Family Ownership, Financing Constraints and Investment Decisions*

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ABSTRACT

This paper provides an empirical answer to the question of how the unique incentives of founding families influence investment decisions. Contrary to theoretical considerations, the results indicate that family firms are not more susceptible to external financing constraints. When compared to companies of similar size and dividend payout ratio, the investment outlays of family firms are consistently less sensitive to internal cash flows. Family businesses are more responsive to their investment opportunities and seem to invest irrespective of cash flow availability. The findings suggest that founding family ownership is associated with lower agency costs and can help to diminish information asymmetries with external suppliers of finance.

JEL Classification: G31, G32

Keywords: Family Firms, Ownership Structure, Investment Policy, Agency Theory

I. Introduction

The incentives associated with founding family ownership and control give reason to assume that family firms are subject to financing constraints. Founding families usually have invested most of their private wealth in the firm and rely on their primary asset as a source of income. In particular, in cases in which funds for private consumption cannot be extracted through an executive position in the firm, families are dependent on steady dividend payments and withdraw funds that might otherwise be used for corporate investment projects. In a world of perfect capital markets this would not impose a restriction since companies could always substitute external funds for internal capital. However, imperfections like information asymmetries, agency problems and transaction costs drive a wedge between the cost of internal and external financing.

Prior academic research also indicates that the level of information asymmetries is generally larger for small and young companies (Petersen and Rajan 1992), both typical characteristics of family businesses. In addition, families might be reluctant to raise new equity since an increase in share capital will dilute their equity stake and gradually undermine their controlling position. According to Shleifer and Vishny (1986), large and undiversified investors will pursue risk reduction strategies, one of which is the use of less debt in the firm's capital structure. In sum, these arguments suggest that family firms are more susceptible to financing restrictions as all sources of external finance imply possible drawbacks for the main shareholder. These constraints could lead to inefficient investment decisions that are primarily based on the availability of internal cash flows.

In contrast to these theoretical considerations, several empirical studies have recently shown that founding family ownership is associated with superior firm performance, both in

terms of accounting and market performance measures.[1] These findings obviously stand in contrast to liquidity constraints and inefficient investment behavior. As a result, the impact of family ownership on investment decisions is ultimately an empirical question.

In this study, I examine the issue using a unique panel dataset of 264 German listed companies from 1997 through 2004. Univariate results show higher investment ratios and financially more stable firm characteristics for family firms when compared to companies of similar size or dividend payout ratio. The analysis of investment-cash flow sensitivities further indicates that investment in family firms is less sensitive to the availability of cash flows and more responsive to investment opportunities in all sample subgroups. These findings provide evidence for more efficient investment decisions and fewer agency conflicts and information asymmetries in family firms. As a result, the advantages of family ownership in aligning the incentives between management and shareholders as well as between different groups of shareholders (see e.g. Anderson and Reeb 2003 or Andres 2008) seem to outweigh the possible disadvantages in terms of access to external capital. These findings are robust to alternative econometric specifications and seem to be robust to endogeneity concerns.

This is the first empirical study to specifically analyze the impact of founding family ownership on investment behavior. Even though the performance studies mentioned above have shown that family firms account for about one third of all exchange-listed companies (and most likely for an even higher percentage of private firms), there is hardly any evidence on the effects that founding family ownership has on firm characteristics other than performance. The present study aims to alleviate this gap.

In addition, the paper contributes to the existing literature on investment-cash flow sensitivities by analyzing the largest number of market-listed German companies to date, covering more than 95% of the market capitalization of non-financial firms in 1997.[2] By

[1] See Anderson and Reeb (2003), Villalonga and Amit (2006) for the US, Barontini and Caprio (2006) for cross-European evidence and Andres (2008) for Germany.
[2] Computation based on data in the DAI Factbook (Deutsches Aktieninstitut 2006).

estimating the standard reduced-form Q-model, investment is found to be highly cash-flow sensitive with higher sensitivities for supposedly unconstrained firms. Moreover, concentrated ownership has a negative, but non-monotonic influence on investment-cash flow sensitivities, suggesting lower agency conflicts and/or information asymmetries in the presence of large shareholders. Controlling for the identity of these blockholders, the results show that investment-cash flow sensitivities are lowest for firms with a founding family as controlling shareholder. Given that about 85% of German listed firms have at least one blockholder who holds voting rights of more than 25%, the German market provides an ideal environment to gain deeper insight into the influence of family control as compared to other types of blockholders.

The remainder of this paper is organized as follows. The next section contains a short outline of related literature and the Q-theory of investment. Section III provides information on the construction of the dataset, variable definitions and descriptive statistics. Section IV focuses on different measures of financial constraints commonly applied in the investment-cash flow literature. Section V deals with the regression analysis of investment cash-flow sensitivities and section VI concludes the paper.

II. Related Literature

In a world of perfect capital markets, a firm's investment decision is independent from its financing policies (Modigliani and Miller 1958). However, it is a generally accepted view that markets are incomplete and imperfect and that firms have limited access to external funds. These market inefficiencies include asymmetric information (Greenwald et al. 1984, Myers and Majluf 1984), agency costs (Bernanke and Gertler 1989, Gertler 1992) and transaction costs. As a result, equity and debt financing are no longer perfect substitutes and corporate investment will be influenced by the availability of internal funds.

Various empirical studies examine the relationship between firm investment and internal cash flows and provide evidence of the pecking order theory postulated by Myers (1984). In these analyses, the sensitivity of a firm's investment spending to internal cash flows is estimated in a regression model that controls for the availability of investment opportunities. Since these opportunities are based on expectations that are not observable, Tobin's q is used as a proxy. All in all, this means that if cash flows and Tobin's q are included in a regression model with firm investment as dependent variable, only Tobin's q should be significant in a perfect world. A significant cash flow coefficient can be interpreted as a sign of external financing constraints.

In their seminal work, Fazzari, Hubbard and Petersen (1998, FHP hereinafter) find that the investment outlays of firms that are more financially constrained (based on a predisposed classification) are more sensitive to internal cash flows than those of less constrained firms. They group firms based on their earnings retention practices, arguing that firms that retain most of their income face higher levels of financing restrictions. A number of subsequent studies apply different segmentation criteria (e.g. size, age) and provide strong support for these conjectures (Aggarwal and Zong 2006, Bond and Meghir 1994, Gilchrist and Himmelberg 1995, Lamont 1997). Their results seem to confirm theoretical considerations that suggest that small firms are more dependent upon internal capital and more susceptible to financing restrictions since potential lenders and suppliers of equity have little information on these firms.[3] In addition, transaction costs are usually not linear in the amount of capital raised, which implies an advantage in accessing external sources for larger companies.

Until recently the finding that companies that face greater levels of financial constraints show a higher sensitivity of investment to the availability of internal funds was pretty much a generally accepted assertion. Starting with Kaplan and Zingales (1997) other studies show the exact opposite and find that the investment of financially *un*constrained

[3] In a market with asymmetric information, the probability for a company to be subject to credit rationing decreases with firm size (Stiglitz and Weiss 1981).

firms is more sensitive to the availability of internal cash flows. Cleary (1999, 2006) and Kadapakkam et al. (1998) confirm these results. Booth and Cleary (2006) present a possible explanation and argue that financially constrained firms build financial slack based on their knowledge of restricted access to external capital. Audretsch and Elston (2002) find mixed evidence for Germany, with the highest sensitivities among medium-sized companies. D'Espallier et al. (in press) take an alternative approach and circumvent the ex-ante classification into potentially constrained and unconstrained groups and estimate firm-specific investment-cash flow sensitivities. In their post-estimation analysis, the authors conclude that investment-cash flow sensitivities are positively related to financial constrains and suggest that the payout ratio is well-suited to discriminate between unconstrained and unconstrained firms.

Despite of conflicting evidence on the relationship between financial constraint groups and investment-cash flow sensitivities, empirical studies generally confirm the existence of a positive sensitivity of investment outlays to internal fund availability. If such a pattern is observed for a group of large companies (which are more likely to be followed by market participants), explanations such as information asymmetries and arguments based on transaction costs are less persuasive. In this situation, the observed sensitivity is more likely the result of agency conflicts between managers and shareholders. In particular managers in large and widely-held corporations have the discretionary power and the incentive to spend free cash flows as this increases their personal utility (Jensen 1986).

Several studies have recently linked the analysis of investment-cash flow sensitivities to aspects of corporate governance. For a sample of UK firms, Pawlina and Renneboog (2005) confirm that investment is strongly sensitive to cash flows and find evidence for agency conflicts of free cash flow as the main source. Haid and Weigand (2001) focus on R&D intensive German corporations. Their results document different levels of liquidity constraints for owner-controlled and manager-controlled firms. Gugler (2003) presents

evidence for Austria and confirms the influence of controlling shareholders on firm investment policy. Similar studies are Gugler and Yurtoglu (2003), Kathuria and Mueller (1995) for the US and Goergen and Renneboog (2001) for the UK.

