequently, we expect that governance influences both investment and the impact of liquidity on investment also differently in the two subsamples. We empirically tackle this conjecture using three types of equations. Hadlock (1998) and Gugler (1998) inspire the first. Governance affects investment via its impact on the cash flow-coefficient. In other words, is the magnitude of the LQ33*CF and the MHQ33*CF affected by governance mechanisms? In case governance reduces AIH and reduces MDH, the magnitude of the cash flow-coefficient reported in the previous regressions should be closer to zero. We approach this by interacting the cash flow variable with the respective governance data we have. As previously discussed, our governance data include dividends[14], debt, ownership, firm-bank relations, board structure, and takeover defenses. We interact cash flow with the governance variables. This implies that the coefficient of the interaction term represents whether governance mitigates (negative sign) or aggravates (positive sign) the cash flow-impact. A

[13] The F-test gives a value of $1.24<F_{3,550}=8.53$.

[14] Past studies have further elaborated on the impact of cash flow on investment in fixed assets by selecting firms that are expected to face financing constraints using dividends. The applied technique is the one of sample splits. We compared firms with a low-dividend payout ratio with those having a high-dividend payout ratio. We expect that low-dividend face relatively high asymmetric information and, therefore, are more likely to be confronted with financing constraints. Our results (not reported) reveal no statistically and economic significant differences. Similarly we applied firm size as sample split criterion, expecting small firms to face financing constraints. Again, our results (not reported) reveal no statistically and economic significant differences. These findings are in line with those reported in Van Ees and Gerretsen (1994).

second specification is used by Cho (1998), who tests the direct influence of governance (insider holdings) on investment. We control for these direct relations, by including the governance variable directly into the investment equation. A third way and the approach we adopt, is to include both the direct effect of governance on investment and the interaction effect via cash flow, i.e. combine the approach of Hadlock (1998) and Cho (1998). The results of the latter exercise are displayed in Table 4.

[Please insert Table 4 here]

In column (1) of Table 4, for convenience, we repeat our results without explicitly including governance variables. Columns (2) to (12) represent the impact of one governance variable in each column.[15] We start the discussion by focussing on the managerial discretion hypothesis, i.e. the low Q-firms. Therefore, in the different columns, we discuss the coefficients of LQ33*CF, LQ33*GOV (the direct effect of the respective governance variable), and LQ33*GOV*CF (the effect of governance via its impact on cash flow). Column (2) focusses on the effect of lagged dividend. A higher dividend payout ratio significantly decreases investment for the low Q-firms, whereas it increases the level of the cash flow-coefficient. Thus dividend has contradicting implications. The following governance variables are the debt-related variables, i.e. leverage, relative bank interlocks (BNK_IR) and bank equity holdings. None of these variables affects in a significant way investment. The next governance variable is the impact of the size of the largest shareholder (C1). Again no significant effects are found. The size of inside equity augments in a significant way the impact of cash flow, aggravating the managerial discretion problem. This result is surprising, given the negative wealth effects of overinvestment. This conclusion differs from Hadlock's (1998) findings, as he reports a positive coefficient for ownership levels below 5% and a negative coefficient for larger ownership levels incorporating all -low and high- Q-firms. However, Cho (1998) documents a direct negative influence on investment which differs from our findings, but again no separate

[15] Several Chow-tests for testing the significance of the fixed effects reveal that the fixed effects are jointly significant and should enter the regression equation even after introducing the governance variables. The *F*-values are computed as follows: $F(n\text{-}1, nT\text{-}n\text{-}K) = [\ (R^2\text{(unrestricted)} - R^2\text{(restricted)}) / (n\text{-}1)\ ] / [\ (1 - R^2\text{(unrestricted)}) / (nT\text{-}n\text{-}K)\ ]$ with n the number of firms, K the number of other regressors and T the number of observations per firm.

effects between low and high Q-firms are allowed.[16] The presence of the structured regime (SR) as well as board size show that the board structure does not affect in a significant way investment.[17] Finally, we consider the impact of a number of takeover defenses, i.e. priority shares (PRIO), preferred shares (PREF) and certificates (CERT). We expect those to aggravate the managerial discretion problem. Our hypotheses are only partially confirmed: the cash flow-coefficient increases for PRIO and PREF. However, investments decrease for firms with PRIO.

