FAMILY CONTROL AND THE SENSITIVITY OF INVESTMENT TO CASH FLOW: EVIDENCE FROM A MULTI-EQUATION MODELLING APPROACH[#]

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Abstract. We empirically examine the influence of family control on the sensitivity of a firm's investment to cash flow. Implementing a dynamic multi-equation investment model, we find – in line with intuition but contrary to previous research – higher sensitivities for family-controlled firms. This pattern becomes stronger once we take into account financial constraints or use the 2008-2010 financial crisis as an exogenous liquidity shock. In addition, we find investments of family firms to be less sensitive to investment opportunities. Overall, our results are consistent with the view that family prefer to finance their investments by internal funds and adjust their investments accordingly.

Keywords: Family control, investment-cash flow sensitivity, family firm, financial flexibility, Germany

JEL Classification: G30, G32, G34

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"76% of family firms are finding it challenging securing financing and are using their own capital."
PwC Family Business Survey 2016[1]

1. Introduction

The above quote from PwC's Family Business Survey 2016 suggest that family firms are constraint when it comes to raising external capital and thus are constraint in their investments. However, starting with Anderson and Reeb (2003) there is a rich literature suggesting that families as owners possess a high level of long-term commitment and family control mitigates agency problems, which arguably should facilitate financing of family firms. Against this background, we investigate whether family control (in listed firms) influences firms' investment behavior, and in particular the sensitivity of a firm's investment to cash flow.

Family control in corporations is a widespread and well documented phenomenon across the world (Claessens et al., 2000; La Porta et al., 1999 among many others). Thereby, families generally intent to preserve control over the firm, often for future generations of the family (Andres, 2011; James, 1999; McVey et al., 2005). Such control considerations will arguably have implications for various dimensions of firm behavior. Foremost, families aiming to maintain control will be reluctant to allow the firm to issue new equity, as new (common) equity comes at the cost of shared control. Relatedly, their willingness to allow the firms to raise additional debt will be limited, as additional debt will increase the scope of financial covenants and amplify the probability of ending up in a state, when debt has to be converted into equity.[2]

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[1] See https://www.pwc.com/gx/en/services/family-business/family-business-survey-2016/financing-growth.html [accessed July 23rd, 2017].

[2] A related argument has been put forward by Shleifer and Vishny (1986). The authors argue that large and undiversified investors will opt for low-risk strategies, e.g., low-leverage strategies, when it comes to capital structure decisions.

Assigning high opportunity costs to outside capital, family control will arguably affect the firm's *financial flexibility*, understood as the *ability* to invest irrespective of the availability of internal cash flows, but also its *willingness* to do so. This provides a rational why survey evidence frequently find, that families generally rely on internal funding, when deciding about financing their investments (e.g., PWC, 2016). Empirically, this should be reflected in a higher sensitivity of investment to cash flow.

Contrary to these arguments, however, existing studies find that family control is associated with lower investment to cash flow sensitivities. For instance, examining a European sample Pindado, Requejo, and de la Torre (2011) find that investments of family firms are less reliant on internal funds. They argue that the long-term perspective of family owners may reduce information asymmetries between the suppliers of capital and the firm. In a parallel paper examining German listed family firms, Andres (2011) finds that family control mitigates investment cash flow sensitivity (ICFS). Studying firms from Taiwan, Kuo and Hung (2012) confirm that family control lessens ICFS.

The above cited studies are based on the seminal work of Fazzari, Hubbard and Peterson (1988), subsequently labeled FHP, who pioneered the analysis of financing constraints on corporate investment. Starting from the well-established q-theory framework, they include cash flow into a Q investment model following Hayashi (1982) and interpret ICFS as a measure of firms' financial constraints.[3] The FHP approach, however, has not been without critique. For instance, Kaplan and Zingales (1997) document that firms, which they categorize as less constrained, exhibit larger ICFS, suggesting potential measurement problems with this approach.[4] Others have criticize that the FHP

[3] The literature often refers to ICFS as the CF-coefficients of a FHP (or related) regression. In this paper, we will use ICFS more broadly, whenever we refer to the sensitivity of corporate investments to cash flow.

[4] Alti (2003); Chen and Chen (2012); Cleary (1999); Erickson and Whited (2000) also cast doubt on the "financial constraints" interpretation of ICFS.

approach ignores the interdependency between a firm's financing and investment decisions (e.g., Gatchev, Pulvino and Tarhan, 2010).

Arguably, the latter concern is particularly relevant for family firms. Thus, interested in the investment behavior of family firms, we adopt the dynamic multi-equation framework proposed by Gatchev, Pulvino and Tarhan (2010) that allows to take into account firms' financing behavior. The model defines a set of investment and financing equations and adds a linear constraint to ensure that for any given firm the sources of funds to equal the uses of funds. As a result, the model of Gatchev, Pulvino and Tarhan (2010) allows not only allows to study investment or financing behavior of firms, but also takes into account the simultaneity of both.

Using a sample of German Prime Standard firms, over a period from 2001 to 2015, we find an overall positive ICFS. The average firm increases investments by EUR 0.052 for every additional EUR in cash flow. Comparing family firms to non-family firms, we find that the average family firm increases investment by EUR 0.109 for each EUR of cash flow, compared to EUR 0.042 in the average non-family firms.[5] The differences are statistically significant and economically meaningful, as they suggest that the ICFS of the average family firm is 2.6 times the ICFS of the average non-family firm. We also document that these differences become even larger under financial constraints. *First*, when we split the sample based on measures of financial constraints, the difference increases to more than 3.0 times for financially constraint firms. Second, during the financial crises period (2008-2010), the ICFS of family becomes 0.209 and thus almost 10 times larger than the ICFS of non-family firms. Finally, we find

[5] Throughout the paper, we will refer to founding family firms as family firms for brevity. However, as described in section 3.3, we follow a strict founding family firm definition.

evidence for the economical intuitive financing behavior of family firms, which suggest that family firms witness a lower equity financing cash flow sensitivity.

We check the robustness of our results in several tests. *First*, our results are robust under different family firm definitions. In particular, we find that the difference in ICFS between family firms and non-family firms is higher whenever we require a higher share of family ownership for a firm to classify as a family firm. Further, we document our results remain unaffected once we define a broader measure of investment, in particular add research and development expenses to the model proposed by (Gatchev et al., 2010). *Second*, we find that our results are robust against endogeneity concerns, once we instrument family firm status by using founder name equal to firm name in a first stage regression, we use the estimated family firm status in the second stage regression of our standard model. *Third*, we rule out that our results are driven by local peculiarities, i.e. the fact that we examine German firms. Schmid (2013) documents that German family firms are unique when it comes to having comparably lower debt levels. However, we document that when we apply the methods in Pindado et al., (2011), we find remarkably similar results, most importantly, results suggesting that family firms mitigate the extend of ICFS.

We contribute to the existing literature along several dimensions. *First*, we add to the literature examining investment and financing decisions using a multi-equation model. The model underlying the following analyses is able to account for the interdependent and intertemporal nature of financing and investment decisions. We expand the conventional inference of multi-equation models by implementing interaction terms (with our sample distinguishing dummy variable). *Second*, we add to the family firm literature by providing a more nuanced view on the investment decisions of listed family firms. Our results are economically intuitive as they are in line with the expected behavior of families as large undiversified blockholders.

The remainder of this paper is organized as follows. Section 2 introduces our empirical design, data and variables. Section 3 presents our empirical results and robustness tests, while section 4 provides a brief summary and conclusion.

2. Empirical design

In this section, we describe our empirical model (in section 2.1), introduce the sample (in section 2.2), outline our founding family firm definition (in section 2.3), and our variables (in section 2.4).

2.1. Empirical model

The standard approach to study firms' investment behavior is to estimate a version of (FHP, 1988)'s reduced form investment regression, often expanded for control variables:

$$\left(\frac{I}{K}\right)_{i,t} = \gamma_1 \times TobinsQ_{i,t} + \gamma_2 \times \left(\frac{CF}{K}\right)_{i,t} + \gamma \times Controls_{i,t} + +\varepsilon_{i,t} \quad (1)$$

where the left hand side variable $\left(\frac{I}{K}\right)_{i,t}$ is investment in property, plant and equipment of firm *i* in period *t* scaled by the beginning of period capital stock, which then is explained by investment opportunities proxied by $TobinsQ_{i,t}$, standardized cash flows $\left(\frac{CF}{K}\right)_{i,t}$ and a set of controls. Thereby, $\left(\frac{CF}{K}\right)_{i,t}$ is included to measure the firm's sensitivity to external financing frictions. The coefficient, γ_2, referred to as ICFS, measures firms' dependence on internal financing and thus is generally interpreted as a proxy for firm's financing frictions (e.g. FHP, 1988; Hoshi et al., 1991).

Interested in the ICFS of family firms, previous literature relies on the above approach and either expands the regression specification by adding interaction terms to $\left(\frac{CF}{K}\right)_{i,t}$ or by studying sample splits

(Andres, 2011; Goergen and Renneboog, 2001; Pindado et al., 2011).[6] The general finding then is that family ownership mitigate firms' ICFS, suggesting that family influence offsets financial friction harming the smooth execution of investment potential.

There are however significant shortfalls with the above-mentioned approach. Gatchev et al. (2010) name three main issues, the first being biased estimates. Depending on the nature of firms' financial decisions, investments could be either correlated with past decisions, or dependent on past decisions, due to persistence. Furthermore, if dependent on past investment, other past decision variables may also have an impact. All variants leading to an omitted variable bias.

In addition, single equation models may result in inefficient regression coefficients over different subsamples. Correct specification will help to produce consistent coefficients asymptotically. However, imposing the necessary sources equal uses constraint will facilitate consistent coefficients enabling inference across coefficients from different subsamples.

