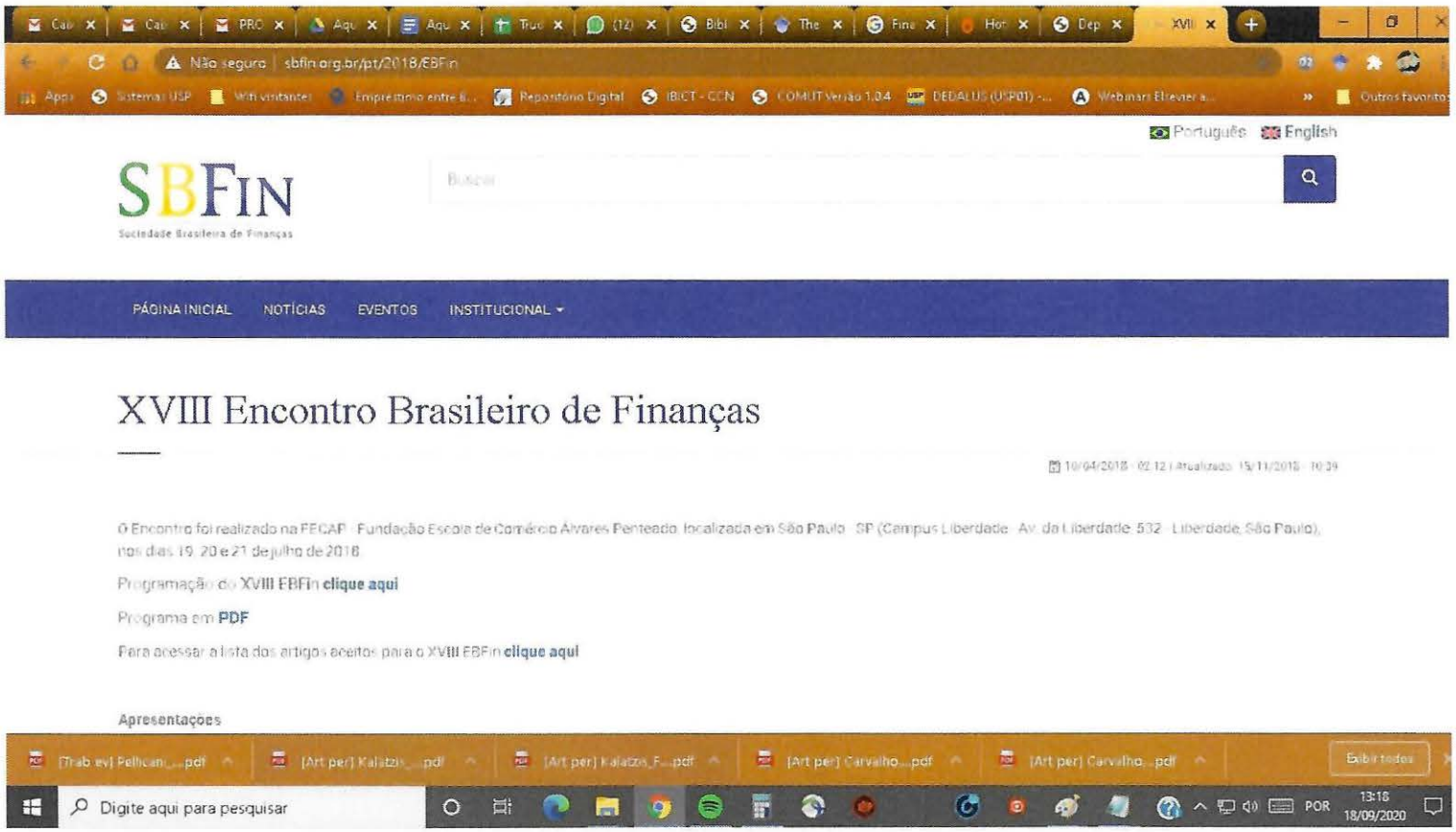

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Family control, pyramidal ownership and financial constraint on investment decisions: Evidence from an Emerging Economy

ABSTRACT

We investigate the effect of pyramidal ownership, family control and the active involvement of the controlling family as a member of the board or as CEO in investment-cash flow sensitivity of Brazilian firms. We use KZ index and WW index to a priori classify firms as financially constrained and unconstrained. Family control does not directly influence the investment-cash flow sensitivity for constrained firms. The active involvement of the controlling family in the board increases investment-cash flow of unconstrained firms, aggravating agency problems. Our results are consistent with the hypothesis of internal capital market for pyramidal, financially constrained firms. However, the results suggest that pyramidal ownership also decreases investment-cash flow sensitivity for financially unconstrained firms.