This study is in the same spirit, but focuses on founding families as a specific type of controlling shareholder.

III. Data

A. Sample Selection and Data Sources

The dataset used for the empirical analysis is based on all companies listed on the 'official market' (*Amtlicher Handel*) trading segment of the Frankfurt Stock Exchange at the end of 1998. Of all these firms, insurance companies, banks and other financial firms were excluded as their accounting data and corporate investment differ substantially from those of manufacturing and commercial firms. Furthermore, four companies were dropped because they were already insolvent at the beginning of the sample period and liquidated only shortly afterwards. For eleven firms, investment data was only available for one accounting year (or less). Since the within-estimator employed in the analysis requires longitudinal variation in the data, these firms had to be excluded, too. For the remaining 264 companies I collected data from 1997 till 2004, resulting in an unbalanced panel of 1,732 complete firm-year observations. Since the data on profit and loss statements of many small German companies (in particular for firms that were not part of one of the main indices) that can be obtained from the major databases is still flawed and incomplete for the late 1990s, all items were manually collected from Hoppenstedt yearbooks.[4]

Governance structures (ownership stakes, board representation) as well as investment and other accounting data was also obtained from this source. Names of the members of the

[4] The "Hoppenstedt Aktienführer" is an annual publication that provides detailed information (e.g., ownership structure, board composition, balance sheet information) on German listed firms.

executive boards (*Vorstand*) and supervisory boards (*Aufsichtsrat*) were gathered for every other year (board members' tenure can be up to five years, depending on the company's articles of incorporation), shareholdings on a yearly basis.

B. Family Firms and Ownership Classification

The empirical literature provides no clear-cut definition of criteria or measures to identify family firms. Most studies require a minimum equity stake of the founding family and/or their board representation. In this study, a firm is categorized as a family business if a) the founder and/or family members hold more than 25% of the voting shares, or b) the founding family is represented on either the executive or the supervisory board if they own less than 25%[5] of the voting rights.

For some firms, this procedure is straightforward, especially in cases where the founder is still active. However, in particular for families with a long presence in the firm, last names change due to marriages as the family expands. In these cases, the affiliation of distant relatives or in-laws serving as board members was confirmed by manually examining company publications (e.g. annual statements, ad hoc announcements, anniversary publications) and other publicly available sources (newspapers…). In order to investigate the influence of the so-called 'founder effect' observed in various performance studies of family firms (e.g. Anderson and Reeb 2003 for the US, Andres 2008 for Germany), the family dummy variable was broken down into three sub-categories: a family firm is 'founder-controlled' if the founder still acts as the company's CEO, 'descendant-controlled' if the founder is no longer active in the executive board or has passed away and one of his/her descendants is in the position of CEO. And last, a firm is 'professionally managed' if it is

[5] Until very recently, only holdings of more than 5% had to be registered with the German Financial Supervisory Authority (BaFin). Shareholdings of less than 5% - however reported in Hoppenstedt – were excluded for reasons of data consistency. Thus, a family (or any other shareholder) has to hold at least 5% of the shares in order to be recorded in the sample.

categorized as a family firm, but has hired a professional management team and the family is thus no longer present in the executive board.

The ownership structures of non-family firms were also classified according to the identity of the largest blockholder. In line with the family firm definition above, the largest shareholder has to hold at least 25% of the voting shares to be categorized as a blockholder. Even though this threshold might seem high at first sight, it is reasonable given the German legal and institutional framework. According to the German Stock Corporation Act (AktG), a stake of 25% provides a blocking minority and allows the blockholder to prevent far reaching decisions of the general shareholders' meeting, like issues of new shares. In addition, this ownership stake should be high enough to ensure both, strong incentives to monitor the management team and the power to do so.

Furthermore, the German institutional framework is characterized by very high levels of ownership concentration. Franks and Mayer (2001) observe that '85% of the largest quoted companies have a single shareholder owning more than 25% of the voting shares' (based on 171 companies in 1990). This percentage is strikingly consistent with the ownership pattern observed in this study, with 84.5% of the firms featuring a shareholder with a stake of more than 25%.

The different blockholder types assigned to companies with one or more shareholders exceeding the 25%-threshold are as follows: families (as defined above), financials (banks, insurances), government (all public authorities), strategic investors (other manufacturing or commercial companies) and others (management teams, foundations and individuals who have invested parts of their private means).[6] Accordingly, all other companies (i.e. companies without blockholder) are classified as 'widely-held'. The classification into these five blockholder-subgroups should be sufficiently accurate to capture the different interests. Among these investors, the group of financial investors supposedly has the biggest influence

[6] If there is more than one blockholder present in a firm, the block is assigned to the blockholder with the largest share.

on efficient investment behavior. On the one hand, they potentially facilitate the company's access to external capital (lower information asymmetries); on the other hand, they should use their controlling position to ensure only positive NPV projects are carried out.

C. Descriptive Statistics and Variable Definitions

All accounting variables are denominated in thousands of Euros. Data for 1997 and 1998 is converted from Deutschmarks (DM) into Euros based on the official conversion rate determined in December 1998.

The market value of a firms' equity at time *t* is calculated by multiplying the end of the year closing price with the number of shares outstanding. However, many German corporations have issued multiple share classes, usually ordinary and preferred shares. In cases where only one of these share classes is listed on the stock exchange, the price of the listed shares is adopted for the unlisted class. Market-to-book value, which is used as a proxy for Tobin's q, is computed as market value of equity + (total assets – book value of equity) divided by total assets.

The cash flows for each company are calculated as net income plus depreciation and changes in long-term provisions. These are defined as the sum of pension provisions and other provisions (excluding tax provisions). In order to be able to meet their future financial obligations, firms that offer company-based pension schemes have to build up pension provisions. Since companies frequently have wide discretionary powers over the investment of these provisions[7] they should be considered a form of cash flow. The inclusion of pension provisions is also in line with Audretsch and Elston (2002). Although this definition should be more accurate, I also used a more conservative cash flow definition based on the sum of net income and depreciation as a robustness check.

[7] See Edwards and Fischer (1994, ch. 3) for a more extensive discussion.

The evolution of firm investment levels over the sample period (adjusted for inflation) is presented in Table 1. Both mean and median investments mirror the general economic development in Germany, showing a strong increase over the period from 1997 till 2001. In 2002 and 2003, investment levels decrease and finally pick up again in 2004.

[Insert Table 1 about here]

As can be seen in Table 2, family firms are present in all kinds of industries. A closer look at the SIC codes reveals that family ownership prevails in electronic and other electrical equipment (SIC code 36), transportation equipment (37), building materials, hardware and gardening (52), miscellaneous retail (59) and business services (73). On the other hand, family firms are hardly present in very capital intensive industries (Electric, gas, and sanitary services (49), heavy construction contractors (16)). The distribution of family firms indicates that they might tend to operate in lower growth industries and/or in industries that require less investment. This issue will be discussed further in the section on robustness tests (V.C).

[Insert Table 2 about here]

Table 3 contains descriptive statistics of the data, subdivided into family and non-family firms. Means are first calculated per company (over time) and then averaged across all sample firms.[8] The final column presents t-statistics testing for differences in means between family and non-family firms.

[Insert Table 3 about here]

Family firms are significantly younger than non-family firms. Although young companies are usually more susceptible to credit rationing as potential lenders have little information about their investment opportunities and the capabilities of the management team (Petersen and Rajan 1992), the comparatively young age of family businesses cannot be

[8] If a company changes its status from family to non-family firm two means are computed and then assigned proportionately (years as family firm in proportion to years in sample) to the relevant group. The overall pattern of these figures does not change if mean values are obtained by weighting the data by years (meaning that the data in the latest years of the sample period get assigned an equal weight even though the number of firms decreased).

interpreted as a sign of financing constraints. With an average age of 80.6 years they seem to be mature companies that have established a sufficiently long track record.