As a final point of criticism, the estimated outcome of single equation models is hard to interpret economically. ICFS could be impacted by all decision variables in the sources equal uses equation, i.e. even without a measurable ICFS, firms could be subject to financing constraints via adjustments to assets on the balance sheet for instance.

To combat these weaknesses described above, we implement a multi-equation model as proposed by Gatchev et al., (2010). In contrast to traditional single equation models, the multi-equation model allows us to reflect the interdependent and intertemporal nature of financing and investment decisions in a

[6] Goergen and Renneboog (2001) have been among the first to apply such design to study the effect of ownership concentration and types on investment behavior.

much-improved way. This is facilitated by reflecting the "sources of cash equal uses of cash" reality of financing and investment decisions in constraining the model.

The constraint is formulated as follows:

$$\Delta CASH_{i,t} + RP_{i,t} + DIV_{i,t} + CAPX_{i,t} + ACQUIS_{i,t} - \Delta LTD_{i,t} - \Delta STD_{i,t} + EQUISS_{i,t} + ASALES_{i,t} = \mathrm{CF}_{i,t} \quad (2)$$

where RP is defined as share repurchases, DIV are dividends paid to shareholders, CAPX are capital expenditures, ACQUIS are net assets from acquisitions, ΔLTD and ΔSTD are changes in long- and short-term debt, EQUISS is defined as proceedings from the issue of equity and ASALES represents disposals of fixed assets. Our measure of cash flow is defined as:

$$CF_{i,t} = EBITDA_{i,t} - INTEXP_{i,t} - TAX_{i,t} - \Delta NWC_{i,t} \quad (3)$$

Where EBITDA is earnings before interest, taxes, depreciation and amortization, INTEXP is interest expense on debt, tax is defined as income taxes and ΔNWC is defined as the annual change in working capital.[7]

Overall, firms target achieving desired levels of the constrained variables, subject to available investment opportunities, by minimizing the penalty for deviating from the optimum

[7] A detailed description of all variables can be found in section 2.4

$$\begin{bmatrix} -CAPX_{i,t} \\ -AQUIS_{i,t} \\ ASALE_{i,t} \\ EQUISS_{i,t} \\ -RP_{i,t} \\ -DIV_{i,t} \\ \Delta LTD_{i,t} \\ \Delta STD_{i,t} \\ -\Delta CASH_{i,t} \end{bmatrix} = L\left[CF_{i,t}\right] + K\begin{bmatrix} -CAPX_{i,t-1} \\ -AQUIS_{i,t-1} \\ ASALE_{i,t-1} \\ EQUISS_{i,t-1} \\ -RP_{i,t-1} \\ -DIV_{i,t-1} \\ \Delta LTD_{i,t-1} \\ \Delta STD_{i,t-1} \\ -\Delta CASH_{i,t-1} \end{bmatrix} + M\begin{bmatrix} TobinsQ_{i,t} \\ SIZE_{i,t} \end{bmatrix} + \begin{bmatrix} -e_{CAPXi,t} \\ -e_{ACQUISi,t} \\ e_{ASALEi,t} \\ e_{EQUISSi,t} \\ -e_{RPi,t} \\ -e_{DIVi,t} \\ e_{\Delta LTDi,t} \\ e_{\Delta STDi,t} \\ -e_{\Delta CASHi,t} \end{bmatrix} \quad (4)$$

The sources equal uses constraint requires the parameter matrices to fulfil the following qualities:

$$i'L = -1, \;\; i'K = \underset{1x9}{0}, \; i'M = \underset{1x2}{0} \quad (5)$$

These constraints ensure that cash flow uses are equal to the sources. The variables $TobinsQ_t$ and $SIZE_t$ represent measures for investment opportunities.

Including the full spectrum of cash flow sources and uses enables us to link founding sources and uses. Specifically, in case of financing constraints, we would expect $CAPX_t$ to be more cash flow sensitive alongside higher cash flow sensitivity of financing variable ($EQUISS_t$, ΔLTD_t, ΔSTD_t). Alternatively, investment-cash flow sensitivities could be offset by higher flexibility in managing the balance sheet, or distribution to shareholders ($ASALE_t$, RP_t, DIV_t, $\Delta CASH_t$).

We analyze family firms by conducting sample splits across different family firm and non-family firm definitions. We then draw inference by comparing coefficients across the various subsamples. To further verify our results, we again test across subgroups, e.g. over the financial crisis and tranquil or non-crisis periods (financial crisis times equating to periods when firms are particularly cash deprived and face difficulties financing investments), as well as financially constrained and non-constrained firms.

2.2. *Sample selection process*

Our sample comprises all firms listed at least once in the German Prime Standard throughout the sample period, beginning with the year 2001 to 2015. The constituents lists of the Prime Standard provided by the German Stock Exchange (Deutsche Börse) is the starting point, based on which we identify 620 individual stocks included in the Prime Standard in one of the sample years, which results in 9,300 firm-year observations. In a next step, we use a standard procedure to define our sample. *First*, we exclude all banks, insurance companies and other financial firms (SIC codes 6000 – 6999) as well as utility firms (SIC codes 4900 – 4999) as the structure of their balance sheet and investment behavior is significantly different from manufacturing firms, which affects 1,075 observations. *Second,* we eliminate 212 observations of firms in special situations such as, insolvency, bankruptcy, mergers and acquisitions, as well as 940 observations of firms with double listings and firms incorporated outside Germany. For this set of firms we gather financial data from Thomson Reuters Datastream. *Third,* we exclude all firms with missing or negative values in total assets and book and market value of assets, as well as the twelve dependent and independent variables[8] of our model, as it requires them to be non-missing. This step further excludes 4,812 observations from our sample and leaves us with 2,261 firm-year observations in our sample. Based on the final sample we collect ownership information from the Hoppenstedt Aktienführer database to identify family firms as described in the following section.

[8] These are: Net cash flow from operating activities, changes in cash balances, changes in long term- and short term debt, share repurchases, equity issues, capital expenditures, asset sales, dividends, firm size, TobinsQ and changes in net working capital

2.3. *Measures of family ownership*

To identify family firms in our above described sample we follow the concept of Anderson and Reeb (2003), Villalonga and Amit (2006) and Andres (2008) and identify *founding family firms*. Founding family firms are described by Villalonga and Amit (2006) as "*…those in which the founder or a member of his or her family by either blood or marriage is an officer, director, or blockholder, either individually or as a group*" (p. 389). This identification criterion requires information about the founding history of a firm, the founders and their family members, as well as current information about ownership and board positions. No database fulfils these requirements simultaneously, hence, our dataset is a hand constructed combining different data sources. The structure the procedure of the data collection in three steps: *First,* we collected information about the founding phase of a firm, the establishment of a firm, i.e. as a spin-off or similar corporate actions, within a privatization or by an entrepreneur. For the latter we collect information about the founder(s) and their family members for each firm in our sample using company websites, annual reports, the Lexis-Nexis database, Hoppenstedt Aktienführer and Who-is-Who database, information from investor relation departments and press searches. *Second,* we collect information on a firm's ownership structure. Therefore, we collect information on all blockholders of a firm with more than 5 percent of voting rights and identify the corresponding shareholders by name using the Hoppenstedt Aktienführer. *Third,* we identify all members of the management as well as supervisory board of each firm in each year. We then use the gathered information to introduce our baseline identification criteria for a family firm[9]:

[9] In a separate analysis we test lower boundaries to identify founding family firms. The definition is provided in Table 1

We define a firm to be a *founding family firm*, if the voting rights of the founding family exceed 50 percent. Following this definition, we identify 439 firm-year observations, representing close to a fifth of all observations.

2.4. Variable description and descriptive statistics

Following Gatchev, Pulvino and Tarhan (2010), our measure of *Cash Flow* is net cash flow from operating activities, while $CAPX_t$ is defined as capital expenditures. $\Delta Cash$ is defined as the change of cash and cash equivalents from year *t-1* to *t*. $\Delta LTDebt_t$ and $\Delta STDebt_t$ is defined as change in long and short term debt from year *t-1* to *t*. $Equity\ Issues_t$ is defined as the proceeds from the sale/issue of common and preferred stock, while $Repurchases_t$ is defined as the amount of funds used to repurchase common or preferred stock. $Acquisitions_t$ is net assets from acquisitions and $Asset\ Sales_t$ as the amount of assets disposed of within the period. $Dividends_t$ is the amount of cash dividends distributed to shareholders. These variables are all normalized by total assets in year *t*. Our measure of $Size_t$ is the logarithm of total assets, $TobinsQ_t$ is defined as the book value of total assets plus the market value of equity minus the book value of equity divided by book value of total assets.

Table 2 provides summary statistics for our main variables. The table provides the number of observations, mean, median and standard deviation values for the full sample, as well as separately for family and non-family firms.

******* Please insert Table 2 about here *******

The average (median) firm has a *Cash Flow* of 7.4 (6.3) percent (to total assets), and a $TobinsQ_t$ equal to 1.27 (1.56). The corresponding value for *CAPX* is 3.4 (4.4) percent.

The last column of Table 2 presents t-statistics testing for differences between mean values of non-family firms and family firms. The mean family firm is associated with a mean $CashFlow_t$ to total assets of 7.3 percent which is significantly higher than in non-family firms. With regards to the other variables shown in Table 2, family firms display significantly lower equity issue and share repurchases volumes than non-family firms. Family firms are also significantly smaller (mean size 12.5) compared to non-family firms (mean size 13.6).