Keywords: pyramid; family control; CEO; Board; investment-cash flow sensitivity; financial constraint.

Introduction

Almost 30 years after the publication Fazzari, Hubbard and Petersen (1988)'s seminal paper, the interpretation of the investment-cash flow sensitivity still remains under debate. Although several studies take it as an indication of financial constraint, others argue that it may reflect expectations of high future returns (Cleary, 1999; Kaplan & Zingales, 1997) or agency problems of free cash flow (Stulz, 1990).

Notwithstanding some evidence about the impact of ownership structures on investment (Degryse & De Jong, 2006; Goergen & Renneboog, 2001; Hadlock, 1998; Pawlina & Renneboog, 2005), the effect of largest ultimate shareholders' characteristics in investment-cash flow sensitivity, notably in emerging market economies, is underexplored in the literature. In a quest for reducing this gap, this paper relies on data from Brazilian firms to investigate investment decisions, focusing on the interactions with financial constraint and governance features.

An important motivation for investigating the relationship between corporate governance and firms' financial constraints is because Brazilian market represents a peculiar and rich scenario as an emerging economy, thus contributing to existing literature. First, most of firms face very high external finance costs when compared with their counterparts in other emerging market countries (de Almeida & Eid Jr, 2014). Very high real interest rates are primarily explained by recurrent fiscal imbalances. The Brazilian Development Bank (BNDES), a state-owned development bank, has historically been the main supplier of long-term funds, with privately owned financial intermediaries being loath to provide long-term credit. As BNDES subsidized loans are mostly destined to large firms, the great majority of Brazilian firms have to rely on their own resources to fund investment, complementing the residual financing requirements with expensive short-term.

Second, families control about half of the Brazilian publicly traded firms. The literature evidences that family control may reduce asymmetric information between shareholders and managers, but it may also increase agency problems between controlling and minority shareholders (La Porta et al., 1999; Stulz, 1990). Given notably the existence of minority shareholders' weak legal protection in Brazil and the concentrated ownership are likely to produce entrenchment effects that can prevail over incentive effects (Black, de Carvalho, & Gorga, 2012; Claessens & Yurtoglu, 2013; Dyck & Zingales, 2004; Klapper & Love, 2004).

Third, pyramidal business groups and the issuance of non-voting shares are widespread, implying deviation from the one share-one vote rule. Claessens et al. (2002) and La Porta et al. (1999) argue that the divergence between the ultimate owner's voting rights and cash flow rights increases the risk of minority shareholders' expropriation. The effects of pyramidal structure on investment spending are controversial. On the one hand, Almeida et al. (2011) find evidence that it functions as an "internal capital market," being an efficient response to financial market failures. On the other hand, pyramidal schemes may aggravate asymmetric information and agency problems between large and minority shareholders, facilitating tunneling and self-dealing.

Our contribution to the existing literature in investigating the impact of ownership structure and financial constraint on investment decisions for an emerging country (Brazil) provide relevant implications. First, we examine whether measures of financial constraint (KZ index and WW index) may yield different results about the investment-cash flow sensitivity for a panel of Brazilian firms. Second, we investigate whether family control directly affects investment-cash flow sensitivity of financially constrained and unconstrained firms. Third, we also check the influence of the ultimate owner' characteristics (the wedge between voting rights and cash flow rights and whether he is also a member of the board or the CEO) on firm's investment decisions. And fourth, given pyramidal business groups' potential for both agency

problems and internal capital market, we verify the effect of this structure in the investment-cash flow sensitivity taking into account the presence of financial constraint.