Now we focus on the coefficients of MHQ33*CF, MHQ33*GOV and MHQ33*GOV*CF in order to analyze how governance affects the asymmetric information problems. Those firms are characterized by Q-values larger than one, and belong to firms where we expect asymmetric information problems to be largest (Vogt (1994)). Column (2) displays the results of the effect of the dividend payout ratio. Larger payout ratio's increase investment, and reduce the cash flow-coefficient, which is in line with reducing the asymmetric information problem. The debt ratio does not show up with significant coefficients. Relative bank interlocks (BNK_IR) and bank equity holdings aggravate the information problem, as the direct influence on investment is negative and the impact on the cash flow-coefficient increases. The size of the largest shareholder does not influence in a significant way the magnitude of the asymmetric information problem. We also find no effect of inside equity. This implies that Myers and Majluf (1984) is not confirmed for the Netherlands, as larger inside equity holdings show no significant effects. The presence of the structured regime increases investment and reduces the impact of cash flow. Also, the number of board members decreases the cash flow-constraint.[18] Priority shares augment the cash flow-coefficient, strengthening the asymmetric information problem. Preferred shares show countervailing effects. They increase investments but at the same time blow up the cash flow-coefficient.

[16] Cho (1998) distinguishes insider ownership below 7%, between 7% and 38% and above 38%. The negative coefficient (with a *t*-value of 3.43) is found in the 7% to 38% interval, while the results for the interval above 38% are insignificant. Cho (1998) reports a positive influence below 7%. However, as our data does not include stakes below 5%, we cannot replicate this test.

[17] The results for relative supervisory board size in the low Q-sample show no significant results (not reported).

[18] In the high Q-sample, the results for relative supervisory board size show a significantly (at the 1% level) negative indirect influence on investment, while the direct influence is insignificant (results not reported). We expect that this finding is driven by board size, which shows precisely the opposite result and is the denominator in relative supervisory board size.

5. Discussion

The regression results in the previous section highlight two clear findings. First, two different problems are at work in the two subsamples. The dissimilar cash flow-coefficients prove that we were correct in defining subsamples of firms with low and high Tobin's Q. Second, the importance of the different subsamples is emphasized by the divergence in the impact governance has on investment. This holds for both the indirect impact (through the influence of governance on the cash flow-sensitivity) and the direct impact (the influence of governance on investment). For each variable we find differences between the low and high Q samples for both direct and indirect coefficients.[19] In the remainder of this section we first interpret the results for the two subsamples in light of the theory and the Dutch institutional setting that underpin the results. Second, we discuss the role of groups of governance mechanisms and compare their impact over both subsamples.

In the low Q-sample we expect that the managerial discretion hypothesis is driving the results. In Table 3 we noticed that the cash flow-sensitivity is relatively high in this segment. Given the importance of overinvestment, we conjecture that several governance mechanisms are not related to investment or may even induce overinvestment. We find that debt, banks and the board structure have no effect. The takeover defenses, in the form of priority shares and preferred shares worsen the overinvestment problem through the cash flow-sensitivity. Surprisingly, insiders worsen the overinvestment problem, through their entrenchment. Apparently, they prefer size to the value of their shares. The results for these governance mechanisms show that in the Netherlands weak governance, as a condition for overinvestment is largely present. The only mechanism that provides effective governance is dividend through its direct impact. However, in their indirect influence, dividends show contradictory results. In general, there are not many forces effectively governing the overinvestors, which explains the high cash flow-coefficient.[20]

[19] Two exceptions are in the indirect relations, i.e. priority and preferred shares.