3. Empirical Results

In this section, we report the results of our investment and financing cash flow sensitivity analysis. We first provide the overview of the results of our multi-equation model, based on Gatchev et al. (2010), investigating heterogeneity of family compared to non-family firm investment and financing cash-flow sensitivities in section 3.1. We then test our initial results by using several robustness checks. In section 3.2 we test our results under (a) different definitions of family firms, (b) using interaction terms and (c) a broader investment measure to confirm our results. In section 3.3, we account for further endogeneity concerns and use a predicted family firm status as an instrument in our model. While in section 3.4.1 we divide the sample according to crisis and non-crisis periods deriving insights into investment and financing behavior in times of uncertainty and changing expectations. Finally, we take into account financial constraints in section 3.4.2 to evaluate the impact family influence on investment.

3.1. Baseline results

We first implement the multi-equation model, as described in section 2.1, for the full Prime Standard sample. The resulting coefficients are broadly in line with results reported by Gatchev et al. (2010), with

an exception to *Equity Issues*$_t$, which is negative and significant hinting towards stronger cash flow sensitivity of equity financing and lower sensitivity of $\Delta STDebt_t$ to *CashFlow*$_t$.[10] With an established multi-equation model in place, we turn to analyzing whether family influence has an impact on ICFS.

Table 3 reports the main results of our analysis in Panel A. We are particularly, interested in the coefficients for cash flow, as well as investment opportunities, *Size*$_t$ and *TobinsQ*$_t$. Each row reports coefficients and t-statistics below the coefficients (in brackets) which are robust to heteroscedasticity (Huber, 1967; White, 1980) and control for firm-level clustering (Rogers, 1993). [11] Not reported for brevity are all other lagged dependent variables included in each of the nine regressions in the multi-equation system. In the overall sample, we find an ICFS of 0.052. We interpret this as the average firm increasing investments, when experiencing positive cash flow shocks, and vice versa. For example, a firm experiencing a positive (negative) cash flow shock of EUR 1.000 will increase (decrease) investments by EUR 0.052. This change is higher for family firms at EUR 0.109, compared to non-family firms with EUR 0.042, yielding a difference in coefficients of EUR 0.067. The difference is statistically significant at 1% level based on bootstrapped standard errors (using 1,000 sampling iterations).[12] For an overview of the differences in coefficients, see Panel B of Table 3. Here we show the difference for each of the coefficients (*Cash Flow*, *Size*$_t$ and *TobinsQ*$_t$) with stars to indicate the statistical significance of the deviation, as well as the *p-value*.

******* Please insert Table 3 about here *******

[10] We report the full model in the online appendix Table 10

[11] For brevity we will refrain from mentioning this further on in the paper, but robust standard errors allowing for firm level clustering are applied in all multi-equation models.

[12] All coefficient comparisons are conducted based on bootstrapped standard errors, using 1,000 sampling iterations. For brevity, we will refrain from noting this with comparisons of coefficients further down in the paper.

The interesting part of implementing a multi-equation model is that we can now analyze the uses and sources of cash flow, to understand how investments are related to these other moving parts of the cash flow equations. For instance, we can track down whether the cash flow sensitivity is, related to financing frictions, decisions to transform the asset base, or preferences to distribute cash flows to shareholders. Based on the coefficients we report, family firms are less sensitive to equity financing than non-family firms. Specifically, family firms witness EUR 0.091 increase in equity proceeds for every EUR 1.000 decrease in cash flow, vs. EUR 0.283 for non-family firms. Again, the difference in coefficients is 0.192 and statistically significant at a 1% level. The difference in ICFS between family and non-family firms can already be fully covered by the difference in equity financing. However, another significant deviation in cash flow sensitivities stems from firms preferences to retain cash. While family firms retain 0.391 in cash for every EUR 1.000 increase in cash flow, non- family firms appear to be far less sensitive, with EUR 0.223. Likewise, here a difference of 0.168 is significant at the 5% level. Additionally, when comparing family and non-family firm behavior regarding stock repurchases, we see family firms far less sensitive to cash flow, with a coefficient that is significantly at the 10% level. All other main dependent variables appear to be more or less in line when comparing family and non-family firms. That includes the cash flow sensitivity of acquisitions, disposals, the refinancing behavior with long-term debt and non-significant cash flow coefficients for short-term debt.

Looking at the influence of investment opportunities, we report family firms in our sample reacting to a lower degree to investment opportunities than non-family firms do. The coefficients for $Size_t$ and $TobinsQ_t$ in the sub-sample of family firms appear to be not significantly different from zero, while positive and significant at the 1% and 5% level for non-family firms. Differences are significant on 5% level.

Overall, when looking at the change in assets for EUR 1.0 increase (decrease) in cash flow, we see assets[13] increasing (decreasing) by EUR 0.6 for family firms. For non-family firms, this is at EUR 0.4. In contrast, for every EUR 1.0 change in cash flow, we report family firms reacting by adjusting financing[14] by EUR 0.4, where non-family firms adjust their financing by a higher EUR 0.6. We interpret this as family firms being more inclined to maintain their investment strategy or less willing to adjust their financing base, showing a lower sensitivity of financing to cash flow fluctuations.

The results confirm our initial economically intuitive argument made in section 1. The key takeaway from this analysis remains the higher sensitivity of capital expenditure and dividends for family firms, while relying less on equity issues. At the same time, firms influenced by families appear to be less sensitive to investment opportunities. We view this as family firms depending on internal cash flows to finance capital expenditure and investments to a larger degree, as compared to other non-family firms.

We next turn testing the robustness of our results. *First* we use a different family firm definition, a more broad definition of a firms' investment activity and a different specification within our baseline model, in particular integrating interaction terms as an alternative to sample splits. *Second*, we specifically account for possible endogeneity of the founding family status and proxy the family firm variable with a first stage estimation of family firm status. *Third*, we distinguish between financial crisis and non-crisis periods, to find out if our results are driven by times when uncertainty is high, expectations about future developments adjust, and where cash is short. Additionally, we then turn to analyzing financial

[13] When referring to assets in this instance, we mean the change in the cash flow uses and sources equation regarding assets, which includes $CAPX_{i,t}$ (0.109), $Acquisitions_{i,t}$ (0.080), $Disposals_{i,t}$ (-0.062) and $\Delta\ Cash_{i,t}$ (0.392). This added together (adjusting positive /negative cash flow influences based on whether the position is a source or use of cash flow) equates to 0.642 for family firms.

[14] When referring to financing in this instance, we mean the change in the cash flow uses and sources equation regarding financing, which includes $Equity\ issues_{i,t}$ (-0.091), $Repurchases_{i,t}$ (0.000), $Dividends_{i,t}$ (0.082), $\Delta LT\ Debt_{i,t}$ (-0.208), and $\Delta ST\ Debt_{i,t}$ (0.024). This added together (adjusting positive /negative cash flow influences based on whether the position is a source or use of cash flow) equates to 0.357 for family firms.

constraints, commonly viewed as influencing investment behavior (Andres, 2011; FHP, 1988; Kaplan and Zingales, 1997).

3.2. Family firm definition, investment definition, and model specification

In this section we test the robustness of our results for (a) a different family firm definition, (b) using a different specification of our baseline model, in particular integrating interaction terms as an alternative to sample splits and (c) the measurement of our investment variable.

We start by using a less strict family firm definition. Our family firm definition D requires the family to hold 25% of shares, or alternatively be present on one of either the executive board or the supervisory board owning a minimum of 5% of all outstanding shares. The definition is commonly used in the literature (see Achleitner et al., 2009; Ampenberger et al., 2011; Andres, 2008, following Villalonga and Amit, 2006, who require significant family influence), allows to control for the influence of the family over their positions in the management and control bodies of a company. In Table 4 - Panel A, we report the results of the estimation of the multi-equation model using the dummy of the alternative family firm definition. A family firm experiencing a positive (negative) cash flow shock of EUR 1.000 will increase (decrease) investments by EUR 0.079, while non-family firms under this definition increase (decrease) its investments by EUR 0.034, both significant at the 1% level. The difference in the investment cash flow coefficient of 0.045 is significant at the 1% level. Thus, also under this alternative less strict definition we can confirm our baseline results that family firms exhibit a higher ICFS. In line with our previously reported results, family firms are less sensitive to equity financing than non-family firms. For every EUR 1.000 decrease in cash flow, family firms witness EUR 0.174 increase in equity proceeds while non-family firms increase their net equity proceeds by EUR 0.305. As panel B of Table 4 reports, the

difference of 0.131 is significant at the 1% level (all based on bootstrapped standard errors, using 1000 sampling iterations). We interpret this as further evidence for our main results.

******* Please insert Table 4 about here *******

We next, test our results by using a different specification to estimate the differences between family and non-family firms. In particular, we use an interaction term instead of a sample split and interact the dummy variable with our main family firm definition A[15] with cash flows. Table 5 reports the results of the interaction of the family firm status and the cash flow variable. The coefficient of the interaction term equals 0.060 and is statistically significant on the 1% level. We see this as a further confirmation of our baseline results, that family firms' investment spending is more cash flow sensitive than those of non-family firms.

******* Please insert Table 5 about here *******

We next, use a broader measure of investment by adding research and development (R&D) expenses to capital expenditures. Due to international accounting standards and the treatment of R&D, the sources of funds, specifically cash flow, needs to be adjusted. We therefore add back R&D expenses to our cash flow variable, as we expect the gross of R&D outflows to be expensed immediately via the profit and loss statement thereby influencing the cash flow variable directly. With this amendment, we estimate the multi-equation model with the newly created investment variable. We again split our sample by family and non-family firms according to our main family firm definition A and report the results in Table 6. Taking in to account R&D expenses in the multi-equation framework, family firms increase (decrease) their investments by EUR 0.203 for every EUR 1.000 increase (decrease) in cash flow, while non-family firms increase (decrease) their investments by EUR 0.112 for every EUR 1.000 increase

[15] The dummy variable equals 1 if the specific firm, in the specific year is considered as a family firm under the respective family firm definition.