Another relevant aspect of this study is the construction of the largest ultimate shareholders' dataset for 399 Brazilian publicly traded firms over the period 1997-2007. Ownership and governance data were manually collected from the website of Brazil's Securities and Exchange Commission (CVM). For an accurate calculation of voting rights and cash flow rights, we identify all ownership chains linking every sample firm to its largest shareholders. Other studies use data from Economatica, a private financial data provider, which does not provide a real picture of the Brazilian firms' intricate ownership structures. As far as we know, no previous paper has investigated the impact of governance practices, family control, pyramidal ownership, and financial constraint on Brazilian firms' investment decisions.

The remainder of the paper is organized as follows. Section 2 briefly reviews the literature. Section 3 describes the data, defines the variables and presents the summary statistics. Section 4 introduces the empirical models of investment and the methodology. Section 5 discusses the results and section 6 concludes.

Literature Review

Investment-cash flow sensitivity and financial constraint

Fazzari et al. (FHP) (1988) associate investment-cash flow sensitivity to the existence of financial constraint since the low-dividend group of a sample of US manufacturing firms showed to be more dependent of internal resources to fund capital expenditure. Investigating the same sample, Kaplan and Zingales (KZ) (1997) reclassified FHP's (1988) low-dividend firms according to operating performance. The results showed that 85% of them had increased the investment rates by relying on cash and credit lines, suggesting that higher investment-cash flow sensitivity might be indicating higher future earnings rather than financial constraint.

Cleary (1999) corroborates KZ (1997) while Gomes (2001) points to the lack of theoretical foundations for a positive linkage between investment and cash flow.

Using different firm-level proxies for asymmetric information (such as size, age, ownership structure, capital intensity, commercial papers, and bond ratings), several studies have confirmed that investment is related to cash flow (Bond & Meghir, 1994; Carpenter & Guariglia, 2003; Gilchrist & Himmelberg, 1995; Hoshi, Kashyap, & Scharfstein, 1991; Kadapakkam, Kumar, & Riddick, 1998; Kalatzis & Azzoni, 2009; Schaller, 1993; Terra, 2003).

The controversy around the investment-cash flow sensitivity has motivated some studies to focus on the definition of financial constraint as well as on sample characteristics. Cleary Povel, and Raith (2007) argue that while KZ (1997) and Cleary (1999) split their sample according to the availability of liquidity, FHP (1988) use a sample of financially wealthy firms and a measure of market imperfection as proxy for financial constraint. Cleary, Povel, and Raith (2007) also document a positive relationship between investment-cash flow sensitivity and the level of asymmetric information. However, when they use the level of internal funds as a proxy for financial constraint, they identify a U-shaped relationship between firm's investment and cash flow. Guariglia (2008) find similar results for a sample of UK firms by using size and age as proxies for asymmetric information and coverage ratio and cash flow to measure internal funds.

Investment sensitivity to cash flow is also observed in firms classified as financially unconstrained. For instance, Kadapakkam et al. (1998) find evidence that large corporations' investment in six OECD countries is more sensitive to cash flow. As large firms are less vulnerable to asymmetric informational problems (they usually have good reputation and more collateral), the higher sensitivity is associated with agency conflicts: large corporations are generally widely-held and therefore their management are less subject to monitoring, leaving large scope for spending free cash flows in value-decreasing investments. As Jensen (1986)

emphasizes, the availability of free cash flows may prompt management to overinvest in projects from which they extract high private benefits (the "empire building" strategy). Degryse and De Jong (2006) and Pindado and De La Torre (2009) follow Jensen (1986) to interpret the positive relationship between investment and cash flow in firms with low growth opportunities.

Due to ambiguous interpretation around investment-cash flow sensitivity, some papers have suggested the use of financial constraint index to capture firms' liquidity constraint. As proposed by KZ (1997), a measure of financial constraint have to consider internal funds level, besides of taking into account qualitative information to identify the presence of financial constraint. Using subjective and objective criteria to rank the low-dividend firms of FHP (1988)'s sample, KZ (1997) estimate an ordered logit model as a function of five variables: cash flow, dividend payout, cash balances, leverage and Tobin's *q*. The estimated coefficients of this regression allow Lamont, Polk, and Saá-Requejo (2001) to construct a "synthetic financial constraint index", named as KZ index. As argued by Baker, Stein, and Wurgler (2003), although KZ index may not be a precise measure of financial constraint and even the coefficients have not the exact weight for other samples, the variables used on its construction and their signs are closely related to financial constraint.