However, family firms are also significantly smaller, both in terms of total assets and sales. In empirical studies, firm size is commonly used as an indicator for financial constraints since small companies are less likely to be covered by analysts and the financial press. The lack of information should hamper small firms' chances to raise capital, in particular with respect to new equity offerings. This view is confirmed by FHP (1988), who find smaller companies to be more dependent upon bank loans. Consequently, this combination should lead to higher levels of leverage among family firms and stands in contrasts to theoretical considerations by Shleifer and Vishny (1986). They observe that risk aversion can be one of the most important costs that large and undiversified shareholders can impose on the firm. One possibility of risk avoidance could be the use of less debt, as this form of capital bears a higher probability of default. Nevertheless, family firms in my sample exhibit a significantly higher percentage of debt in their capital structures. An explanation for this finding could be the families' willingness to maintain control. The incentive to fund profitable investment projects with debt will probably be higher for these firms as an increase in share capital would dilute the family's equity stake. It should be noted, though, that the economic significance of debt ratios seems to be limited, given the difference in means of only 2.5%. Regarding the debt maturity structure, no differences between the two subgroups can be observed (FHP 1988 find higher levels of short-term debt for small companies). In line with the idea that financially constrained firms build up financial slack, family firms show a significantly higher level of cash holdings compared to non-family firms (9.4% of total assets compared to 7.7%).

Overall, the results of the univariate analysis could be interpreted as a sign of liquidity constraints among family firms. They are on average smaller – suggesting information asymmetries – and more heavily leveraged (which will make it more difficult to take up loans), and hold significantly more cash. Family firms also seem to pay out a higher

percentage of cash flows to their shareholders (the difference in payout ratios is not statistically significant, though). In addition, the observation of significantly higher values of Tobin's q indicates that they are in a position where the need for additional funds for investment projects is particularly high. Therefore, different measures of financial constraints are investigated more closely in the following.

IV. Measures of Financial Constraints

In the past 20 years, numerous studies have investigated the relationship between financial constraints and corporate investment behavior (FHP 1988, Gilchrist and Himmerberg 1995, Kaplan and Zingales 1997, Kadapakkam et al. 1998, Cleary 1999, to name just a few). The procedure generally applied in these empirical investigations has been to identify variables that serve as proxies for the (unobservable) level of internal and external financing constraints and then use these variables in order to differentiate between financially constrained and unconstrained firms.

In this study, firms are classified into groups based on firm size and dividend payout ratios. The use of size as a criterion of financial constraints is based on the notion that smaller firms will face higher informational asymmetries (for reasons already mentioned above). This approach is used, among others, by Kadapakkam et al. (1998), Cleary (2006) and Audretsch and Elston (2002). Companies are segmented into two groups each year, based on their total assets.[9] Accordingly, large firms are those with total assets above the sample median in each year, whereas small firms have total assets below the median.

The second criterion is similar to the original approach by FHP (1988) and classifies firms according to their dividend payout ratios. Following their rationale, firms facing a large

[9] Other studies (e.g. Kadapakkam et al. 1998) use several size measures and compare the results obtained with these criteria to each other. Following Kadapakkam et al. (1998) I also used sales as an alternative measure. These regressions are not reported as they did not materially change the results.

"wedge" between the cost of internal and external finance will decide to retain most of their income to avoid the use of more expensive external sources of capital. D'Espallier et al. (in press) examine different constraint measures and suggest "that the payout ratio is able to discriminate between constrained and unconstrained firms." The calculation used to obtain a payout rate in most studies is to divide dividends by EBIT (e.g. Cleary 2006).

However, the German tax system used to treat distributed and retained earnings differently in the early years of the sample period. Until 2000, the tax rate on retained earnings was higher than the tax on dividends by 10%. This essentially means that corporate tax liabilities were sensitive to the decision to pay dividends. If a company made a loss and did not pay any dividends to its shareholders, the tax liability was 0. If - however - the same company decided to pay dividends despite of the loss, this incurred a tax liability. In addition, shareholders who received a (net) dividend also received a tax credit (equivalent to the tax paid on their gross dividend by the company) which was then applied to their personal income tax computation. From 2001 onwards, dividends and retained earnings are no longer taxed differently in Germany.

In order to adjust for the disturbing influence of tax regulations, dividends are related to zero dividend distribution profits. These are defined as follows:

$$\frac{D\left(1-t_r\right)}{\left(1-t_d\right)} + \mathrm{R}\,, \tag{1}$$

where t_d stands for the tax rate on dividends, t_r for the tax rate on retained earnings, $D(1\text{-}t_r)$ are net dividends (i.e. dividends net of tax), $D/(1\text{-}t_d)$ are gross dividends (including the tax credit for periods before 2001) and R are retained earnings. This means that all profits are standardized to a hypothetical case in which all companies retain their profits. In line with the cash flow definition used for the investment-cash flow analysis, depreciation and changes in long-term provisions (pension provisions and other provisions) are added to expression (1).

Since dividends paid on preferred shares are usually different from dividends on ordinary shares, a weighted average is calculated:

$$\frac{D_O * NOS_O + D_P * NOS_P}{NOS_O + NOS_P}, \tag{2}$$

where D_O and D_P are dividends per share on ordinary and preferred shares and NOS_O and NOS_P the number of ordinary and preferred shares, respectively.

[Insert Table 4 about here]

Descriptive statistics of the subgroups based on firm size and dividend payout ratios as segmentation criteria are shown in Table 4. Both, the investment and cash flow ratios are obtained by scaling the relevant variable by the beginning of period level of net fixed assets. T-values reported in the table denote statistical significance for differences in means between family and non-family businesses. Firms seem to be classified reasonably well according to their financial status. Based on traditional financial ratios, large firms seem to be in a solid financial condition, whereas small firms show signs of financial constraints. The variables investment and cash flow ratio as well as return on equity and (surprisingly) sales growth are on average significantly larger (at least at the .05-level) for large companies compared to their smaller counterparts. Leverage is also slightly higher for smaller firms, although not significantly. Concerning the distinction between family and non-family firms within these two subgroups, almost all differences of financial ratios are statistically significant in the "large" group. Among small companies, family businesses are only distinguishable from non-family firms in terms of market-to-book ratio and investment ratio.

With regard to the segmentation by dividend payout ratios, high payout firms (presumably not financially constrained) also seem to be in a more stable financial condition than low payout firms (presumably constrained). They are on average more profitable (ROE significant at the .01-level), show higher cash flow ratios (.05-level) and use significantly less debt (significant at the .01-level). The comparison between family and non-family firms

shows that family firms seem to be in a healthier financial condition in the high payout group. In the low payout group they exhibit significantly higher investment ratios and higher values of Tobin's q.

In conclusion, the two selection criteria seem to detect the susceptibility to financial constraints quite well. In line with theoretical arguments, small firms as well as companies that retain a higher percentage of their earnings show signs of financing constraints. Within these subgroups, family firms consistently show higher investment ratios and significantly higher values of Tobin's q. They are also different from non-family firms with respect to return on equity (significantly higher in two subgroups), cash flow ratio and leverage (both significantly higher in two subgroups). Contrary to the assumption based on the univariate analysis, these financial ratios reveal that family firms are not more susceptible to financial constrains when compared to non-family firms in the same subgroup. In fact, these figures could even be interpreted as signs of a lower level of financial constraints among family firms.

This section confirms that larger firms as well as firms that pay out a higher proportion of their cash flows seem to be financially unconstrained. In theory, this should lead to a low sensitivity of investment spending to the availability of internal cash flows. The following section aims to analyze this relationship by estimating investment-cash flow sensitivities in a panel regression framework. Further, the effect of family ownership (and large blockholders in general) on a firm's investment policy will be investigated.

V. Regression Analysis

The estimation of investment-cash flow sensitivities is based on the following basic regression model used by Kaplan and Zigales (1997) and Cleary (1999, 2006) among others:[10]

$$\left(\frac{I}{K}\right)_{it} = \beta_{CF}\left(\frac{CF}{K}\right)_{it} + \beta_{MB}\left(\frac{M}{B}\right)_{it} + u_{it}, \qquad (3)$$

where *I/K* is the ratio of corporate investments to the beginning of the year book value for net property, plant and equipment. *CF* represents cash flow and is defined as net income plus depreciation and change in long-term provisions (pension provisions and other provisions, excluding tax provisions). To remove size effects, the cash flow variable is also normalized by the level of net fixed assets at the beginning of the year. *M/B* represents the firm's market-to-book value and is computed as the ratio of market value of equity + (total assets – book value of equity) to total assets at the end of the previous year. As commonly applied in investment-cash flow analysis I control for firm-specific effects by using the within-estimator approach.[11] All regressions also include year dummies in order to control for possible year effects.

As stated above, the basic investment regression model in equation (3) is used by the overwhelming majority of empirical investment-cash flow studies. For the purpose of a direct comparability of the results in this study with the coefficients of other recent papers, I use the basic regression model as a starting point. However, this type of analysis might lead to biased coefficients β_{CF} and β_{MB} if relevant control variables are omitted. In large cross-sections, it can be argued that this possible bias can be neglected as long as the bias is the same for all types of companies. Yet, the present analysis aims to analyze whether there are differences

[10] Using this well-established methodology yields the advantage of a direct comparability between the coefficients in this paper and those obtained in closely related studies.