(decrease) in cash flow. The difference of the investment cash flow coefficient between family firms and non-family firms equals 0.088 and is significant at the 1% level. We also confirm our previous results that family firms are less sensitive to equity financing than non-family firms. Family firms witness EUR 0.085 increase in equity proceeds for every EUR 1.000 decrease in cash flow, vs. EUR 0.276 for non-family firms. The difference in coefficients is 0.096 and statistically significant at a 1% level.

To summarize, our results remain unaffected under a more broad investment measure, taking R&D expenses into account.

******* Please insert Table 6 about here *******

3.3. Endogeneity of family firm status

In this section, we want to counter endogeneity concerns potentially undermining our results. In particular, one source of potential endogeneity we identify is the influence of the dependent variable on family status of the firm. As such, families could potentially be influenced in their investment decisions, by the firms' capability to stem investments and therefore ensure its sustained development. To ensure our family indicators are strictly exogenous, we instrument these using an exogenous instrument applied previously in the literature. We follow a three-stepped approach: *First*, we build on (Fahlenbrach, 2009) and use a dummy variable equal to one whenever the founder name is equal to the companies' name[16] to estimate the likelihood of the respective observation being a family firm observation. We believe the instrument fulfills the two main requirements of an instrumental variable: There is no reason to suspect the decision to name the company is related to its current investment

[16] While the initial approach (Fahlenbrach, 2009) equates the name of the founding CEO to the name of the company at the IPO, we need to adapt the technique to our family definition, not only focusing on the founder CEO but the founding family as a whole. Furthermore, instead of the name only being required to be related to the firm name, our definition is stricter, requiring the full name of the founder(s) to be included in the firm name. It therefore does not suffice, for Adidas AG to comprise the first letters of given and surname of the founder Adolf Dassler. Instead we require one of the funder(s) names to be included in the name of the company, as for instance with Friedrich Jacob Merck, the founder of Merck Group. Nevertheless we also apply a more relaxed version of the instrument, which also provides similar results.

capabilities. We do, however, expect a positive correlation between the instrument itself and the family status of the firm. We additionally control for cash flow, TobinsQ, as well as firm size when estimating the family firm status. Specifically we estimate the following logistic regression, accounting for year and industry effects (based on Fama and French (1997) 12 industry classifications):

$$Family\ Firm\ Dummy_{i,t} = \beta_1 \text{FounderName in FirmName Dummy}_{i,t} + \beta_2 CF_{i,t} + \beta_3 TobinsQ_{i,t} + \beta_4 Size_{i,t} + IFE + YFE + \varepsilon_{i,t} \quad (6)$$

The $Family\ Firm\ Dummy_{i,t}$ is a dummy that equals one if family firm definition A is fulfilled. The results of this estimation can be seen in Table 7 – Panel A. The Founder Name equal to Firm Name dummy is positively correlated to the Family Firm Dummy with statistical significance at 1% level. All other predictors, with the exception of TobinsQ are significant. *Second*, we use the estimated probability of a respective observation being a family firm and define a threshold when the respective firm year observation is considered as a family firm. Therefore, we construct a dummy variable that equals one if the probability of the predicted family firm status is in upper quartile of the predicted probability. We set the threshold at the 75 percentile, as it reflects the original family firm distribution in our sample, equal to approximately ¼ of all observations. In a *third* step, we construct a sample split based on the above constructed derived family firm dummy and re-estimate the multi-equation model accordingly. The results of this analysis are shown in Table 7 – Panel B, where again for reasons of brevity, we show only the coefficients of the cash flow on the investment variable. As Table 7 – Panel B shows, the coefficient of the group of predicted family firms exhibits an ICFS of 0.097, while the group of non-family firms has an ICFS of 0.041, both statistically significant at the 1% level. We test again for differences between the coefficients within the group of family firms and non-family firms. Table 7 – Panel C shows the results of this test, where differences are reported with stars, to indicate statistical

significance, as well as p-values beneath the differences. The difference between both groups is 0.056 and is significant at the 5% level. To summarize, when we account for a possible endogeneity in the family firm status our results remain robust.

******* Please insert Table 7 about here *******

3.4. Financial constraints and excess ICFS of family firms

3.4.1. Investment and financing cash flow sensitivities during the financial crisis

To extend our understanding about uncertainty, rapid changes in future expectations and liquidity constraints on investment behavior, taking into account family influence, we conduct a sample split differentiating between observations within the financial crisis period and observations outside of the financial crisis. We hereby define the financial crisis as starting in 2008 and lasting throughout 2010, in line with previous research (Campello et al., 2010; Duchin et al., 2010; Jaslowitzer et al., 2016). We opt for not taking into account 2007, as we view the first signs of the financial crisis only having a limited impact on German firms. Only as the full scale of the crisis became apparent in 2008, with major bankruptcies like Lehman Brothers, the effects of the crisis where transmitted on this side of the Atlantic. Similarly, we view the effects as lasting slightly longer in Europe, leading us to classify 2010 as a crisis year.

We now focus only on the cash flow coefficients, leaving aside the proxies for investment opportunities, and lagged dependent variables for all nine regressions of our multi-equation model, for brevity. In Table 8 we report the coefficients of our model, as well as the respective t-statistics in brackets below the coefficients. Like in the previous analysis, we report the difference of coefficients for family and non-family firms in Panel B of Table 8, now both for crisis and non-crisis periods, as well as for family firms

in crisis and non-crisis periods. Again, differences are reported with stars, to indicate statistical significance, as well as p-values beneath the differences.

******* Please insert Table 8 about here *******

The financial crisis and the accompanying uncertainty, changing future expectations and liquidity constraints, appear to affect the sensitivity of investment to cash flow to a larger extent for family firms, than non-family firms. While outside the crisis the investment-cash flow sensitivity decreases marginally to 0.091 (vs. 0.109 in the overall sample) for family firms, in times of crisis, 1/5 of every additional EUR 1.000 of cash flow generated (lost) is spent on investments (decreases the expenditure on investment). This is rather striking, when comparing investment behavior of non-family firms, who appear to maintain a constant investment regime, not changing the dependence of investment on internal cash flow, even in crisis periods. Accordingly, the difference in cash flow coefficients between family firms and non-family firms is rather high during the crisis (0.188) and significant at 1% level. We continue to measure positive and significant difference in non-crisis times (0.045) at a 5% level. When comparing family within crisis and outside of crisis times, we report a difference of 0.118, also statistically significant a 5% level. We interpret this as family firms having to adjust their investment behavior more in times when liquidity is short and uncertainty is high. This is also a confirmation of our previous results in section 3.1, as it implies that family firms need to alter their investment stronger than non-family firms do, especially in times of a cash flow shock.

3.4.2. Investment and financing cash flow sensitivities and financial constraints

In this section, we take into account, financial constraints, asking in how far our result of the above analysis are influenced by financial constraints. Like in the previous section 3.4 we conduct sample splits, using indicator variables for financial constraints.

Our measures of financial constraints are the Kaplan-Zingales Index[17] (Lamont et al., 2001; Kaplan and Zingales, 1997) as well as the Whited-Wu Index[18] (Whited and Wu, 2006). Based on the annual sample mean of each index, we split the sample in financially constrained and unconstrained firms. We then run the multi-equation model for each subsample, equivalent to the previous sections. In Table 9, we report the cash flow coefficients for each capital expenditure regression in all subsamples.

******* Please insert Table 9 about here *******

We continue to measure positive and significant ICFS across all samples. For constrained family and non-family firms, we report a positive divergence between in the ICFS. Also for unconstrained family firms and non-family firms we can reject the null hypothesis of homogeneous influence. The last column of Table 9 reports a positive difference in the ICFS for financially constrained family and non-family firms, significant at the 5% level.

We interpret this result as financial constraints driving heterogeneous influences on investment behavior. In this sense, the previous results need to be viewed as impacted by the presence of financial constraints.

4. Summary and Conclusion

Previous research has stated that family firms have lower investment-cash flow sensitivities than their non-family counterparts. These results are counter intuitive, as families are large, undiversified blockholders, which are risk averse and seeking to maintain control over their companies. These attributes imply that family firms are more reluctant towards outside finance such as debt and equity.