Another financial constraint index, proposed by Whited and Wu (2006), exploits an Euler investment equation approach to create the WW index. The level of financial constraint is measured as function of six factors: cash flow, dividend dummy, firms' size, industry sales growth, sales growth, and leverage. As firms' size is closely related to financial constraint, Hadlock and Pierce (2010) suggest that WW index may better capture liquidity constraint than KZ index.

Following prior studies, we combine these two financial constraint indexes and investment-cash flow sensitivity to analyze how internal funds are related to investment decision when investment models are controlled by some features of ownership structure.

The family control effect

A growing literature has focused on the impact of governance and ownership structures on investment decisions since, as discussed earlier, overinvestment may stem from agency costs of free cash flow while underinvestment is probably due to asymmetric information. Kuo and Hung (2012) provide evidence that the investment-cash flow sensitivity for family firms is higher than for non-family firms and the difference tends to decline when family firms present higher growth opportunities. These results support the view that high-growth family firms are less prone to asymmetric information problems and financial constraints. They argue that outside investors perceive the controlling families as both having superior knowledge about their firms' businesses and being committed to the firms' permanence in the market. Kuo and Hung (2012) find that investment in low-growth family firms is more sensitive to cash flow in those whose ultimate owners have control rights far exceeding their cash-flow rights. They show in addition that independent directors seem to mitigate the adverse effect from family control, increasing firms' value by allaying overinvestment and underinvestment problems. Pindado et al. (2011) and Andres (2011) reach a similar conclusion that family firms have lower investment-cash flow sensitivity, and that this potential benefit disappears when voting rights exceed cash flow rights.

In institutional environments where ownership is concentrated and minority shareholders are poorly legally protected, as in Brazil, controlling families may expand the potential for expropriating outside investors. In this context, as the controlling family dominates management and the board of directors, the family can ensure that firm's decisions are aligned with its own interests and strategies (La Porta *et* al, 1999). This would imply higher costs to raise external finance, harming therefore investment. However, controlling families can contribute to reduce asymmetric information problems because they may have long-standing expertise in the firm's business as well as strong commitment with its financial stability and

permanence in the market (Pindado et al., 2011; Andres, 2011; Kuo & Hung, 2012). Also, controlling shareholders may alleviate the agency conflict between outsiders and management because their monitoring incentives seem to be sharper (La Porta et al., 1999). Therein, several studies indicate that the results are still quite ambiguous about the essential issue of family control and their impact on investment decision.

Taking into account that almost half of public Brazilian firms are controlled by families, we also consider that the effect of family control on investment decisions is determined by features, such as being a member of the board or CEO, and firm's financial situation. Outsider shareholders tend to be more concerned with the power of the largest ultimate shareholder: enjoying of one or both positions, he may affect firms' investment decisions either by preventing agency problems or by abusing their disproportionate power to expropriating outside shareholders. In this sense, Anderson and Reeb (2003) argue that family firms should have more independent directors to deal with agency problems of free cash flow, mitigating bad investment decisions in unprofitable projects. In this way, we expect that if the ultimate owner is a member of the board or CEO, investment-cash flow sensitivity of financially constrained firms controlled by families can be lower than those non-family controlled due to mitigation of asymmetric information. On the other hand, if the ultimate owner is a member of the board or CEO, investment-cash flow sensitivity of financially unconstrained firms controlled by families can be higher than those non-family controlled due to agency problems.