[20] The direct impact of priority shares has a contradictory influence, in comparison with the indirect impact. This may be explained by the lower percentage of firms with priority shares in the low Q-sample (33% versus 41%).

In the high Q-sample we predict that the asymmetric information hypothesis is at work. The findings in Table 3 showed that this underinvestment problem is of minor importance, in comparison with overinvestment. Myers and Majluf (1984) argue that the asymmetric information problem is especially relevant in firms with high managerial shareholdings and/or blockholdings. In our findings the ownership structure has no effect on investment spendings. This implies that the key condition for Myers and Majluf's (1984) theory does not seem to hold in our sample. We find that debt has no effect. As expected we find that priority and preferred shares worsen the cash flow-constraint of the firms. Note that the results for the direct influence of preferred shares are contradictory. We have no explanation for these findings. Contrary to expectations, we find that banks (direct and indirect) worsen the asymmetric information problems. Several characteristics induce investment in the high Q-sample. Dividends are effective, both directly and indirectly. The structured regime seems to be effective, both directly and indirectly. Similarly, board size (indirect) shows to be an efficient governance variable. In the high Q-sample we find several effective governance mechanisms, which may explain the lower cash flow-sensitivity in this sample.

So far, we discussed our findings for the governance mechanisms separately for the two subsamples. We also noted that the effects of governance mechanisms differ between the samples. It is interesting to compare each mechanism over both samples. Dividends are effective in both samples. This mechanism is most likely to act relatively independent of the institutional setting. However, the indirect effect in the low Q sample indicates ineffective governance. Debt and banks are not effective in both samples. In the asymmetric information sample banks even have an adverse effect, both direct and indirect. This implies that we find that banks fail in the Netherlands in their role of governing firms and providing capital. A potential explanation is a sample selection problem as banks may be on the board precisely in firms with large asymmetric information problems. With respect to the ownership structure we find that in the low Q-sample insiders seem to be entrenched overinvestors (indirect). In the high Q-sample we find no effect, which contradicts Myers and Majluf (1984). The two-tier board system in the Netherlands and several other European countries is heavily debated. Our findings show that in the low Q-sample board has no effect. This implies that the monitoring function of board on overinvestment is absent. On the other hand, in the high Q-sample the structured regime and board size are effective. These findings suggest that the board is helpful

in firms that already have good prospects, but fail to monitor firms with bad prospects. Our findings for takeover defenses reveal that priority shares and preferred shares have the same and expected indirect impact in both samples. Takeover defenses have a negative impact, as they shield firms from shareholder activism and the market for corporate control. However, it is puzzling that priority shares in the low Q-sample and preferred shares in the high Q-sample have contradictory direct effects.

6. Concluding remarks

A hotly debated issue in the investment spending literature is whether and why investment depends on internally generated funds. Theory offers two competing explanations for why investment may hinge on the availability of internal funds. Either managers are wasting free cash flow (managerial discretion) and overinvestment results. Or asymmetric information between and among owners and external fund providers induces an external finance premium yielding underinvestment (asymmetric information hypothesis).

This paper finds that cash flow is a significant variable in explaining fixed investments in the Netherlands. We empirically discriminate between the asymmetric information hypothesis and managerial discretion hypothesis by interacting Tobin's Q and cash flow, further refining Vogt (1994). Our analysis shows that both high Q-firms and low Q-firms posit a positive cash flow-dependence. However, low Q-firms have a significantly higher cash flow-coefficient than medium and high Q-firms. The interaction term between Tobin's Q and cash flow within these subgroups is not significant suggesting that two groups –low and high Q-firms– should be considered. The level of the cash flow-coefficient is larger in the low Q-group pointing out the importance of managerial discretion.