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[17] Individual firm values of the Kaplan-Zingales Index are derived using the following formula: KZ Index = -1.001909 x Cash Flows$_{i,t}$ / K$_{i,t}$ + 0.2826389 x TobinsQ$_{i,t}$ + 3.139193 x Debt$_{i,t}$ / Total Capital$_{i,t}$ + '-39.3678 x Dividends$_{i,t}$ / K$_{i,t}$ + -1.314759 x Cash$_{i,t}$ / K$_{i,t}$

[18] Individual firm values of the Whited-Wu Index are derived using the following formula: Whited-Wu Index = -0.091 x (EBITDA$_{i,t}$ / Total Assets$_{i,t}$) - 0.062 x Positive Dividend Dummy$_{i,t}$ + 0.021 x (Total Debt$_{i,t}$ / Total Assets$_{i,t}$) - 0.044 x ln(Total Assets$_{i,t}$) + 0.102 x Mean Industry Sales Growth$_{i,t}$ - 0.035 x Firm Specific Sales Growth$_{i,t}$

Hence, we conclude that family firms do exhibit a higher investment-cash flow sensitivity than non-family firms. Previous studies have typically implemented single equations models to measure the sensitivity of investment to cash flows. As shown by Gatchev et al. (2010) these models mostly do not reflect the intertemporal and interdependent nature of investment and financing decision. Moreover, the methodology is subject to biased estimates due to omitted variables, an may therefore lead to inefficient estimates and potentially misleading inference. We therefore use a multi-equation setting to revisit the question of investment cash flow sensitivities, taking into account the full spectrum of cash flow sources and uses. Based on a sample of German Prime Standard listed firms, over a period from 2001 to 2015, we find an overall positive and highly significant ICFS at a low single digit level. Further differentiating the sample based on hand collected information about family firms we find that family firms investment increases (decreases) by EUR 0.109, for each positive (negative) euro of cash flow shock born by a firm, compared to non-family firms with EUR 0.042. We also find evidence for the economical intuitive financing behavior of family firms, which suggest that family firms witness a lower equity financing cash flow sensitivity and a higher sensitivity of cash distributions to shareholders. We use several robustness tests to confirm our results. These include covering alternative family firm definitions. In particular, we find that the investment-cash flow sensitivity decreases with lower family ownership. We also extend our model by using a more broad definition of investment, by adding research and development expenses to the capital expenditures. We additionally modify our specification by using interaction terms instead of sample splits to tests for differences between family and non-family firms. Also under this specification we find supporting evidence for our initial results. To control for further endogeneity concerns we instrument family firm status using an indicator of the founder name equating to the firm name and again perform a sample split to control for differences based on the estimated family firm status. We find that also in this setting our results remain robust.

In addition, we use the recent financial crisis as a natural experiment to gain insights on how liquidity constraints associated with the crisis effects family and non-family firms in their financing and investment decisions. We find that higher uncertainty, changing future expectations, and liquidity constraints surrounding the crisis appear to affect the sensitivity of investments to cash flow to a larger extent for family firms, than non-family firms. Further, we split our sample into constrained and unconstrained firms and find that the group of constrained family firms exhibit the higher sensitivity of investments to cash flows.

We contribute to the existing literature by providing a simultaneous view on the financial and investment decisions of listed family firms. The model underlying our analyses is able to account for the interdependent and intertemporal nature of financing and investment decisions. Our results are economically intuitive as they are in line with the expected behavior of families as large undiversified blockholders.

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Appendix A: Detailed definitions of variables

******* Please insert Table 1 about here *******

Figures and tables

Table 1: ***Variable descriptions***

Variable type	Variable name	Description	Source
Financing and Investment Variables			
	$Acquisitions_{i,t}$	Net assets from acquisitions in *t* deflated by total assets in *t*, winsorised at 1% tails annually	Thomson Reuters
	$Asset\ Sales_{i,t}$	Disposals of fixed assets in *t* deflated by total assets in *t*, winsorised at 1% tails annually	Thomson Reuters
	$CAPX_{i,t}$	Capital Expenditure (additions to fixed assets) in *t* deflated by total assets in *t*, winsorised at 1% tails annually	Thomson Reuters
	$\Delta Cash_{i,t}$	Cash and cash equivalents in t minus Cash and cash equivalents in *t-1* deflated by total assets in *t*, winsorised at 1% tails annually	Thomson Reuters
	$Cash\ Flow_{i,t}$	Net cash flow from operating activities in *t* deflated by total assets in *t*, winsorised at 1% tails annually	Thomson Reuters
	$Dividends_{i,t}$	Cash dividends paid total in *t* deflated by total assets in *t*, winsorised at 1% tails annually	Thomson Reuters
	EBITDA	Earnings before interest, taxes, depreciation and amortization	Thomson Reuters
	$Equity\ Issues_{i,t}$	Net Proceeds from Sale/Issue of Common & Preferred Outstanding Shares in *t* deflated by total assets in *t*, winsorised at 1% tails annually	Thomson Reuters
	$Firm\ size_{i,t}$	The natural logarithm of total assets in *t*, winsorised at 1% tails annually	Thomson Reuters
	INTEXP	Interest expenses paid	Thomson Reuters
	$\Delta LT\ Debt_{i,t}$	Long term debt in *t* deflated by total assets in *t*, winsorised at 1% tails annually	Thomson Reuters
	TAX	Income taxes paid	Thomson Reuters
	$TobinsQ_{i,t}$	Market value of equity minus the book value of equity plus the book value of total assets divided by book value of total assets in *t*, winsorised at 1% tails annually	Thomson Reuters
	$\Delta NWC_{i,t}$	Working Capital in *t* minus Working Capital in *t-1*	Thomson Reuters
	$Repurchases_{i,t}$	Redeemed, Retired, Converted of Common/Preferred Outstanding Shares in *t* deflated by total assets in *t*, winsorised at 1% tails annually	Thomson Reuters

ΔST Debt$_{i,t}$	Short term debt in t deflated by total assets in *t*, winsorised at 1% tails annually	Thomson Reuters
Ownership and governance variables		
Founding Family Firm$_{i,t}$ - Main Definition A	Indicator variable equal to 1 when: Members of a founding family hold 50% or more of a firms equity	Hoppenstedt Aktienführer, other databases, investor relations departments, press
Founding Family Firm - Definition D	Indicator variable equal to 1 when: Members of a founding family hold 25% or more of equity or 2. Members of the family are present on the supervisory board holding more than 5% of the firm's equity or 3. Members of the family are actively involved in the management holding more than 5% of the firm's equity	Hoppenstedt Aktienführer, other databases, investor relations departments, press
Other variables		
Kaplan-Zingales Index$_{i,t}$	Kaplan-Zingales Index, calculated as KZ-Index=-1.001909 x EBITDA / Fixed Assets + 0.2826389 x TobinsQ + 3.139193 x Total Debt / Total Assets + -39.3678 x Dividends / Fixed Assets + -1.314759 x Cash / Fixed Assets, as proposed by Lamont et al. (2001). All variables included in the calculation of index values are winsorised at 1% tails annually	Thomson Reuters
Whited-Wu Index$_{i,t}$	Whited-Wu Index, calculated as WW-Index= 0.091 x EBITDA / Fixed Assets – 0.062 x Dividends + 0.021 x Total Debt / Total Assets – 0.044 x ln(Total Assets) + 0.102 x mean(Industry Sales Growth) – 0.035 x Sales Growth. All variables included in the calculation of index values are winsorised at 1% tails annually	Thomson Reuters

Notes: This table reports the used variables, their definitions and sources. Ownership variables are collected from the Hoppenstedt Aktienführer and combined with family information from firm's annual reports, Lexis-Nexis, Who-is who webpages, and further web and press searches.

Table 2: ***Summary statistics***

Variable	All firms						Non-Family Firms		Family Firms			
	N	Mean	p25	p50	p75	sd	N	Mean	N	Mean	ΔMean (FF vs NonFF)	t-value
Cash Flow$_t$	2,261	0.063	0.023	0.074	0.126	0.149	1,277	0.056	984	0.073	-0.018	-2.82
ΔCash$_t$	2,261	-0.003	-0.028	0.003	0.037	0.110	1,277	0.003	984	-0.011	0.014	2.95
ΔLT Debt$_t$	2,261	0.006	-0.016	0.000	0.017	0.066	1,277	0.005	984	0.006	-0.001	-0.35
ΔST Debt$_t$	2,261	-0.002	-0.014	0.000	0.015	0.060	1,277	-0.001	984	-0.005	0.004	1.42
Equity Issues$_t$	2,261	0.015	0.000	0.000	0.001	0.059	1,277	0.019	984	0.011	0.008	3.32
Repurchases$_t$	2,261	0.003	0.000	0.000	0.000	0.013	1,277	0.003	984	0.004	-0.001	-1.43
CAPX$_t$	2,261	0.044	0.017	0.034	0.057	0.039	1,277	0.044	984	0.044	0.000	-0.11
Acquisitions$_t$	2,261	0.014	0.000	0.000	0.008	0.039	1,277	0.014	984	0.014	0.001	0.34
Asset Sales$_t$	2,261	0.010	0.000	0.002	0.008	0.036	1,277	0.011	984	0.010	0.001	0.56
Dividends$_t$	2,261	0.018	0.000	0.009	0.022	0.033	1,277	0.016	984	0.020	-0.004	-3.05
Size$_t$	2,261	13.165	11.445	12.801	14.550	2.224	1,277	13.651	984	12.534	1.117	12.51
TobinsQ$_t$	2,261	1.561	1.036	1.277	1.695	0.957	1,277	1.534	984	1.596	-0.062	-1.48
KZ-Index$_t$	2,261	0.063	0.023	0.074	0.126	0.149	1,277	0.056	984	0.073	-0.018	-2.82
WW-Index$_t$	2,261	-0.003	-0.028	0.003	0.037	0.110	1,277	0.003	984	-0.011	0.014	2.95

Notes: The table reports summary statistics for the main variables over all observations, non-family firm observations, and family firm observations. The full sample consists of 2,261 firm-year observations of non-financial German firms over the 2001 – 2015 period. The subsample observations and means are identified according to our strictest family firm measure, requiring 50% ownership by a family member, or 50% ownership by a family member present on either the executive management board or the supervisory board of the respective company, for the company to satisfy the family firm definition. Detailed variable definitions are found in Table 1 in the Appendix. *, **, *** indicate significance at the 0.10, 0.05, 0.01 level, respectively.