The pyramidal effect

Bianco and Casavola (1999) present evidence that pyramidal firms, notably those with low availability of internal funds and tight financial constraints, tend to invest more because they may benefit from an "internal capital market" among firms that belong business group. In the same vein, Almeida and Wolfenzon (2006) formulate a theoretical model wherein pyramidal ownership represents an efficient response to financial market failures, allowing controlling

families to finance new enterprises with cash flows diverted from listed firms already belonging to the business group. With data for Korean firms, Almeida et al. (2011) provide empirical support to Almeida and Wolfenson's theory of the financial advantage of pyramids. They show that the new firms incorporated into the Korean business groups ("chaebols") through pyramidal ownership schemes are "selected." In other words, the incoming firms tend to show low past profitability and/or low asset pledgeability, resulting on a more likelihood to be placed lower down on the pyramidal structure. Focusing on Indian firms, Lensink, Molen and Gangopadhyay (2003) find that pyramidal firms are less dependent of cash flows to finance investment than stand-alone firms, suggesting that the former faces less financial constraint. Conversely, George, Kabir and Qian (2011) do not identify significant differences in investment-cash flow sensitivity between Indian pyramidal and stand-alone firms.

The literature shows that pyramidal business groups can mitigate financial constraints on profitable investment projects (the internal capital market hypothesis), being an efficient response to financial market failures. Nonetheless, pyramidal schemes may also worsen asymmetric information and agency problems between large and minority shareholders by facilitating tunneling and self-dealing. Therefore, the impact of pyramidal groups in investment decisions cannot be predicted *a priori*. However, we can expect different effects according to the presence of financial constraints. First, investment-cash flow sensitivity could be lower when they are owned through pyramidal schemes because they benefit from the transfer of funds among their affiliated firms. Second, for financially unconstrained firms, investment-cash flow sensitivity could be higher when they are owned through pyramidal schemes because tunneling propitiates to expropriate free cash flow.

Data and Model

We use several sources to construct our dataset. Concerning ownership, we collected data manually for every company and year over the period from 1997 to 2007 from *Informações Anuais* (IAN, *Annual Informative Report*), a report which publicly traded companies had to file with Comissão de Valores Imobiliários (CVM), Brazil's capital market regulator. IAN provides data such as types and numbers of shares held by firms' largest shareholders, composition of the management team and the board of directors, and whether the firm belongs to business groups.

To identify the sample firm's largest ultimate shareholder, we first look to the firm's largest direct shareholders. If they also are firms, we examine their direct shareholders. If direct shareholders in this second ownership layer also are firms, we proceed to identify their respective direct shareholders and so successively up to reach the ultimate shareholder along every ownership chain. We reconstitute in an organogram the ownership structure for every sample company-year, showing the main shareholders' voting rights and cash flow rights for all intermediate firms throughout the ownership chains. The company's largest ultimate shareholder is the shareholder who holds the largest amount of direct and indirect voting rights.

The cash flow rights represent the shareholder's stake in the company's total capital (the sum of ordinary and preferred shares). When ownership is indirect, that is, when the largest shareholder owns a stake in the company through at least one intermediate company, the cash flow rights are measured as the product of total capital held in each intermediate firm along the ownership chain. If there are multiple ownership chains, the cash flow rights are the sum of all cash flow rights calculated on each ownership chain.

The voting rights represent the shareholder's stake in the company's voting capital (ordinary shares). The controlling shareholder is the shareholder who owns, directly or indirectly, more than 50% of the company's voting rights. When ownership is indirect, the amount of the largest ultimate shareholder's voting rights depends on whether there is a controlling shareholder. If

so, the voting rights are the voting shares in the first layer of the ownership chain; when there is not, the voting rights are calculated in the same way as cash flow rights.

Besides ownership data, we use financial and accounting data, which are provided by Economatica. Data about firm's listing segments are drawn from the website of the Brazilian Stock Exchange (BM&FBovespa). We exclude financial firms and firms for which financial or ownership data are inconsistent or missing. The resulting sample is an unbalanced panel of 399 public companies over the period 1997-2007 (2,329 firm-year observations).

Financial Constraint Indexes

As comment before, we rely on two indexes to *ex ante* distinguish firms that are likely to face financial constraint from those that are not: the KZ index and the WW index. The Kaplan-Zingales (KZ) index is calculated according to equation (1):

$$KZIndex_{it} = -\left(1.0019 \cdot \frac{Cash\ Flow_{it}}{K_{i,t-1}}\right) + \left(0.2826 \cdot Q_{it}\right) + \left(3.1391 \cdot \frac{Debt_{it}}{TotCap_{it}}\right) - \left(39.3678 \cdot \frac{Dividend_{it}}{K_{i,t-1}}\right) - \left(1.3147 \cdot \frac{Cash_{it}}{K_{i,t-1}}\right) \quad (1)$$

where K denotes capital stock, measured as the value of property plant and equipment net of depreciation; *Cash Flow* is the sum of net income, depreciation and amortization; Q is the proxy for Tobin's q, measured as the sum of the market value and total debt, divided by total assets; *Debt* represents the sum of long-term and short-term debt; *TotCap* is the sum of total debt and stockholder's equity; *Dividend* is the dividend payout, measured as the dividends paid by preferred stocks and common stock multiplied by the corresponding amount of shares; and *Cash* is the sum of cash and short-term investments.