The characteristics of the Dutch institutional setting allow for an interesting analysis of the impact of corporate governance on investment, an analysis which is not possible for US-data. For the managerial discretion hypothesis we find that in low Q-firms the cash flow-coefficient increases with insider holdings, dividends and takeover defenses (priority shares and preferred shares). Investment decreases with dividends and priority shares in this subsample. In the

asymmetric information subsample, i.e. for high Q-firms, we find that dividends, the structured regime and board size reduce the cash flow-sensitivity, while bank-relations and takeover defenses (priority shares and preferred shares) have the opposite effect. Investment increases with dividends, the structured regime and preferred shares, whereas investment decreases with bank-relations. These results confirm that the mechanisms of governance differ between the asymmetric information and managerial discretion hypotheses, as governance differently affects investment and the cash flow-sensitivity of investment in firms with good and bad prospects.

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Table 1: Definitions and descriptive statistics of variables for investments and financial and governance structures

Definitions and descriptive statistics for the full sample for the variables used. The sample consists of 697 observations for 132 firms in the 1993 to 1998 period. The data for the investments and the financial structure are obtained from Statistics Netherlands. The ownership structure data is from *Het Financieele Dagblad*. Technical takeover defenses are from the *Gids bij de Officiële Prijscourant van de Amsterdamse Effectenbeurs*. The data for board members of the non-financial and financial firms are from the *Jaarboek Nederlandse Ondernemingen*. The data on the structured regimes for 1997 is obtained from the Monitoring Report 1998 and the firm's annual reports. In order for a firm-year to be included in the data set, we require that data is available for all items. Blockholdings are defined as stakes of 5% and more and expressed as a percentage of the firm's equity. The items denoted *t* are measured over or in the current year or at the beginning of the current year, while the items denoted *t-1* refer to the previous year and items denoted *t+1* refer to the next year.

Variable	**Description**	**Code**	**Mean**	**Median**	**Std.Dev.**
Investment fixed assets	Fixed-investment expenditures (t)/replacement value of fixed assets (t)	I	0.220	0.161	0.324
Tobin's Q	Market value of total assets (t)/replacement value of total assets (t)	Q	1.406	1.195	0.764
Cash flow	Cash flow (t)/replacement value of fixed assets (t)	CF	0.413	0.265	0.584
Change net working capital	(Net working capital (t+1)-net working capital (t))/replacement value of fixed assets (t)	ΔNWC	0.092	0.035	0.639
Sales	Sales (t)/replacement value of fixed assets (t)	SLS	7.657	4.012	13.155
Fixed assets	Replacement value of fixed assets (t) in million Dutch guilders	RVFA	2149.77	190.85	9563.67
Dividend	Dividend payout ratio (t-1)	DIV	0.334	0.350	0.338
Debt	Long-term debt (t)/replacement value of total assets (t)	DEBT	0.128	0.111	0.108
Relative bank interlocks	Number of bank interlocks (t-1)/ /number of board members (t-1)	BNK_IR	0.114	0	0.164
Bank blockholdings	Blockholdings by banks (t-1)	BNK_EQ	7.711	5.140	10.394
Largest blockholding	Stake of the largest blockholder (t-1)	C1	25.886	18.890	21.215
Insider blockholdings	Blockholdings by members of managerial and supervisory boards (t-1)	INSIDE_EQ	6.014	0	18.278
Structured regime	Dummy with value of 1 for presence of structural regime (t-1), 0 otherwise	SR	0.702	1	0.458
Board size	Number of board members (t-1)	BOARD	8.09	7	3.71
Supervisory board	Number of supervisory board members (t-1)/number of board members (t-1)	S_BOARD	0.658	0.667	0.114
Priority shares	Dummy with value of 1 for presence of priority shares (t-1), 0 otherwise	PRIO	0.39	0	0.49
Preferred shares	Dummy with value of 1 for presence of preferred shares (t-1), 0 otherwise	PREF	0.63	1	0.48
Certificates	Dummy with value of 1 for presence of certificates (t-1), 0 otherwise	CERT	0.37	0	0.48