[11] Unlike most investment-cash flow estimations, Pawlina and Renneboog (2005) use the (supposedly more efficient) random-effects estimator. In my sample, the Hausman test rejects the null hypothesis of zero correlation between the vector of explanatory variables and the error term. Therefore, the consistent fixed-effects estimator is used in all regressions.

between two types of firms (family vs. non-family firms) that were shown to differ significantly in the previous section. In this case, it is hardly convincing to argue that the omission of potentially relevant variables should result in similar biases for both groups. Therefore, the robustness analysis includes several additional regressions that control for other factors.

$$\left(\frac{I}{K}\right)_{it} = \beta_{CF}\left(\frac{CF}{K}\right)_{it} + \beta_{MB}\left(\frac{M}{B}\right)_{it} + \beta_{C}\left(\text{control variables}\right)_{it} + u_{it}, \qquad (4)$$

The set of control variables comprises factors that were shown to have an impact on firm investment. Most importantly, there is strong evidence that firms facing financing constraints are well aware of their situation and retain cash in order to finance investment projects. Almeida et al. (2004) present a model in which constrained firms choose their optimal cash policy to balance the cost of holding liquid assets and the profitability of future investments. Estimating cash-cash flow sensitivities, they find empirical support for their predictions: supposedly constrained firms show significantly positive sensitivities while unconstrained firms do not. Therefore, regression model (4) controls for a firm's cash holdings, defined as the ratio of cash and marketable securities to total assets.

In addition, leverage and lagged production are included as control variables. Although both variables lack a compelling theory, they were shown to be important in the empirical investment literature. Hennessy (2004) provides evidence on the effect of leverage and a firm's debt rating on investment: firms with higher debt burdens (and below investment grade bonds) tend to invest significantly less. Lastly, lagged production – defined as sales plus the change in inventories (scaled by total assets) – is a commonly used variable in the empirical macro literature. Jorgenson (1971) argues that "real output emerges as the single most important determinant of investment". Schiantarelli and Georgoutsos (1990) show that when firms have monopoly power, lagged production seems to be an important determinant of current investment. The theoretical arguments proposed are mainly based on the idea that

production affects liquidity which, in turn, has an influence on investment. However, if liquidity (i.e. cash and short-term securities) is important, it is unclear why production, and not liquidity itself, should be included in a regression. Nevertheless, Hoshi et al. (1991) show empirically that both liquidity and production have a significant effect on firm-level investment. As a consequence, equation (4) contains both variables. Lastly, all robustness tests also comprise annual dummy variables.

Until recently, a high sensitivity of investments to a firm's current cash flow was interpreted as a sign of financing constraints (e.g. FHP 1988). Kaplan and Zingales (1997) as well as other empirical examinations question this relationship and find higher investment-cash flow sensitivities for firms that are unconstrained based on the selection criteria discussed above. Even though this still remains an unresolved question, high investment-cash flow sensitivities are a broadly accepted sign of inefficient investment behavior.

A. Main Regression Results

Table 5 contains the regression results for the whole sample and the four financial constraints groups. The estimates show that firm investment is sensitive to cash flow in all groups; a positive and significant coefficient for *M/B* can only be observed in the high dividend payout group. Compared to the regression results of other recent investment-cash flow studies that use German subsamples (and the same methodology), the cash flow coefficient for the full sample is lower (0.201 in Cleary (2006) and 0.139 in Aggarwal and Zong (2006)). It should be noted, though, that these papers use entirely different datasets over different observation periods. In line with both studies, the investment policy of German firms seems to be significantly affected by the availability of internally generated funds. Contrary to the assumption of higher sensitivities for financially constrained companies, the cash flow coefficients are significantly higher for large firms and firms with a higher dividend payout

rate.[12] This is consistent with evidence by Kaplan and Zingales (1997) and also with results on German subsamples in Kapadakkam et al. (1998) and Cleary (2006). Therefore, investment-cash flow sensitivities do not seem to provide useful measures of financing constraints. This means that when interpreting a positive relationship between firm investment and the availability of cash flows several possible explanations have to be considered.

In addition to financing constraints that are the result of a poor financial status or asymmetric information between the firm and the capital market in the sense of Myers and Majluf (1984), the observation of high investment-cash flow sensitivities can also be attributed to agency costs. In particular in firms that are classified as being financially unconstrained, high cash flow ratios and a stable financial condition might increase the susceptibility to the free cash flow problem (Jensen 1986). In this case, high investment-cash flow sensitivities are more likely the result of agency conflicts between management and shareholders. Managers who are not monitored closely enough might take the opportunity of high cash flows in order to increase their personal utility (e.g. through empire building) instead of paying these funds out to shareholders. In this sense, investment-cash flow sensitivities are also influenced by the degree of agency conflicts.

[Insert Table 5 about here]

In order to gain insight into the role of families as dominant shareholders and their influence on investment decisions, the regression model is estimated separately for family and non-family firms. In addition to the arguments raised above, families might have a strong incentive to influence investments by pursuing projects that are unrelated to the firm's core business. A diversification strategy of the family's portfolio is more likely to be followed within the company as the availability of private funds for sufficient external diversification is usually limited. By using readily available funds in the form of cash flows, the family will not

[12] Following the methodology by Booth and Cleary (2006), t-statistics are based on cross-dummy variable coefficients. These are constructed by multiplying M/B and CF/K by the upper subgroup dummy variable. See Booth and Cleary (2006, p.13) for a more detailed description.

have to face the scrutiny of external suppliers of capital. Such behavior would lead to comparatively high investment-cash flow sensitivities. On the other hand, the higher profitability of family businesses (Anderson and Reeb 2003, Andres 2008, Villalonga and Amit 2006) presents a strong case against this consideration and should be an indicator of more efficient investment decisions.

Table 6 aims to provide an empirical answer to this question. The results indicate that the sensitivity of firm investment to cash flows is significantly lower for family firms compared to non-family firms. This holds true for the whole sample as well as for all subgroups. In the full sample regression, the cash flow coefficient of non-family firms is about eight times (!) as large as that of family firms. In contrast to high levels of investment-cash flow sensitivity among non-family firms, the cash flow coefficient is not statistically different from zero for small and low-payout family businesses and only slightly larger than zero for the whole sample of family firms.

[Insert Table 6 about here]

Positive and significant coefficients of *M/B* in the family-subsample show that corporate investment is sensitive to investment opportunities for these firms. This sensitivity is also significantly higher for family businesses compared to non-family firms in three out of the four financial constraint groups. In non-family firms, a significant relationship between investment spending and investment opportunities, as proxied by market-to-book value cannot be observed. In sum, the combined findings of low investment-cash flow sensitivities and positive sensitivities of investment to *M/B* suggest that investment in family firms is more focused on value creation. Companies with founding family ownership seem to be more responsive to their investment opportunities and invest irrespective of the availability of internal cash flows.

B. Family Influence and Other Dominating Shareholders

As pointed out above, various empirical studies on family ownership have documented the occurrence of the so-called 'founder effect'. This basically means that the performance of family firms is particularly strong (both, in terms of accounting performance and market performance) as long as the founder is still active as CEO. The regression results in Table 7 shed light on the question if founder-led family firms also show different patterns in terms of investment behavior. The estimates of model 1 indicate that the investment-cash flow sensitivity among family firms is significantly lower and almost equal to zero when the founder is still active. This finding can also be interpreted as a sign of lower agency problems in founder-led firms. Regressions including similar interaction terms for descendant-CEOs and professional CEOs in family firms (not reported) do not show significant coefficients.

[Insert Table 7 about here]

Although the typical owner-manager conflict does not apply to family firms in most cases (since family members are often part of the executive board), another type of agency conflict in the form of minority shareholder expropriation might be present. Entrenched family members could use their position in the firm and spend free cash flows on projects that maximise their personal utility, leading to high investment-cash flow sensitivities. In line with arguments on insider share ownership (Morck et al. 1988, McConell and Servaes 1990) the degree to which the families' interests are aligned with those of minority shareholders could be non-monotonic. The regression results of model 2 shall examine this argument. The coefficients of the interaction terms provide support for these theoretical considerations and indicate a non-monotonic relationship between investment-cash flow sensitivity and family ownership. However, the quadratic term is only weakly statistically significant.