Put forward by Whited and Wu (2006), the WW index draws on the investment Euler equation and measures the degree of financial constraint as a function of the following variables:

$$WWIndex_{it} = -\left(0.091 \cdot \frac{Cash\,Flow_{it}}{TA_{i,t-1}}\right) - (0.062 \cdot DIVPOS_{it}) + \left(0.021 \cdot \frac{Debt_{it}}{TA_{i,t-1}}\right) - 0.044 \cdot \ln(TA_{it}) + 0.102 \cdot ISG_{it} - 0.035 \cdot SG_{it} \quad (2)$$

where *TA* is total assets; *DIVPOS* is a dummy variable that takes value 1 if the firm pays dividends, and zero otherwise; *ISG* is the industry sales growth, and *SG* is the firm real sales growth.

As economic conditions can affect the magnitude of financial constraint, we compute the KZ and the WW indexes for every firm and year. Higher values for both indexes indicate higher likelihood of financial constraint. We classify as financially constrained firms those belonging to the third tercile and as financially unconstrained those included in the first tercile.

Econometric Models

We employ a dynamic and non-linear version of the accelerator model, in which the dependent variable is investment rate, measured as $(K_t - K_{t-1})/K_{t-1}$ where K is capital stock. The following investment model is applied to conduct our tests:

$$I_{it} = \beta_0 + \gamma_1 I_{i,t-1} + \gamma_2 (I_{i,t-1})^2 + \beta_1 CF_{it} + (\beta_2 + \beta_3 CF_{it}) FD_{it} + (\beta_4 + \beta_5 CF_{it} + \beta_6 (CF_{it} * FD_{it})) LUS_{it} + \varphi X_{it} + \alpha_i + \nu_t + \varepsilon_{it} \quad (3)$$

where α_i is the firm-specific effect; ν_t is the time-specific effect; and ε_{it} is the error term. The family dummy *FD* variable assumes value 1 if ultimate owner holds the control of firm and represents a family, and 0 otherwise. The relationship between cash flow, family control and his presence on the board (or as *CEO*) is represented by the interaction term *CF*FD*LUS*. When the interest lies on the effect of board (or the *CEO* effect), the *LUS* variable is equal to *Board* variable (or the *CEO* variable), which assumes value 1 if the largest ultimate shareholder is a member of the board (or is the *CEO*), respectively, and 0 otherwise.

We also include other firm-level characteristics that are usually used on investment models, represented by X_{it} in model (3). Specifically, these variables control for the effect of sales growth (*SG*), debt and firms' size on investment decisions. In this vector of variables (X_{it}), we also insert two corporate governance variables (the *CG* and *Divergence* variables). These variables take into account the effect of improvements on investor' poor legal protection and of expropriation to minority shareholders.

Basically, the *CG* variable is a proxy for good corporate governance. It is based on the three new listing segments created by the Brazilian stock exchange (Level 1, Level 2, and Novo Mercado), all of which require stricter governance standards than that legally mandatory.[1] Listing on these segments is voluntary and regulated by private contracting. We construct the *CG* variables as taking value 1 if the firm is listed in one of these three segments and 0 otherwise. The *Divergence* variable measures the excess of voting rights of the largest ultimate shareholder, measured by the difference between voting rights and cash flow rights.