Table 2: Regression analysis of determinants of investment for basic variables

Regression results for the basic variables. The sample consists of 697 observations for 132 firms in the 1993 to 1998 period. The definitions and data sources of the variables are in Table 1. The explained variable is investment in fixed assets over replacement value of fixed assets (I). The regressions contain firm and year dummies (results not reported). In columns (1) and (2) are OLS regressions. Columns (3) and (4) contain 2SLS regressions in which ΔNWC is instrumented by the beginning-of-the-period net working capital and SLS is instrumented by one-period lagged SLS. The *t*-values are in parentheses. Significant coefficients are indicated by * (10% level), ** (5% level), and *** (1% level).

Variable	**(1) OLS**		**(2) OLS**		**(3) 2SLS**		**(4) 2SLS**	
Constant	-0.023	(-0.16)	-0.032	(-0.20)	0.022	(0.47)	0.057	(0.53)
Q	0.099	(3.24)***	0.099	(3.24)***	0.098	(4.41)***	0.132	(3.25)***
CF	0.221	(4.71)***	0.236	(4.73)***	0.190	(2.51)**	0.223	(2.63)***
ΔNWC			-0.018	(-0.90)	-0.160	(-3.15)***	-0.152	(-2.98)***
SLS					0.021	(4.29)***	0.020	(4.16)***
Q*CF							-0.011	(-0.87)
Adj. R^2	*0.242*		*0.242*		*0.253*		*0.253*	

Table 3: Regression analysis of determinants of investment with interaction between cash flow and Tobin's Q

Regression results for the basic variables and interaction between cash flow and Tobin's Q. The sample consists of 697 observations for 132 firms in the 1993 to 1998 period. The definitions and data sources of the variables are in Table 1. The explained variable is investment in fixed assets over replacement value of fixed assets (I). The regressions contain firm and year dummies (results not reported). In columns (1) and (2) are OLS regressions. Columns (3) and (4) contain 2SLS regressions in which ΔNWC is instrumented by the beginning-of-the-period net working capital and SLS is instrumented by one-period lagged SLS. LQ50 is 1 for firms with an average Tobin's Q below the median, and 0 otherwise. HQ50 is 1 for firms with an average Tobin's Q equal to or above the median, and 0 otherwise. LQ33 is 1 for firms in the lower 33% average Tobin's Q interval, and 0 otherwise; HQ33 is 1 for firms in the upper 33% average Tobin's Q interval, and 0 otherwise; for the remaining firms MQ33 is 1. The *t*-values are in parentheses. Significant coefficients are indicated by * (10% level), ** (5% level), and *** (1% level).

Variable	**(1)**		**(2)**		**(3)**		**(4)**	
Constant	0.086	(0.87)	0.044	(0.41)	0.070	(0.69)	-0.033	(-0.22)
Q	0.115	(3.57)***	0.142	(3.44)***	0.117	(3.53)***	0.144	(3.30)***
ΔNWC	-0.148	(-3.41)***	-0.160	(-3.43)***	-0.196	(-3.99)***	-0.200	(-3.90)***
SLS	0.020	(4.13)***	0.020	(4.09)***	0.022	(4.41)***	0.022	(4.29)***
LQ50*CF	0.224	(2.15)**	0.491	(1.81)*				
HQ50*CF	0.170	(2.31)**	0.234	(2.38)**				
LQ50*CF*Q			-0.226	(-1.07)				
HQ50*CF*Q			-0.014	(-0.88)				
LQ33*CF					0.584	(3.22)***	0.564	(0.88)
MQ33*CF					0.127	(1.18)	0.312	(1.11)
HQ33*CF					0.195	(2.52)**	0.260	(2.45)**
LQ33*CF*Q							0.031	(0.05)
MQ33*CF*Q							-0.147	(-0.70)
HQ33*CF*Q							-0.014	(-0.80)
Adj. R^2	*0.260*		*0.259*		*0.250*		*0.250*	