In the case of family firms, lower investment-cash flow sensitivities are most likely the result of a strong incentive alignment between the founding family and minority shareholders. In other companies the alignment of interests between a management team and outside shareholders should be increased through monitoring. However, companies with atomistic

shareholder structures are likely to face the free-rider problem (Holmstrom 1982, Shleifer and Vishny 1986) which gives managers the discretionary powers to spend free cash flows (Jensen 1986). In contrast, large blockholders have both the power and the incentive to decrease agency costs and increase firm value. In addition, the presence of large shareholders can diminish information asymmetries and thus facilitate external financing. In particular, the blockholding of a financial institution should help to reduce asymmetries between the firm and the bank. Güner et al. (2008) find evidence of increased external financing and lower investment-cash flow sensitivities when commercial bankers enter the boards of U.S. firms. In contrast to these results, Dittmann et al. (2008) find that bankers on the boards of German firms do not help to overcome financial constraints. Regression model 1 in Table 8 includes interaction terms for all blockholder types (defined as shareholdings above 25% of the voting share capital) mentioned above.

[Insert Table 8 about here]

The results show that all types of blockholdings are negatively related to investment-cash flow sensitivities, but only partly significantly. Only coefficients on founding-family and strategic blockholdings are statistically significant (at the 0.01-level). Again, the negative coefficient on strategic blockholders should be interpreted with caution as it can be attributed to both, mitigation of agency problems due to the high monitoring incentives and reduced financial constraints. Large strategic investors (defined as other – usually larger – industrial firms) usually face lower information asymmetries themselves, enjoy lower costs of external financing and can pass funds on to their subsidiaries or affiliated companies. This argument is in line with evidence by Hoshi et al. (2001) who find lower investment-cash flow sensitivities for firms that are part of a business group (*keiretsu*).

The second regression model in Table 8 examines possible non-linearities between share ownership of the largest shareholder and investment-cash flow sensitivity for the full sample. As expected, the coefficient of the linear ownership variable is negative and

statistically significant, providing evidence for reduced free cash flow problems and/or financing constraints as the ownership of the main shareholder increases. On the contrary, the squared term is significantly positive and confirms a non-monotonic relationship.[13] The minimum of this function is reached at an ownership level of about 55%.

In sum, the results of the regression analysis provide strong evidence that larger firms and firms with a higher dividend payout rate are more investment-cash flow sensitive. A closer analysis of the various size and payout subgroups shows that family businesses exhibit significantly lower investment-cash flow sensitivities and are more responsive to investment opportunities than non-family firms. Furthermore, concentrated ownership structures are negatively related to investment-cash flow sensitivities, most likely the result of lower agency costs.

C. Robustness Tests

The results presented thus far are based on the basic regression model as presented in equation (3). As indicated above, this specification is still applied in most empirical investment-cash flow studies and requires only few data items. However, coefficients that are based on this model could be biased if important firm characteristics are ignored. Therefore, several robustness tests are presented in table 9.

[Insert Table 9 about here]

Columns 1 and 2 contain the estimates of an extended regression model (equation (4)) that controls for additional firm characteristics. As can be seen in column 1, the inclusion of the control variables has only a very limited effect on the cash flow coefficient. It is only slightly lower (0.041 vs. 0.047) and still highly significant. The results in column 2 confirm the finding of a significantly lower investment-cash flow sensitivity for family firms.[14]

[13] This pattern is even more pronounced for the sub-sample of non-family firms (results not reported).
[14] Regression results for the various constraint groups are not reported. The results presented above remain qualitatively unchanged when the set of control variables is included in the subgroup regressions.

Among the control variables, only the coefficient for lagged production is significant. As the variable lacks a strong theoretical foundation, the coefficient is somewhat difficult to interpret. Nevertheless, the main results of positive investment-cash flow sensitivities and lower coefficients for family firms remain unchanged irrespective of the inclusion of the production variable.

Another possible bias might arise due to the the distribution of family and non-family firms among industries. As shown in table 2, family businesses are hardly present in very capital intensive industries (for example, all 16 firms in “Electric, gas and sanitary services” (SIC code 49) are non-family firms). Since some of these industries have grown at high rates in recent years, non-family firms might tend to operate in higher growth industries where current liquidity might be a good proxy for future investment opportunities. This could imply that the cash flow variable acts as a proxy for omitted future profitability variables and thus picks up the effect of investment opportunities missed by the market-to-book ratio (Bond et al. 2003, FHP 1988). If this effect were higher for non-family firms, higher investment-cash flow sensitivities could be the result of a larger positive bias for these firms. In order to control for a possible industry bias, the regressions in columns 3 and 4 exclude all industries where the representation of family and non-family firms is completely biased in one direction or the other. This specification decreases the sample size by 46 firms. The regression results in columns 3 and 4 of table 9 confirm the previous findings, showing a positive investment-cash flow sensitivity for all firms and a significantly lower sensitivity for family firms.

Lastly, Bond et al. (2003) and Audretsch and Elston (2002) point out the importance of controlling for possible biases that are due to unobserved firm-specific effects and endogenous explanatory variables. In the presence of these effects, OLS and within-group regressions would lead to biased estimates. Specifically, rewriting equation (3) as an error-components model yields:

$$\left(\frac{I}{K}\right)_{it} = \beta_{CF}\left(\frac{CF}{K}\right)_{it} + \beta_{MB}\left(\frac{M}{B}\right)_{it} + \nu_i + \varepsilon_{it}, \qquad (5)$$

where ν_i is a firm-specific effect (assumed constant over time) to allow for unobserved influences on the investment policy. ε_{it} is a disturbance term. For OLS to yield unbiased estimates, the error term ($\nu_i + \varepsilon_{it}$) must not be correlated with the explanatory variables. However, if panel data models such as (5) are applied to a dataset with a large cross-section of firms and a small number of time-series observations, there is a potential problem since the explanatory variables are likely to be correlated across firms with the firm fixed effect ν_i. If this is the case, estimates based on OLS are biased an inconsistent. The within-estimator used in this paper eliminates the firm fixed effect by "time demeaning" the data, leading to (potentially) unbiased coefficient estimates. Nevertheless, the fixed effects model still rests on the assumption that the explanatory variables are uncorrelated with the disturbance term, i.e. $\text{cov}(x_{it}, \varepsilon_i) = 0$, where ε_i is the deviation from the time mean of the disturbance term ε_{it} (Nickell 1981). This is referred to as the assumption of (strict) exogeneity. If this assumption is violated (i.e. if there is an endogeneity problem), the within-estimator also yields biased coefficients.

In order to obtain consistent estimates, the model (equation (5)) is first-differenced to eliminate the fixed-effect, ν_i:

$$\left(\frac{I}{K}\right)_{it} - \left(\frac{I}{K}\right)_{it-1} = \beta_{CF}\left(\left(\frac{CF}{K}\right)_{it} - \left(\frac{CF}{K}\right)_{it-1}\right) + \beta_{MB}\left(\left(\frac{M}{B}\right)_{it} - \left(\frac{M}{B}\right)_{it-1}\right) + \left(\varepsilon_{it} - \varepsilon_{it-1}\right) \qquad (6)$$

As suggested by Arellano and Bond (1991), an instrumental variable approach (see Anderson and Hsiao 1981) is then used to estimate (6).

Provided there is no serial correlation in the disturbance term, all lagged values of the explanatory variables can be used as valid instruments in the first-differenced equation. In the regressions in columns 5 and 6 of table 9, lagged values dated *t–2* and earlier are used as

instruments for all explanatory variables.[15] This means that the regression model allows for the endogeneity of the regressors as it is likely that shocks affecting the investment policy also affect cash flows and other explanatory variables. Arrelano and Bond (1991) develop a Generalized Method of Moments (GMM) technique in-first-differences to obtain an estimator that is unbiased and consistent under these conditions.

The parameter estimates reported in columns 5 and 6 of table 9 confirm the results obtained with the within-estimator. Significance levels are slightly lower but still point at a strong sensitivity of firm investment to current cash flows. The interaction term for family firms is significantly lower in both model specifications. Note that these models also control for a possible endogeneity of family ownership. Although previous papers examining the relationship between family ownership and firm performance have shown that the superior performance of family businesses is not driven by endogeneity (Anderson and Reeb 2003, Villalonga and Amit 2006), one might express concerns that lower investment cash flow sensitivities for family firms are the result of a reversed causality. Financing constraints and/or agency problems (hence, high investment-cash flow sensitivities) might be an incentive to give up family control whereas strong performance and low financing constraints could prompt families to keep their shares. However, several papers have shown that family ownership in Germany is very stable even over generations (Andres 2008, Erhardt et al. 2004). In the present dataset, the average ownership stake of founding families remains stable at around 60% throughout the sample period from 1997 till 2004. Despite these arguments, the GMM regression in table 9 control for the possible endogeneity of family ownership and can be regarded as an indication that the evidence presented in this paper is not driven by endogeneity of family ownership.[16]

[15] All GMM models are estimated using the „xtabond2“ command in STATA.