Table 3: ***Baseline results***

Panel A

Cash Flow Coefficients and t-Values						
	(1)	(2)	(3)	(4)	(5)	(6)
	Family Firm Definition A			**Non-Family Firm Definition A**		
	Cash Flow	Size	TobinsQ	Cash Flow	Size	TobinsQ
CAPX	0.109***	-0.001	-0.001	0.042***	0.001**	0.002**
	[4.88]	[-0.41]	[-0.87]	[6.21]	[2.43]	[2.21]
Acquisitions	0.080***	0.002*	-0.004	0.075***	0.001*	0.002*
	[2.73]	[1.82]	[-1.42]	[6.09]	[1.72]	[1.76]
Asset Sales	-0.062**	0.004***	-0.001	-0.044***	0.001***	-0.001**
	[-2.40]	[3.01]	[-0.65]	[-2.96]	[2.64]	[-2.21]
Equity Issues	-0.091**	0.000	0.003**	-0.283***	-0.001	0.015***
	[-2.14]	[0.28]	[2.39]	[-7.88]	[-1.33]	[5.43]
Repurchases	0.000	-0.001**	0.000	0.013***	0.000	0.002***
	[-0.10]	[-2.08]	[-1.33]	[4.10]	[0.10]	[3.61]
Dividends	0.082***	-0.002*	0.011***	0.044***	-0.001*	0.006***
	[3.20]	[-1.82]	[3.91]	[3.87]	[-1.87]	[4.15]
ΔLT Debt	-0.208***	0.000	0.003	-0.268***	0.003***	0.002
	[-4.46]	[-0.29]	[1.20]	[-9.44]	[3.93]	[0.64]
ΔST Debt	0.024	0.001	0.000	-0.007	0.002***	0.003
	[0.80]	[1.22]	[0.15]	[-0.30]	[2.82]	[1.44]
ΔCash	0.391***	0.005***	0.000	0.223***	0.004***	0.005
	[3.58]	[2.81]	[-0.02]	[4.83]	[4.56]	[1.54]
ΔUses of Fund + ΔSources of Funds	1.00			1.00		
ΔAssets	0.6			0.4		
ΔFinancing	0.4			0.6		
N	439			1822		

Panel B

Bootstrap (1,000 Iterations) Difference Test			
	Cash Flow	Size	TobinsQ
	(1) - (4)	(2) - (5)	(3) - (6)
CAPX	0.067***	-0.002**	-0.003**
	0.002	0.039	0.034
Acquisitions	0.005	0.001	-0.006***
	0.431	0.204	0.006
Asset Sales	-0.018	0.003	0.000
	0.301	0.204	0.500
Equity Issues	0.192***	0.001	-0.012***
	0.000	0.127	0.000
Repurchases	-0.013*	-0.001	-0.002***
	0.063	0.204	0.002
Dividends	0.038*	-0.001*	0.005*
	0.070	0.090	0.057
ΔLT Debt	0.060*	-0.003**	0.001
	0.096	0.015	0.384
ΔST Debt	0.031	-0.001	-0.003
	0.198	0.214	0.229
ΔCash	0.168**	0.001	-0.005
	0.036	0.293	0.271

Notes: The table presents results from two estimations of a system of equations described by equation (4) and subject to constraints as explained in section 2.1 in Panel A. The first estimation refers to the subsample of firms classifying as family firm according to definition A. The second estimation refers to the remaining sample. The full sample consists of 2,261 firm-year observations of non-financial German firms over the 2001 – 2015 period. Only coefficients for Cash Flow, Size and TobinsQ are reported. Lagged dependent variables are included in each of the nine regressions but coefficients not reported. The constraint ensures that all cash flow coefficients over uses and sources of funds sum up to one. We demean all included variables in each year to control for time fixed effects. The t-values (in square brackets) are robust to heteroscedasticity (Huber, 1967; White, 1980) and control for firm-level clustering (Rogers, 1993). *, **, *** indicate significance at the 0.10, 0.05, 0.01 level, respectively. The table in Panel B reports difference tests for the coefficients reported in Panel A. The p-values of the coefficients are based on the bootstrapped standard errors using 1,000 iterations.

Table 4: *Alternative Family Firm Definition*

Panel A

Cash Flow Coefficients and t-Values						
	(1)	(2)	(3)	(4)	(5)	(6)
	Family Firm Definition D			**Non-Family Firm Definition D**		
	Cash Flow	Size	TobinsQ	Cash Flow	Size	TobinsQ
CAPX	0.079***	0.000	0.001	0.034***	0.001*	0.001
	[6.45]	[-0.61]	[0.80]	[4.68]	[1.84]	[1.64]
Acquisitions	0.073***	0.003***	-0.001	0.080***	0.000	0.001
	[3.95]	[3.23]	[-0.38]	[5.25]	[0.59]	[0.98]
Asset Sales	-0.050***	0.003***	-0.001	-0.046***	0.001*	-0.002**
	[-2.88]	[3.09]	[-0.84]	[-2.65]	[1.83]	[-2.22]
Equity Issues	-0.174***	-0.001	0.009***	-0.305***	-0.001	0.014***
	[-5.39]	[-0.71]	[3.63]	[-6.73]	[-1.52]	[3.90]
Repurchases	0.007	0.000	0.001*	0.013***	0.000	0.002***
	[1.49]	[-0.21]	[1.66]	[3.76]	[-0.46]	[3.19]
Dividends	0.044***	-0.001*	0.010***	0.051***	0.000	0.005***
	[3.91]	[-1.93]	[4.86]	[3.27]	[-1.39]	[3.12]
ΔLT Debt	-0.256***	0.002*	0.005**	-0.263***	0.002**	-0.002
	[-7.30]	[1.79]	[2.19]	[-7.11]	[2.56]	[-0.93]
ΔST Debt	0.005	0.002***	-0.001	-0.003	0.001*	0.006**
	[0.23]	[2.89]	[-0.98]	[-0.11]	[1.79]	[2.30]
ΔCash	0.323***	0.006***	0.000	0.205***	0.003***	0.006
	[5.35]	[3.88]	[-0.08]	[3.38]	[2.62]	[1.34]
ΔUses of Fund + ΔSources of Funds	1.00			1.00		
ΔAssets	0.5			0.4		
ΔFinancing	0.5			0.6		
N	984			1277		

Panel B

Bootstrap (1,000 Iterations) Difference Test			
	Cash Flow	Size	TobinsQ
	(1) - (4)	(2) - (5)	(3) - (6)
CAPX	0.045***	-0.001*	0.000
	0.000	0.054	0.500
Acquisitions	-0.007	0.003***	-0.002
	0.363	0.000	0.148
Asset Sales	-0.004	0.002***	-0.001
	0.438	0.000	0.212
Equity Issues	0.131***	0.000	-0.005
	0.003	0.500	0.139
Repurchases	-0.006	0.000***	-0.001
	0.149	0.000	0.121
Dividends	-0.007	-0.001**	0.005**
	0.323	0.043	0.042
ΔLT Debt	0.007	0.000	0.007**
	0.433	0.500	0.030
ΔST Debt	0.008	0.001	-0.007**
	0.415	0.189	0.015
ΔCash	0.118**	0.003**	-0.006
	0.036	0.034	0.179

Notes: The table presents results from two estimations of a system of equations described by equation (4) and subject to constraints as explained in section 2.1 in Panel A. The first estimation refers to the subsample of firms classifying as family firm according to definition D. The second estimation refers to the remaining sample. The full sample consists of 2,261 firm-year observations of non-financial German firms over the 2001 – 2015 period. Only coefficients for Cash Flow, Size and TobinsQ are reported. Lagged dependent variables are included in each of the nine regressions but coefficients not reported. The constraint ensures that all cash flow coefficients over uses and sources of funds sum up to one. We demean all included variables in each year to control for time fixed effects. The t-values (in square brackets) are robust to heteroscedasticity (Huber, 1967; White, 1980) and control for firm-level clustering (Rogers, 1993). *, **, *** indicate significance at the 0.10, 0.05, 0.01 level, respectively. The table in Panel B reports difference tests for the coefficients reported in Panel A. The p-values of the coefficients are based on the bootstrapped standard errors using 1,000 iterations.

Table 5: ***Family Firm Dummy Interacted with Cash Flow***

Cash Flow Coefficients and t-Values					
	(1)	(2)	(3)	(4)	(5)
	Family Firm Type A (Dummy Variable)				
	Cash Flow x Family Firm A Dummy	CashFlow	Size	TobinsQ	Family Firm A Dummy
CAPEX	0.060***	0.027***	0.000	0.001	-0.002
	[4.01]	[4.99]	[0.76]	[1.14]	[-1.04]
Acquisitions	0.053***	0.037***	0.002***	0.000	-0.003
	[2.81]	[5.25]	[3.18]	[0.01]	[-1.59]
Asset Sales	-0.074**	-0.009	0.001***	-0.001**	0.004
	[-1.99]	[-0.60]	[3.33]	[-2.22]	[1.12]
Equity Issues	0.051	-0.204***	-0.001	0.012***	-0.016***
	[1.44]	[-6.44]	[-1.39]	[5.44]	[-3.87]
Repurchases	-0.012**	0.010***	0.000	0.002***	0.000
	[-2.16]	[3.41]	[-0.11]	[2.76]	[0.32]
Dividends	0.036*	0.033***	-0.001**	0.007***	0.001
	[1.67]	[4.11]	[-2.48]	[5.38]	[0.28]
ΔLT Debt	-0.128***	-0.143***	0.003***	0.002	0.005
	[-3.42]	[-7.41]	[4.06]	[1.05]	[1.22]
ΔST Debt	-0.120***	0.087***	0.002***	0.003*	0.002
	[-2.62]	[4.12]	[3.59]	[1.95]	[0.47]
ΔCash	0.369***	-0.153***	0.004***	0.006**	0.000
	[3.71]	[-3.57]	[5.06]	[2.01]	[-0.03]
Delta Uses of Fund + Delta Sources of Funds	1.00				
N	2261				

Notes: The table above present results from estimations of a system of equations described by equation (4) amended by including an interaction term of the family firm variable under the definition A and cash flows, subject to constraints as explained in section 2.1. The first estimation refers to the subsample of firms classifying as family firm according to definition A. The second estimation refers to the remaining sample. The full sample consists of 2,261 firm-year observations of non-financial German firms over the 2001 – 2015 period. Only coefficients for Cash Flow, Size and TobinsQ are reported. Lagged dependent variables are included in each of the nine regressions but coefficients not reported for brevity. The constraint ensures that all cash flow coefficients over uses and sources of funds sum up to one. We demean all included variables in each year to control for time fixed effects. The t-values (in square brackets) are robust to heteroscedasticity (Huber, 1967; White, 1980) and control for firm-level clustering (Rogers, 1993). *, **, *** indicate significance at the 0.10, 0.05, 0.01 level, respectively.