Table 4: Regression analysis of determinants of investment including governance characteristics

Regression results for the basic variables and interaction between cash flow and Tobin's Q. The sample consists of 697 observations for 132 firms in the 1993 to 1998 period. The definitions and data sources of the variables are in Table 1. The explained variable is investment in fixed assets over replacement value of fixed assets (I). The regressions contain firm and year dummies (results not reported). In columns (1) and (2) are OLS regressions. Columns (3) and (4) contain 2SLS regressions in which ΔNWC is instrumented by the beginning-of-the-period net working capital and SLS is instrumented by one-period lagged SLS. LQ33 is 1 for firms in the lower 33% average Tobin's Q interval, and 0 otherwise; for the remaining firms MHQ33 is 1. The *t*-values are in parentheses. Significant coefficients are indicated by * (10% level), ** (5% level), and *** (1% level).

Variable	**(1) Basic regression**		**(2) DIV**		**(3) DEBT**		**(4) BNK_IR**		**(5) BNK_EQ**		**(6) C1**	
Constant	-0.009	(-0.08)	-0.011	(-0.08)	0.026	(0.18)	0.049	(0.35)	0.038	(0.28)	-0.022	(-0.15)
Q	0.123	(3.84)***	0.124	(3.91)***	0.144	(4.13)***	0.122	(3.75)***	0.128	(3.93)***	0.120	(3.62)***
ΔNWC	-0.186	(-3.29)***	-0.186	(-3.39)***	-0.202	(-3.40)***	-0.185	(-3.26)***	-0.206	(-3.51)***	-0.206	(4.28)***
SLS	0.022	(4.40)***	0.022	(4.22)***	0.020	(3.95)***	0.022	(4.40)***	0.021	(4.14)***	0.022	(4.35)***
LQ33*CF	0.558	(2.93)***	-0.134	(-0.48)	0.743	(3.02)***	0.561	(2.82)***	0.662	(3.06)***	0.889	(3.01)***
LQ33**GOV*			-0.415	(-2.15)**	-0.323	(-0.65)	0.017	(0.06)	0.002	(0.49)	0.004	(1.09)
LQ33**GOV**CF			2.105	(3.04)***	-2.201	(-1.35)	-0.058	(-0.04)	-0.016	(-0.97)	-0.014	(-1.32)
MHQ33*CF	0.161	(2.14)**	0.231	(3.01)***	0.186	(2.34)**	0.158	(2.11)**	0.132	(1.67)*	0.228	(2.53)**
MHQ33**GOV*			0.156	(2.02)**	0.010	(0.31)	-0.696	(-2.06)**	-0.008	(-2.53)**	0.002	(0.91)
MHQ33**GOV* *CF			-0.276	(-2.06)**	-0.455	(-1.60)	1.165	(1.70)*	0.005	(1.59)	-0.001	(-0.99)
Adj. R^2	*0.247*		*0.241*		*0.241*		*0.247*		*0.241*		*0.243*	