[16] In additional regressions (not reported) I test the robustness of the findings in a dynamic panel model (i.e. with $(I/K)_{t-1}$ as the lagged dependent variable). The results (GMM-in-differences and GMM-in-systems) show insignificant coefficients for lagged investment, but confirm all other results, in particular with respect to significantly lower investment-cash flow sensitivities for family firms.

VI. Conclusion

This paper examined the investment behavior of family firms as compared to non-family firms and the related question if family businesses face financing constraints. The characteristics of family holdings suggest that investment decisions in family firms are potentially influenced by the incentives associated with this ownership structure. The highly concentrated family holdings and their long-term presence in the firm imply that these investors are tempted to rely on internal sources of finance when funds for profitable investment projects are needed: External debt financing might be considered too risky due to the increased default probability and new share offerings might be avoided since an increase in share capital will gradually reduce family control. Additional costs could be imposed on minority shareholders by families who use their position in the firm in order to maximise private benefits and waste free cash flows. In contrast, various empirical studies recently investigated the performance effects of founding family ownership and consistently documented that these firms perform better or at least as well as firms with other ownership structures. Obviously, these findings stand in contrast to inefficient investment behavior and financial constraints.

In this study, I address these questions using a sample of 264 German non-financial firms for the period from 1997 until 2004. Results for the whole sample and several subgroups confirm previous evidence and find investment to be highly cash flow sensitive. Contrary to the supposition that family firms are more susceptible to financing restrictions, my findings indicate that they are financially more stable when compared to non-family firms that are similar in terms of size and dividend payout ratio. Family firms are, however, more heavily leveraged which is probably a reaction to the reluctance to issue equity.

The analysis of investment-cash flow sensitivities shows that investment decisions of family firms are less sensitive to the availability of internal cash flows and more responsive to

investment opportunities. This effect is found to be strongest as long as the founder is active in the firm.

Furthermore, the evidence suggests that ownership concentration is related to investment-cash flow sensitivities in a non-monotonic pattern. The relationship between the ownership stake of the largest shareholder and investment-cash flow sensitivity is first negative, but gets weaker with higher ownership stakes. This is partly similar to evidence on insider ownership (Pawlina and Renneboog 2005) but extends the pattern to outside ownership.

In conclusion, these findings confirm the assertion of lower agency conflicts in family firms. Lower investment-cash flow sensitivities and more stable financial ratios for family businesses in subgroups that are commonly assumed to be financially constrained could also be interpreted as signs of lower information asymmetries. The long-term commitment and presence of family members could help to overcome these asymmetries through reputation building between the family and external suppliers of capital.

References:

Aggarwal, R. and S. Zong (2006), 'The cash-flow-investment relationship: international evidence of limited access to external finance', *Journal of Multinational Financial Management*, Vol. 16, pp. 89-104.

Almeida, H., M. Campello and M. S. Weisbach (2004), 'The cash flow sensitivity of cash', *Journal of Finance*, Vol. 59, pp. 1777-1804.

Anderson, T. W. and C. Hsiao (1981), 'Estimation of dynamic models with error components', *Journal of the American Statistical Association*, Vol. 76, pp. 598-606.

Anderson, R. C. and D. M. Reeb (2003), 'Founding family ownership and firm performance: evidence from the S&P 500', *Journal of Finance*, Vol. 58, pp. 1301-1328.

Andres, C. (2008), 'Large shareholders and firm performance – an empirical examination of founding-family ownership', *Journal of Corporate Finance*, Vol. 14, pp. 431-445.

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

Audretsch, D. B. and J. A. Elston (2002), 'Does firm size matter? Evidence on the impact of liquidity constraints on firm investment behavior in Germany', *International Journal of Industrial Organization*, Vol. 20, pp. 1-17.

Barontini, R. and L. Caprio (2005), 'The effect of family control on firm value and performance: evidence from continental Europe', *European Financial Management*, Vol. 12, pp. 689-723.

Bernanke, B. S. and M. Gertler (1989), 'Agency costs, net worth and business fluctuations', *American Economic Review*, Vol. 73, pp. 257-76.

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

Bond, S., J. A. Elston, J. Mairesse and B. Mulkay (2003), 'Financial factors and investment in Belgium, France, Germany, and the United Kingdom: A comparison using company panel data', *The Review of Economics and Statistics*, Vol. 85, pp. 153-165.

Booth, L. D. and S. Cleary (2006), 'Cash flow volatility, financial slack and investment decisions', EFMA 2006 Madrid Meetings Paper.

Cleary, S. (1999), 'The relationship between firm investment and financial status', *Journal of Finance*, Vol. 54, pp. 673-91.

Cleary, S. (2006), 'International corporate investment and the relationships between financial constraint measures', *Journal of Banking & Finance*, Vol. 30, pp. 1559-1580.

D'Espallier, B., S. Vandemaele and L. Peeters (in press), 'Investment-cash flow sensitivities or cash-cash flow sensitivities? An evaluative framework for measures of financial constraints', forthcoming *Journal of Business Finance & Accounting*.

Deutsches Aktieninstitut (2006), DAI Factbook 2006, Frankfurt.

Dittmann, I., E. Maug and C. Schneider (2008), 'Bankers on the boards of German firms: what they do, what they are worth, and why they are (still) there', ECGI Finance Working Paper No. 196/2008.

Edwards, J. S. and K. Fischer (1994), 'Banks, finance and investment in Germany', London and Cambridge: CEPR and Cambridge University Press.

Ehrhardt, O., E. Nowak and F.-M. Weber (2004), 'Running in the family: the evolution of ownership, control, and performance in German family-owned firms 1903-2003', Working Paper.

Fazzari, S. M., R., G. Hubbart and B. C. Petersen (1988), 'Financing constraints and corporate investment', *Brookings Papers on Economic Activity*, Vol. 1, pp. 141-206.

Franks, J. and C. Mayer (2001), 'Ownership and control of German corporations', *Review of Financial Studies*, Vol. 14, pp. 943-977.

Gertler, M. (1992), 'Financial capacity and output fluctuation in an economy with multi-period financial relationship', *Review of Economic Studies,* Vol. 59, pp. 455-472.

Gilchrist, S. and C. P. Himmelberg (1995), 'Evidence for the role of cash flow in investment', *Journal of Monetary Economics,* Vol. 36, pp. 541-572.

Goergen, M. and L. Renneboog (2001), 'Investment policy, internal financing and ownership concentration in the UK', *Journal of Corporate Finance,* Vol. 7, pp. 257-84.

Greenwald, B., J. E. Stiglitz and A. Weiss (1984), 'Informational imperfections and macroeconomic fluctuations', *Amercian Economic Review Papers and Proceedings,* Vol. 74, pp. 194-99.

Gugler, K. (2003), 'Corporate governance and investment', *International Journal of the Economics of Business,* Vol. 10, pp. 261-289.

Gugler, K. and B. B. Yurtoglu (2003), 'Average q, marginal q and the relationship between ownership and performance', *Economic Letters,* Vol. 78, pp. 379-84.

Güner, A. B., U. Malmendier and G. Tate (2008), 'Financial expertise of directors', *Journal of Financial Economics*, Vol. 88, pp. 323-354.

Haid, A. and J. Weigand (2001), 'R&D, liquidity constraints, and corporate governance', *Jahrbücher für Nationalökonomie und Statistik,* Vol. 221, pp. 145-67.

Homstrom, B. (1982), 'Moral hazard in teams', *Bell Journal of Economics,* Vol. 13, pp. 324-340.

Hennessy, C. A. (2004), 'Tobin's q, debt overhang, and investment', *Journal of Finance,* Vol. 59, pp. 1717-1742.

Hoshi, T., A. Kashyap and D. S. Scharfstein (1991), 'Corporate structure, liquidity and investment: evidence from Japanese industrial groups', *Quarterly Journal of Economics,* Vol. 20, pp. 33-60.

Jensen, M. C. (1986), 'The agency costs of free cash flow: corporate finance and takeovers', *American Economic Review,* Vol. 76, pp. 323-329.

Jorgenson, D. (1971), 'Economic studies of investment behaviour: a review', *Journal of Economic Literature,* Vol. 9, pp. 1111-1147.

Kadapakkam, P.-R., P. C. Kumar and L. A. Riddick (1998), 'The impact of cash flows and firm size on investment: the international evidence', *Journal of Banking & Finance,* Vol. 22, pp. 293-220.

Kaplan, S. N. and L. Zingales (1997), 'Do investment-cash flow sensitivities provide useful measures of financing constraints?', *The Quarterly Journal of Economics,* Vol. 112, pp. 169-215.

Kathuria, R. and D. C. Mueller (1995), 'Investment and cash flow: asymmetric information or managerial discretion', *Empirica,* Vol. 22, pp. 211-34.

Lamont, O. A. (1997), 'Cash flow and investment: evidence from international capital markets', *Journal of Finance,* Vol. 52, pp. 83-109.