Table 6: *Alternative Measurement of the Investment Variable*

Panel A

Cash Flow Coefficients and t-Values						
	(1)	(2)	(3)	(4)	(5)	(6)
	Family Firm Definition A			**Non-Family Firm Definition A**		
	Cash Flow	Size	TobinsQ	Cash Flow	Size	TobinsQ
CAPX + R&D	0.203***	-0.001	0.001	0.112***	-0.001*	0.007***
	[5.71]	[-0.68]	[0.33]	[7.77]	[-1.93]	[3.24]
Acquisitions	0.075***	0.002*	-0.004	0.075***	0.001	0.001
	[2.75]	[1.70]	[-1.45]	[6.02]	[1.52]	[1.41]
Asset Sales	-0.060**	0.004***	-0.001	-0.047***	0.001***	-0.001*
	[-2.42]	[2.91]	[-0.51]	[-3.03]	[2.74]	[-1.78]
Equity Issues	-0.085**	0.000	0.003**	-0.276***	-0.001***	0.017***
	[-2.10]	[0.37]	[2.44]	[-7.82]	[-2.70]	[5.48]
Repurchases	0.003	-0.001**	0.000	0.012***	0.000	0.002***
	[1.02]	[-1.99]	[-1.36]	[4.05]	[0.28]	[3.56]
Dividends	0.081***	-0.002**	0.011***	0.041***	0.000	0.006***
	[3.41]	[-2.02]	[4.01]	[3.57]	[-1.42]	[3.70]
ΔLT Debt	-0.204***	0.000	0.003	-0.273***	0.003***	0.005**
	[-4.96]	[-0.17]	[1.42]	[-9.97]	[3.67]	[2.16]
ΔST Debt	0.008	0.001	0.001	-0.018	0.002***	0.002
	[0.29]	[0.84]	[0.36]	[-0.87]	[3.40]	[1.12]
ΔCash	0.297***	0.006***	-0.001	0.146***	0.005***	0.006**
	[3.12]	[3.11]	[-0.11]	[3.04]	[4.86]	[2.16]
ΔUses of Fund + ΔSources of Funds	1.00			1.00		
ΔAssets	0.5			0.4		
ΔFinancing	0.5			0.6		
N	439			1822		

Panel B

Bootstrap (1,000 Iterations) Difference Test			
	Cash Flow	Size	TobinsQ
	(1) - (4)	(2) - (5)	(3) - (6)
CAPX + R&D	0.088***	-0.001	-0.004*
	0.004	0.250	0.090
Acquisitions	0.011	0.002*	-0.007***
	0.376	0.083	0.006
Asset Sales	0.010	0.003*	-0.001
	0.257	0.083	0.170
Equity Issues	0.096***	0.001	-0.004*
	0.006	0.156	0.061
Repurchases	-0.014***	-0.001*	-0.003***
	0.004	0.083	0.000
Dividends	0.075**	-0.001	0.007**
	0.018	0.114	0.031
ΔLT Debt	0.059	-0.003**	-0.001
	0.141	0.032	0.391
ΔST Debt	0.008	-0.001	0.002
	0.428	0.203	0.309
ΔCash	0.012	0.000	0.004
	0.447	0.500	0.268

Notes: The table present results from two estimations of a system of equations described by equation (4) and subject to constraints as explained in section 2.1 in Panel A. The investment measure includes R&D expenses. The cash flow variable is amended by adding back R&D expenses to cash flows as expecting the gross of R&D outflows to be expensed immediately via the profit and loss statement thereby influencing the cash flow variable directly. The first estimation refers to the subsample of firms classifying as family firms according to definition A. The second estimation refers to the remaining sample. The full sample consists of 2,261 firm-year observations of non-financial German firms over the 2001 – 2015 period. Only coefficients for Cash Flow, Size and TobinsQ are reported. Lagged dependent variables are included in each of the nine regressions but coefficients are not reported. The constraint ensures that all cash flow coefficients over uses and sources of funds sum up to one. We demean all included variables in each year to control for time fixed effects. The t-values (in square brackets) are robust to heteroscedasticity (Huber, 1967; White, 1980) and control for firm-level clustering (Rogers, 1993). *, **, *** indicate significance at the 0.10, 0.05, 0.01 level, respectively. The table in Panel B reports difference tests for the coefficients reported in Panel A. The p-values of the coefficients are based on the bootstrapped standard errors using 1,000 iterations.

Table 7: ***Excess ICFS of family firms with instrumented family status***

Panel A

Logit Regression - Prediction of Family Firm Status Coefficients and t-Values		
	(1)	(2)
Dependent Variable	**Family Firm Type A (Dummy Variable)**	
Size	-0.237*** [-8.60]	-0.273*** [-9.51]
TobinsQ	-0.040 [-0.85]	-0.034 [-0.70]
CashFlow	1.515*** [4.67]	1.361*** [4.14]
Company Name equals Founder Name		0.874*** [7.78]
Year Effects	Yes	Yes
Industry Effects (Fama-French 12)	Yes	Yes
N	2855	2855

Panel B

Predicted Family Firm Status - Cash Flow Coefficients and t-Values						
	(1)	(2)	(3)	(4)	(5)	(6)
	Predicted Family Firm Type A			**Predicted Non-Family Firm Type A**		
	Cash Flow	Size	TobinsQ	Cash Flow	Size	TobinsQ
CAPX	0.097*** [6.94]	0.000 [0.34]	0.001 [0.48]	0.041*** [9.32]	0.001*** [2.99]	0.001 [1.64]

Panel C

Bootstrap (1,000 Iterations) Difference Test			
	Cash Flow	Size	TobinsQ
	(1) - (4)	(2) - (5)	(3) - (6)
CAPX	0.056*** 2.853	-0.001 0.953	0.000 0.000

Notes: The table presents the results of logistic regressions explaining a dummy variable indicating a family firm observation of type A, i.e. indicating that family firm definition A is fulfilled in Panel A. Both models allow for time and industry effects. The sample consists of 2,240 firm-year observations of non-financial German firms over the 2001 – 2015 period. Panel B present results from two estimations of a system of equations described by equation (4) and subject to constraints as explained in section 2.1. The first estimation refers to the subsample of observations predicted to classify as family firm observation of type A according to the regression (2) from Panel A. An observations is predicted to classify as family firm observation of type A, if the estimated likelihood of being of type A is larger than 75 percent according to regression (2) from Panel A. The second estimation refers to the remaining sample. Only coefficients for Cash Flow, Size and TobinsQ for the CAPX-regression are reported. Lagged dependent variables are included in each of the nine regressions but coefficients not reported. The constraint ensures that all cash flow coefficients over uses and sources of funds sum up to one. We demean all included variables in each year to control for time fixed effects. The t-values (in square brackets) are robust to heteroscedasticity (Huber, 1967; White, 1980) and control for firm-level clustering (Rogers, 1993). *, **, *** indicate significance at the 0.10, 0.05, 0.01 level, respectively. The table in Panel C reports difference tests for the coefficients reported in Panel B. The p-values of the coefficients are based on the bootstrapped standard errors using 1,000 iterations.

Table 8: ***Excess ICFS of family firms during the financial crisis***

Panel A

Cash Flow Coefficients and t-Values - Bootstrapped (1,000 Iterations)						
	Financial Crisis (2008,2009,2010)			Tranquil times (2002-2007;2011-2015)		
	(1)	(2)	(3)	(4)	(5)	(6)
	All	**FF A**	**NFF A**	**All**	**FF A**	**NFF A**
CAPX	0.048***	0.209***	0.021	0.052***	0.091***	0.046***
	[2.60]	[3.39]	[1.57]	[7.20]	[5.82]	[5.99]
Acquisitions	0.047**	0.095	0.045***	0.081***	0.078**	0.081***
	[2.57]	[1.37]	[2.62]	[6.52]	[2.49]	[6.14]
Asset Sales	-0.004	0.005	-0.008	-0.058***	-0.081**	-0.053***
	[-0.61]	[0.45]	[-1.10]	[-3.60]	[-2.32]	[-2.92]
Equity Issues	-0.284***	-0.301**	-0.286***	-0.255***	-0.047***	-0.284***
	[-4.37]	[-1.98]	[-4.15]	[-6.83]	[-2.87]	[-7.09]
Repurchases	0.014	0.002	0.018	0.010***	-0.004	0.012***
	[1.42]	[0.07]	[1.59]	[4.18]	[-1.29]	[4.41]
Dividends	0.035***	0.089	0.023***	0.053***	0.078***	0.048***
	[3.33]	[1.60]	[2.94]	[4.58]	[2.98]	[3.79]
ΔLT Debt	-0.284***	-0.236**	-0.306***	-0.253***	-0.203***	-0.266***
	[-5.95]	[-2.04]	[-5.80]	[-9.42]	[-4.33]	[-8.89]
ΔST Debt	0.087**	0.001	0.096**	-0.018	0.033	-0.022
	[2.42]	[0.01]	[2.20]	[-0.87]	[0.83]	[-1.00]
ΔCash	0.371***	0.074	0.389***	0.221***	0.460***	0.187***
	[4.23]	[0.26]	[4.30]	[4.70]	[4.38]	[3.92]
ΔUses of Fund + ΔSources of Funds	1.00	1.00	1.00	1.00	1.00	1.00
ΔAssets	0.5	0.4	0.5	0.4	0.7	0.4
ΔFinancing	0.5	0.6	0.5	0.6	0.3	0.6
N	427	91	336	1834	348	1486