Variable	(7) INSIDE_EQ		(8) SR		(9) BOARD		(10) PRIO		(11) PREF		(12) CERT	
Constant	0.006	(0.04)	-0.224	(-1.29)	0.067	(-0.45)	-0.098	(-0.62)	-0.088	(-0.61)	0.031	(0.23)
Q	0.127	(3.81)***	0.135	(4.16)***	0.139	(4.36)***	0.122	(3.73)***	0.117	(3.62)***	0.123	(3.77)***
ΔNWC	-0.207	(-4.76)***	-0.151	(-2.99)***	-0.157	(-3.04)***	-0.216	(-3.63)***	-0.206	(-3.61)***	-0.187	(-3.30)***
SLS	0.024	(4.74)***	0.025	(4.96)***	0.019	(3.75)***	0.032	(5.99)***	0.027	(5.36)***	0.023	(4.55)***
LQ33*CF	0.182	(0.74)	-0.078	(-0.21)	0.317	(0.57)	0.082	(0.35)	-0.031	(-0.10)	0.605	(2.95)***
LQ33**GOV*	0.001	(0.09)	0.137	(0.59)	-0.020	(-0.80)	-0.390	(-2.35)**	-0.158	(-1.36)	0.010	(0.05)
LQ33**GOV**CF	0.026	(2.09)**	0.627	(1.46)	0.029	(0.35)	0.768	(2.23)**	0.774	(2.11)**	-0.497	(-1.02)
MHQ33*CF	0.160	(2.05)**	0.195	(2.54)**	0.416	(3.15)***	-0.051	(-0.62)	0.016	(0.19)	0.154	(2.02)**
MHQ33**GOV*	0.001	(0.25)	0.295	(2.42)**	-0.012	(-0.94)	0.038	(0.39)	0.199	(2.35)**	0.188	(1.22)
MHQ33**GOV* *CF	-0.001	(-0.34)	-0.250	(-3.03)***	-0.042	(-2.68)***	0.365	(4.02)***	0.194	(2.24)**	-0.104	(-0.58)
Adj. R^2	*0.250*		*0.263*		*0.266*		*0.261*		*0.260*		*0.243*	

Appendix: Descriptive statistics for Tobin's Q subsamples of variables for investments and financial and governance structures

Descriptive statistics for the subsamples for the variables used. The full sample consists of 697 observations for 132 firms in the 1993 to 1998 period. The data sources are in Table 1. Average Tobin's Q of a firm is the average value of Tobin's Q over all yearly observations for that firm. In Panel A we define subsamples based on 50% intervals for average Tobin's Q. The low 50% Tobin's Q sample includes firms with an average Tobin's Q below the median of average Tobin's Q. The high 50% Tobin's Q sample includes firms with an average Tobin's Q above or equal to the median of average Tobin's Q. The sample size is 347 and 350, respectively. In Panel B we define subsamples based on 33% intervals for average Tobin's Q. The samples size is 231 for the low 33% sample, 235 for the middle 33% sample and 231 for the high 33% sample. The *t*-values for the differences between subsamples are in parentheses and are based on an independent samples *t*-test. Significant differences are indicated by * (10% level), ** (5% level), and *** (1% level).

Panel A: Comparison of 50% Tobin's Q samples						
	Low 50% Tobin's Q sample		**High 50% Tobin's Q sample**		**Difference between low**	
Variable	**Mean**	**Std.Dev.**	**Mean**	**Std.Dev.**	**Diff.**	***t*-value**
I	0.164	0.306	0.275	0.333	0.111	(4.57)***
Q	0.995	0.181	1.812	0.893	0.817	(16.76)***
CF	0.291	0.388	0.533	0.708	0.241	(5.58)***
ΔNWC	0.059	0.524	0.125	0.736	0.066	(1.36)
SLS	8.097	16.930	7.222	7.782	-0.875	(-0.88)
RVFA	1207.89	370.32	3083.49	12961.85	1875.50	(2.61)***
DIV	0.308	0.225	0.359	0.419	0.050	(1.97)**
DEBT	0.138	0.109	0.117	0.105	-0.021	(-2.67)***
BNK_IR	0.117	0.173	0.112	0.154	-0.005	(-0.41)
BNK_EQ	9.550	11.787	5.888	8.426	-3.662	(-4.71)***
C1	24.566	19.339	27.195	22.877	2.628	(1.64)
INSIDE_EQ	5.587	18.406	6.438	18.167	0.852	(0.62)
SR	0.787	0.410	0.617	0.487	-0.170	(-4.98)***
BOARD	7.73	3.38	8.44	3.99	0.71	(2.52)**
S_BOARD	0.690	0.091	0.626	0.124	-0.064	(-7.82)***
PRIO	0.34	0.47	0.43	0.50	0.094	(2.56)**
PREF	0.66	0.48	0.60	0.49	-0.054	(-1.48)
CERT	0.37	0.48	0.37	0.48	-0.000	(-0.01)
Observations	*347*		*350*			