McConnell, J. and H. Servaes (1990), 'Additional evidence on equity ownership and corporate value', *Journal of Financial Economics*, Vol. 27, pp. 595-612.

Modigliani, F. and M. H. Miller (1958), 'The cost of capital, corporate finance and the theory of investment, *American Economic Review*, Vol. 48, pp. 261-97.

Morck, R., A. Shleifer and R. W. Vishny (1988), 'Management ownership and market valuation, an empirical analysis', *Journal of Financial Economics*, Vol. 20, pp. 293-315.

Myers, S. (1984), 'The capital structure puzzle', *Journal of Finance,* Vol. 39, pp. 575-92.

Myers, S. and N. S. Majluf (1984), 'Corporate Financing and Investment Decisions when Firms have Information that Investors do not have', *Journal of Financial Economics,* Vol. 13, pp. 187-221.

Nickell, S. J. (1981), 'Biases in dynamic models with fixed effects', *Econometrica,* Vol. 49, pp. 1417-1426.

Pawlina, G. and L. Renneboog (2005), 'Is investment-cash flow sensitivity caused by agency costs or asymmetric information? Evidence from the UK', *European Financial Management*, Vol. 11, pp. 483-513.

Petersen, M. A. and R. G. Rajan (1992), 'The benefits of firm-creditor relationships: evidence from small business data', University of Chicago Working Paper #362.

Schiantarelli, F. and D. Georgoutsos (1990), 'Monopolistic competition and the q theory of investment', *European Economic Review*, Vol. 34, pp. 1061-1078.

Shleifer, A. and R. W. Vishny (1986), 'Large shareholders and corporate control', *Journal of Political Economy*, Vol. 94, pp. 461-88.

Stiglitz, J. E. and A. Weiss (1981), 'Credit Rationing in Markets with Imperfect Information', *American Economic Review*, Vol. 71, pp. 393-410.

Villalogna, B. and R. Amit (2006), 'How Do Family Ownership, Control, and Management Affect Firm Value?', *Journal of Financial Economics*, Vol. 80, pp. 385-417.

Table 1
Investment Levels over Time

Descriptive statistics for firm investment levels [in thousands of Euros] over time. The sample comprises 264 companies for the period from 1997-2004. Investment data are adjusted for inflation based on inflation data published by the Federal Statistical Office Germany.

Year	1997	1998	1999	2000	2001	2002	2003	2004	All Years
n	245	254	243	240	217	187	181	165	1,732
Mean	233,046	366,554	486,566	583,575	681,238	636,892	498,234	524,649	501,344
Median	28,013	29,161	33,162	29,749	43,067	32,829	28,038	31,694	31,964
Std. Dev.	866,581	1,621,227	2,516,057	3,059,918	3,378,187	2,668,079	2,176,764	2,264,444	2,318,907

Table 2
Number and Percentage of Family and Non-Family Firms by SIC-Code

Number and Percentage of firms by two-digit SIC-Codes (n = 264). Family firms are defined as companies with a founding-family ownership of at least 25% or family members in either the executive or supervisory board.

SIC-Code	Industry Description	Family Firms	Non-Family Firms	Percentage Family Firms in Industry
13	Oil and gas extraction	0	1	0.00%
14	Non-metallic minerals, except fuels	0	2	0.00%
15	General building contractors	3	4	42.86%
16	Heavy construction contractors	0	3	0.00%
20	Food and kindred products	7	8	46.67%
22	Textile mill products	2	2	50.00%
23	Apparel and other textile products	3	3	50.00%
24	Lumber and wood products	2	1	66.67%
25	Furniture and fixtures	1	0	100.00%
26	Paper and allied products	2	5	28.57%
27	Printing and publishing	1	1	50.00%
28	Chemicals and allied products	8	9	47.06%
30	Rubber and miscellaneous plastic products	1	6	14.29%
31	Leather and leather products	0	1	0.00%
32	Stone, clay, glass, and concrete products	4	7	36.36%
33	Primary metal industries	1	2	33.33%
34	Fabricated metal products	1	6	14.29%
35	Industrial machinery and equipment	9	24	27.27%
36	Electrical and electronic equipment	8	7	53.33%
37	Transportation equipment	8	6	57.14%
38	Instruments and related products	1	1	50.00%
41	Local and interurban passenger transit	0	1	0.00%
45	Transportation by air	0	1	0.00%
47	Transportation services	0	2	0.00%
48	Communications	1	1	50.00%
49	Electric, gas, and sanitary services	0	16	0.00%
50	Wholesale trade--durable goods	5	7	41.67%
51	Wholesale trade--nondurable goods	6	7	46.15%
52	Building materials, hardware and gardening	3	0	100.00%
53	General merchandise stores	0	1	0.00%
54	Food stores	0	3	0.00%
55	Automotive dealers and gasoline service stations	0	2	0.00%
56	Apparel and accessory stores	1	1	50.00%
57	Furniture, home furnishings and equipment stores	0	1	0.00%
59	Miscellaneous retail	3	0	100.00%
61	Non-depository credit institutions	0	1	0.00%
62	Security, commodity brokers, and services	2	1	66.67%
64	Insurance agents, brokers, and service	1	0	100.00%
65	Real estate	8	14	36.36%
67	Holding and other investment offices	1	3	25.00%
70	Hotels, camps, and other lodging places	0	1	0.00%
73	Business services	3	0	100.00%
75	Automotive repair, services, and parking	1	0	100.00%
78	Motion pictures	1	0	100.00%
80	Health services	3	1	75.00%

Table 3
Summary Statistics for Family and Non-Family Firms

Descriptive data for family and non-family firms. Mean values are first calculated per company and then averaged across all sample firms. Family firms are defined as those where members of the founding-family hold at least 25% of the voting rights or (if less) a family member serves as either executive or supervisory board member. Investment and cash flow ratio are defined as tangible investments and cash flow divided by net fixed assets by the beginning of the fiscal year. Cash holdings are defined as the ratio of cash and marketable securities to total assets. Leverage is defined as total debt divided by total assets. The dividend payout ratio is calculated as dividend per share divided by cash flow per share. All accounting figures are expressed in thousands of Euros. Asterisks denote statistical significance at the 0.01(***) and 0.05(**)-level.

Panel A: Company Size Measures and Age

	All Firms	Family Firms	Non-Family Firms	t-statistic
Number of firms	264	101	163	
Age [years]	87.57	80.58	90.86	4.10***
Total assets	4,647,342	2,675,560	6,468,556	4.24***
Sales	4,138,890	3,208,837	5,223,877	3.04***
Employees	17,636	17,589	19,951	0.88
Market Value	2,452,144	2,252,598	2,893,581	1.58

Panel B: Company Investment, Cash flow and Capital Structure

	All Firms	Family Firms	Non-Family Firms	t-statistic
Investment	445,666	262,470	629,757	3.40***
Investment ratio	0.255	0.314	0.229	-6.95***
Cash flow ratio	0.351	0.391	0.325	-1.07
Cash holdings	0.083	0.094	0.077	-3.32***
Leverage	0.414	0.429	0.404	-2.11**
Long-term debt/Total debt	0.724	0.721	0.726	0.15
Tobin's q	1.588	2.122	1.245	-2.72***
Dividend payout ratio	0.174	0.179	0.171	-0.42

Table 4
Summary Statistics for Financial Constraint Groups

Financial ratios for family and non-family firms. Mean values are first calculated per company and then averaged across all sample firms. Family firms are defined as those where members of the founding-family hold at least 25% of the voting rights or (if less) a family member serves as either executive or supervisory board member. Large firms are those with total assets above the sample median in each year (small firms below the median). Segmentation by dividend payout ratio is implemented accordingly. Investment and cash flow ratio are defined as tangible investments and cash flow divided by net fixed assets by the beginning of the fiscal year. Leverage is total debt/total assets. Return on equity is defined as EBITDA divided by total equity. T-statistics test for differences in means between family and non-family firms. Asterisks denote statistical significance at the 0.01(***), 0.05(**) and 0.01(*)-level.