Panel B

Bootstrap (1,000 Iterations) Difference Test			
	FF vs. NFF during Financial Crisis	FF vs. NFF during tranquil times	FF during Financial Crisis vs. FF during tranquil times
	(2) - (3)	(5) - (6)	(2) - (5)
CAPX	0.188***	0.045**	0.118**
	0.001	0.015	0.029
Acquisitions	0.050	-0.003	0.017
	0.262	0.463	0.418
Asset Sales	0.013	-0.028	0.086**
	0.209	0.265	0.023
Equity Issues	-0.015	0.237***	-0.254**
	0.463	0.000	0.043
Repurchases	-0.016	-0.016***	0.006
	0.353	0.001	0.442
Dividends	0.066	0.030	0.011
	0.143	0.151	0.435
ΔLT Debt	0.070	0.063	-0.033
	0.273	0.118	0.389
ΔST Debt	-0.095*	0.055*	-0.032
	0.088	0.091	0.308
ΔCash	-0.315**	0.273**	-0.386**
	0.010	0.010	0.010

Notes: The above table in Panel A present results from estimating a system of equations described by equation (4)) subject to the constraints as explained in section 2.1. The underlying sample of the analysis consists of the 2,261 observations contained within the Prime Standard between 2001 and 2015. We show coefficients for the Cash Flow coefficients. All lagged dependent variables as well as Size and TobinsQ coefficients (included in each of the nine regression) are not tabulated for brevity. We demean all included variables in each year to control for time fixed effects. The constraints imply that all cash flow coefficients over uses and sources of funds sum up to one. As neither Firm Size, TobinsQ, nor the dependent variable lags are sources or uses in time t, their coefficients are required to sum up to zero across the equation system. The t-values (in square brackets) are robust to heteroscedasticity (Huber, 1967; White, 1980) and control for firm-level clustering (Rogers, 1993). *, **, *** indicate significance at the 0.10, 0.05, 0.01 level, respectively. The table in Panel B reports difference tests for the coefficients reported in Panel A. the p-values of the coefficients are based on the bootstrapped standard errors using 1,000 iterations.

Table 9: ***Financial constraints and excess ICFS of family firms***

Panel A

Constrained Firms measured using the Kaplan-Zingales and Whited-Wu Indexes Cash Flow Coefficients and T-Values						
	(1)	(2)	(3)	(4)	(5)	(6)
	Complete Sample	**FF A**	**NFF A**	**Complete Sample**	**FF A**	**NFF A**
	Kaplan-Zingales Index above Median			Kaplan-Zingales Index below Median		
CAPX	0.066***	0.162***	0.050***	0.045***	0.046***	0.045***
	[5.87]	[5.22]	[4.90]	[9.41]	[3.28]	[9.04]
	Whited-Wu Index above Median			Whited-Wu Index below Median		
CAPX	0.046***	0.130***	0.030***	0.068***	0.069***	0.068***
	[7.57]	[5.42]	[5.53]	[10.57]	[4.70]	[9.61]

Panel B

	Bootstrap (1,000 Iterations) Difference Test		
	FF vs. NFF financially constrained	**FF vs. NFF not financially constrained**	**Financially constrained vs. unconstrained FF**
	Kaplan-Zingales Index		
	(2) - (3)	(5) - (6)	(2) - (5)
CAPX	0.112***	0.001	0.096**
	0.001	0.479	0.015
	Whited-Wu Index		
CAPX	0.100***	0.092***	0.061*
	0.001	0.000	0.052

Notes: The above table in Panel A presents results from estimating a system of equations described by equation (4) subject to the constraints as explained in section 2.1. The underlying sample of the analysis consists of the 2,039 observations contained within the Prime Standard between 2001 and 2015. We show coefficients for the Cash Flow coefficients of the CAPX regressions. All other regressions in the system of equations, as well as lagged dependent variables, Size and TobinsQ coefficients (included in the CAPX regression) are not tabulated for brevity. We demean all included variables in each year to control for time fixed effects. The constraints imply that all cash flow coefficients over uses and sources of funds sum up to one. As neither Firm Size, TobinsQ, nor the dependent variable lags are sources or uses in time t, their coefficients are required to sum up to zero across the equation system. The t-values (in square brackets) are robust to heteroscedasticity (Huber, 1967; White, 1980) and control for firm-level clustering (Rogers, 1993). *, **, *** indicate significance at the 0.10, 0.05, 0.01 level, respectively. The table in Panel reports difference tests for the coefficients reported in Panel A and Panel B. The p-values of the coefficients in are based on the bootstrapped standard errors using 1,000 iterations.

6. Online Appendix [Not for Publication]

Table 10: *Full Multi-Equation Analysis*

	CF_t	$TobinsQ_t$	$Size_t$	$CAPX_{t-1}$	Acquis $_{t-1}$	Disp $_{t-1}$	NEP_{t-1}	Repur $_{t-1}$	Divid $_{t-1}$	ΔLTDebt $_{t-1}$	ΔSTDebt $_{t-1}$	ΔCash $_{t-1}$
$CAPX_t$	0.052***	0.001	0.001	0.637***	-0.039***	-0.003	0.032**	-0.112***	-0.051***	0.018*	0.013	0.015
	[7.40]	[1.36]	[1.39]	[23.99]	[-2.71]	[-0.29]	[2.16]	[-3.36]	[-2.99]	[1.88]	[1.27]	[1.61]
$Acquisitions_t$	0.075***	0.001	0.001**	-0.115***	0.117***	-0.005	0.029***	0.078	-0.018	0.007	-0.001	-0.008
	[6.54]	[0.61]	[2.27]	[-5.78]	[4.26]	[-0.31]	[2.91]	[0.95]	[-0.62]	[0.46]	[-0.05]	[-0.98]
$Asset\ Sales_t$	-0.047***	-0.001**	0.001***	0.065***	0.047	0.035**	-0.029**	-0.049*	0.013	-0.004	-0.009	0.005
	[-3.64]	[-2.08]	[2.27]	[2.95]	[1.61]	[2.14]	[-2.08]	[-1.92]	[0.72]	[-0.34]	[-0.67]	[0.86]
$Equity\ Issues_t$	-0.259***	0.013***	-0.001	0.122***	-0.028	0.064*	0.070**	0.054	-0.035	0.031	-0.029	-0.034*
	[-7.70]	[5.50]	[-1.45]	[3.88]	[-1.15]	[1.89]	[2.28]	[0.73]	[-0.79]	[1.51]	[-1.22]	[-1.72]
$Repurchases_t$	0.011***	0.001**	0.000	-0.009	0.003	0.033**	-0.005**	0.289***	-0.005	-0.009*	0.006*	0.006***
	[3.96]	[2.51]	[-0.56]	[-1.30]	[0.33]	[2.21]	[-2.12]	[6.22]	[-0.48]	[-1.87]	[1.72]	[2.58]
$Dividends_t$	0.051***	0.007***	-0.001**	-0.021	-0.002	0.023	-0.042***	0.019	0.453***	-0.016**	-0.01	0.041***
	[4.82]	[5.19]	[-2.42]	[-1.50]	[-0.20]	[0.75]	[-4.59]	[0.35]	[9.27]	[-2.40]	[-1.32]	[3.58]
$\Delta LT\ Debt_t$	-0.256***	0.002	0.002***	0.238***	0.066*	-0.094***	-0.106***	0.229*	0.234***	-0.105***	0.064**	0.080***
	[-10.02]	[0.93]	[3.64]	[6.32]	[1.75]	[-3.06]	[-4.64]	[1.92]	[5.24]	[-3.97]	[1.98]	[4.88]
$\Delta ST\ Debt_t$	-0.003	0.002	0.002***	0.031	-0.03	-0.03	-0.031	-0.099	0.037	0.097***	-0.145***	0.009
	[-0.17]	[1.59]	[3.39]	[0.85]	[-1.02]	[-0.66]	[-1.58]	[-1.19]	[1.15]	[4.66]	[-4.26]	[0.68]
$\Delta Cash_t$	0.246***	0.005*	0.004***	-0.034	-0.022	-0.074	-0.109**	-0.139	-0.130*	0.018	-0.127***	0.006
	[5.57]	[1.96]	[5.21]	[-0.77]	[-0.49]	[-1.56]	[-2.44]	[-1.09]	[-1.81]	[0.61]	[-3.51]	[0.16]
N	2261											

Notes: The above table in Panel A presents results from estimating a system of equations described by equation (4) subject to the constraints as explained in section 2.1. The underlying sample of the analysis consists of the 2,039 observations contained within the Prime Standard between 2001 and 2015. We show coefficients for Cash Flow, TobinsQ and Size variables. Additionally, all lagged dependent variables included in each of the nine regression are tabulated. We demean all included variables in each year to control for time fixed effects. The constraints imply that all cash flow coefficients over uses and sources of funds sum up to one. As neither Firm Size, TobinsQ, nor the dependent variable lags are sources or uses in time t, their coefficients are required to sum up to zero across the equation system. The t-values (in square brackets) are robust to heteroscedasticity (Huber, 1967; White, 1980) and control for firm-level clustering (Rogers, 1993).*, **, *** indicate significance at the 0.10, 0.05, 0.01 level, respectively.