Panel B: Comparisons of 33% Tobin's Q samples												
	Low 33% Tobin's Q sample		**Middle 33% Tobin's Q sample**		**High 33% Tobin's Q sample**		**Difference between low and middle Q sample**		**Difference between middle and high sample**		**Difference between low and high sample**	
Variable	**Mean**	**Std.Dev.**	**Mean**	**Std.Dev.**	**Mean**	**Std.Dev.**	**Diff.**	***t*-value**	**Diff.**	***t*-value**	**Diff.**	***t*-value**
I	0.161	0.325	0.174	0.219	0.325	0.384	0.013	(0.51)	0.150	(5.18)***	0.164	(4.94)***
Q	0.923	0.136	1.213	0.197	2.083	0.988	0.290	(18.43)***	0.870	(13.13)***	1.160	(17.69)***
CF	0.190	0.186	0.391	0.431	0.656	0.836	0.201	(6.55)***	0.265	(4.29)***	0.466	(8.27)***
ΔNWC	0.007	0.482	0.103	0.454	0.166	0.885	0.096	(2.22)**	0.063	(0.96)	0.159	(2.39)**
SLS	4.494	7.350	9.920	19.136	8.518	9.005	5.426	(4.05)***	-1.402	(-1.02)	4.024	(5.26)***
RVFA	1065.83	2522.31	3696.89	15578.14	1659.80	4432.78	2631.05	(2.56)**	-2037.09	(-1.93)*	593.97	(1.77)*
DIV	0.274	0.216	0.361	1.304	0.365	0.402	0.087	(3.19)***	0.004	(0.12)	0.092	(3.05)***
DEBT	0.160	0.115	0.109	0.101	0.113	0.099	-0.051	(-5.10)***	0.004	(0.41)	-0.047	(-4.73)***
BNK_IR	0.119	0.175	0.117	0.158	0.107	0.158	-0.001	(-0.08)	-0.012	(-0.73)	-1.193	(-0.77)
BNK_EQ	9.293	11.258	8.538	10.465	5.287	8.924	-0.755	(-0.75)	-3.251	(-3.61)***	-4.006	(-4.24)***
C1	26.112	17.924	19.946	18.703	31.702	24.794	-6.166	(-3.63)***	11.759	(5.79)***	5.590	(2.78)***
INSIDE_EQ	5.273	17.219	4.204	15.395	8.598	21.512	-1.069	(-0.71)	4.394	(2.53)**	3.325	(1.83)*
SR	0.853	0.355	0.698	0.460	0.554	0.498	-0.155	(-4.07)***	-0.144	(-3.32)***	-0.299	(-7.42)***
BOARD	7.71	3.02	8.00	3.96	8.54	4.03	0.29	(0.89)	0.54	(1.45)	0.83	(2.50)**
S_BOARD	0.694	0.085	0.664	0.109	0.615	0.128	-0.031	(-3.38)***	-0.049	(-4.40)	-0.079	(-7.83)***
PRIO	0.33	0.47	0.41	0.49	0.42	0.49	0.079	(1.78)*	0.01	(0.62)	0.08	(1.83)*
PREF	0.65	0.48	0.68	0.47	0.55	0.50	0.027	(0.62)	-0.13	(-2.83)***	-0.10	(-2.20)**
CERT	0.36	0.48	0.44	0.50	0.32	0.47	0.079	(1.74)*	-0.13	(-2.83)***	-0.05	(-1.08)
Observations	*231*		*235*		*231*							