Panel A: Financial constraint groups by firm size

	Investment ratio	Cash-flow ratio	Tobin's q	Return on equity	Leverage	Sales growth
Total Sample	0.255	0.351	1.588	0.1489	0.414	0.070
Large	*0.267*	*0.399*	*1.215*	*0.161*	*0.414*	*0.089*
Family	0.343	0.484	1.562	0.180	0.434	0.101
Non-Family	0.230	0.346	1.007	0.150	0.403	0.082
t-statistic	6.26***	2.39**	8.61***	2.96***	2.68***	0.49
Small	*0.256*	*0.303*	*1.960*	*0.137*	*0.426*	*0.050*
Family	0.297	0.306	2.629	0.137	0.426	0.035
Non-Family	0.226	0.302	1.501	0.139	0.426	0.059
t-statistic	3.73***	0.03	1.76*	-0.05	-0.01	-0.70

Panel B: Financial constraint groups by dividend payout ratio

	Investment ratio	Cash-flow ratio	Tobin's q	Return on equity	Leverage	Sales growth
High	*0.278*	*0.431*	*1.361*	*0.165*	*0.376*	*0.082*
Family	0.325	0.505	1.641	0.180	0.388	0.065
Non-Family	0.244	0.378	1.169	0.156	0.366	0.093
t-statistic	4.55***	2.89***	6.60***	3.75***	1.74*	-0.73
Low	*0.253*	*0.282*	*1.805*	*0.129*	*0.478*	*0.064*
Family	0.298	0.270	2.624	0.124	0.483	0.070
Non-Family	0.224	0.290	1.276	0.132	0.475	0.059
t-statistic	4.09***	-0.17	1.99**	-0.09	0.58	0.30

Table 5
Investment Regressions for Financial Constraint Groups

This table contains results of fixed-effects regressions of investment/net fixed assets on cash flow/net fixed assets and market-to-book value for a sample of 265 German firms for the period from 1997 till 2004. Firms are classified by total assets (large vs. small) and dividend payout ratio (high vs. low). T-values for the individual regressions are in parentheses. T-statistics for the differences in subgroups (Cross-dummy t) are based on cross-dummy variable coefficients. These are constructed by multiplying M/B and CF/K by the upper subgroup dummy variable (see Booth and Cleary 2006). All regressions include dummy variables for each year of the sample period. Asterisks denote statistical significance at the 0.01-level.

Group	CF/K	M/B	R^2	n
All firms	0.047 (5.64)***	0.000 (0.03)	0.079	1460
Large	0.130 (6.17)***	-0.023 (-1.41)	0.186	738
Small	0.034 (2.91)***	-0.000 (-0.22)	0.052	722
Cross-dummy t	3.76***	-0.85		
High payout	0.224 (5.90)***	0.089 (5.60)***	0.198	704
Low payout	0.038 (3.81)***	-0.000 (-0.38)	0.074	704
Cross-dummy t	3.84***	3.75***		

Table 6
Investment Regressions for Family and Non-Family Firms

This table contains results of fixed-effects regressions of investment/net fixed assets on cash flow/net fixed assets and market-to-book value for a sample of 265 German firms for the period from 1997 till 2004. Firms are classified by total assets (large vs. small) and dividend payout ratio (high vs. low). A firm is defined as a family firm if members of the founding-family hold at least 25% of the voting rights or (if less) a family member serves as either executive or supervisory board member. T-values for the individual regression are in parentheses. T-statistics for the differences in subgroups (Cross-dummy t) are based on cross-dummy variable coefficients. These are constructed by multiplying M/B and CF/K by the upper subgroup dummy variable (see Booth and Cleary 2006). All regressions include dummy variables for each year of the sample period. Asterisks denote statistical significance at the 0.01(***), 0.05(**) and 0.10(*)-level.

Group	CF/K	M/B	R2	n
All firms				
Family firms	0.019 (1.93)*	0.042 (2.73)***	0.092	578
Non-family firms	0.153 (8.90)***	-0.051 (-1.62)	0.124	878
Cross-dummy t	-6.4***	2.65***		
Large				
Family firms	0.083 (5.74)***	0.038 (1.13)	0.220	281
Non-family firms	0.311 (4.84)***	-0.013(-0.53)	0.175	457
Cross-dummy t	-4.76***	-1.72*		
Small				
Family firms	-0.001 (-0.13)	0.119 (5.56)***	0.165	300
Non-family firms	0.230 (6.06)***	-0.074 (-1.45)	0.141	422
Cross-dummy t	-6.23***	4.94***		
High payout				
Family firms	0.185 (5.32)***	0.109 (8.78)***	0.390	292
Non-family firms	0.333 (4.61)***	-0.136 (-2.39)***	0.105	412
Cross-dummy t	-2.14**	4.55***		
Low payout				
Family firms	0.015 (1.29)	-0.033 (-1.15)	0.055	287
Non-family firms	0.150 (7.18)***	-0.013 (-0.28)	0.189	417
Cross-dummy t	-5.49***	-1.61		

Table 7
Investment Regressions and Family-Firm Characteristics

This table contains results of fixed-effects regressions of investment/net fixed assets on cash flow/net fixed assets and market-to-book value for a sample of 102 German family firms for the period from 1997 till 2004 A firm is defined as a family firm if members of the founding-family hold at least 25% of the voting rights or (if less) a family member serves as either executive or supervisory board member. The variable CF/K*founder is defined as CF/K multiplied with a dummy variable that is 1 if the founder is still active as CEO. Both regressions include dummy variables for each year of the sample period. Asterisks denote statistical significance at the 0.01(***), 0.05(**) and 0.10(*)-level.

	Model 1		Model 2	
CF/K	0.318	6.26***	0.284	2.59***
M/B	0.049	3.29***	0.047	3.00***
CF/K*founder	-0.308	-5.99***		
CF/K*fam_ownership			-0.951	-2.19**
CF/K*fam_ownership^2			0.717	1.65*
R^2	0.204		0.106	
n	578		578	

Table 8
Investment Regressions and Ownership Types

This table contains results of fixed-effects regressions of investment/net fixed assets on cash flow/net fixed assets, market-to-book value and different ownership characteristics for a sample of 264 German firms for the period from 1997 till 2004. Family is a dummy variable that equals one if members of the founding-family hold at least 25% of the voting rights or (if less) a family member serves as either executive or supervisory board member. The different blockholder variables are dummies that equal one if the respective shareholder type holds voting rights of 25% or more. Both regressions include dummy variables for each year of the sample period. Asterisks denote statistical significance at the 0.01(***), 0.05(**) and 0.10(*)-level.

	Model 1		Model 2	
CF/K	0.202	8.41***	0.115	3.24***
M/B	0.000	0.19	0.000	0.21
CF/K*ownership			-0.300	-2.27**
CF/K*ownership2			0.272	2.44**
CF/K*family	-0.182	-7.09***		
CF/K*financial	-0.138	-0.97		
CF/K*government	-0.139	-0.91		
CF/K*strategic	-0.097	-3.06***		
CF/K*other	-0.121	-0.90		
R^2	0.096		0.091	
n	1460		1460	

Table 9
Robustness Tests

This table contains regression results of investment/net fixed assets on several control variables for a sample of German firms for the period from 1997 till 2004. Columns 1-4 are based on fixed-effects (within) estimations, columns 5 and 6 display the results of GMM-in-differences estimations. CF/K is defined as cash flow over the beginning-of-the-period level of net fixed assets. Family is a dummy variable that equals one if members of the founding-family hold at least 25% of the voting rights or (if less) a family member serves as either executive or supervisory board member. Cash holdings are defined as the ratio of cash and marketable securities to total assets. Lagged production is sales plus the change in inventories (scaled by total assets). All regressions include year dummies. Variables in specifications (5) and (6) are expressed in first-differences. In the GMM models, all variables ate treated as endogenous and instrumented by their lagged levels x_{t-2}... x_1. T-statistics, asymptotically robust to heteroskedasticity, are reported in parentheses. Asterisks denote statistical significance at the 0.01(***), 0.05(**) and 0.10(*)-level.

	Fixed Effects				GMM	
	Full Sample		Unbiased Industries			
	(1)	(2)	(3)	(4)	(5)	(6)
CF/K	0.041	0.172	0.150	0.169	0.173	0.218
	(4.73)***	(7.73)***	(8.27)***	(7.16)***	(2.60)***	(2.03)**
CF/K*Family		- 0.152	- 0.129	- 0.150	- 0.167	- 0.211
		(-6.63)***	(-6.44)***	(-6.31)***	(-2.47)**	(-1.97)**
M/B	- 0.000	- 0.000	- 0.000	- 0.000	- 0.002	0.000
	(-0.21)	(-0.34)	(-0.19)	(-0.01)	(-0.12)	(0.11)
Cash holdings	- 0.162	- 0.264		- 0.293		-0.246
	(-0.92)	(-1.52)		(-1.59)		(-0.53)
Lagged production	- 0.100	- 0.112		-0.087		- 0.228
	(-2.49)***	(-2.84)***		(-2.06)***		(-0.86)
Leverage	0.197	0.208		0.115		- 0.284
	(1.52)	(1.56)		(1.18)		(-0.58)
N	1320	1320	1196	1096	1180	1050
R-squared	0.047	0.082	0.105	0.088		
AR(1)					- 2.61	- 2.23
AR(2)					- 0.44	- 0.15