To investigate the effect of pyramidal arrangements in investment-cash flow sensitivity of financially constrained and unconstrained firms, we interact the cash flow variable (*CF*) with the *PD* variable, which takes value 1 if the firm belongs to a pyramidal scheme and 0 otherwise. Our second investment model is:

$$I_{it} = \beta_0 + \gamma_1 I_{i,t-1} + \gamma_2 (I_{i,t-1})^2 + \beta_1 CF_{it} + (\beta_2 + \beta_3 CF_{it}) PD_{it} + \varphi X_{it} + \alpha_i + \nu_t + \varepsilon_{it} \quad (4)$$

We use the two-step system GMM estimator (GMM-sys) of Blundell and Bond (1998) with Windmeijer (2005) robust correction to estimate the investment models. The validity of the instruments is checked by the Arellano-Bond test, which tests the second-order serial correlation (m_2), and the Sargan test for over-identification, which verifies the null hypothesis of the validity of the instruments. Furthermore, following Pindado and de la Torre (2004), Pindado et al. (2011), and Wintoki et al. (2012), we take ownership and governance variables as endogenous and use the corresponding first lagged variable as instrument.

Empirical Results

Table 1 reports summary statistics and mean difference tests between the groups of financially constrained and unconstrained firms. For brevity, we refer to the groups of firms classified according to the KZ index (WW index) as financially constrained and unconstrained such as KZ_{FC} and KZ_{FUC} (WW_{FC} and WW_{FUC}), respectively.

[Insert Table 1 here]

Panel A of table 1 presents the summary statistics for financial variables. On average, the investment rate for KZ_{FUC} is less than half of that for WW_{FUC}. Besides, while the average investment rate is negative for KZ_{FC}, it is zero for WW_{FC}. For both indexes, average cash flows and profitability measures (*ROA*, *ROE*) are positive for financially unconstrained firms and negative for firms considered as financially constrained. Firms classified by both indexes as financially unconstrained are larger, less leveraged, and have higher sales growth than those classified as financially constrained. The greater availability of tangible assets of unconstrained firms may indicate their higher capability to provide collateral to long-term borrowing (Almeida, Campello, & Weisbach, 2004; Gilchrist & Himmelberg, 1995). It is worth noting that the average size of WW_{FUC} is twenty-one times larger than that for WW_{FC}, while this proportion for KZ_{FUC} and KZ_{FC} is just 1.67.

Summary statistics for governance and ownership variables are shown in Panel B of table 1. For all these variables, the WW index entails significant mean difference tests, indicating that it sharply discriminates the groups of financially constrained and unconstrained firms. Regardless of the index, the percentage of family firms is larger in financially constrained firms, although the difference is even higher for firms classified by the WW index: families control nearly 60% of the WW_{FC} and only 28% of the WW_{FUC}. The largest ultimate shareholder is a director or a CEO in 73% and 54% of WW_{FC}, respectively. Using any of the two indexes, the fraction of firms listed in the premium governance segments is lower for those classified as

financially constrained, suggesting that it may be costlier for them to adopt better governance practices.[2]

The effect of board and CEO in investment-cash flow sensitivity of family firms

Table 2 presents the regression results for the effect of board, CEO and family control in investment-cash flow sensitivity of financially constrained firms grouped by KZ and WW index.

[Insert Table 2 about here]

Columns (1a) and (1b) of Table 2 indicates that the relationship between cash flow (CF) and the investment rate (I) is statistically significant in all specifications, except in columns (2a) and (3b). As current profitability is negative for KZ_{FC} and WW_{FC} firms, the observed positive investment-cash flow sensitivity cannot signal future profitability and thus may reveal financial constraint.

As a great fraction of family firms may have a largest ultimate shareholder who is also the CEO or a member of the board, we first estimate separately the effect of family control, board and CEO in investment-cash flow sensitivity. Columns (2a) and (2b) of Table 2 report that the coefficients for family control effect in investment-cash flow sensitivity, *CF*FD*, are insignificant at conventional levels, implying that family control may not directly influence investment decisions of financially constrained firms.

Columns (3a) and (3b) of Table 2 show that the estimated coefficients of *CF*LUS*, in which *LUS* is equal to the Board variable, are negative in both columns but significant only for KZ_{FC} firms (column 3a: $\beta = -.14$, $p<.10$; column 3b: $\beta = -.01$, $p>.10$). This finding evidences that the presence of the largest ultimate shareholder on the board may reduce investment-cash flow sensitivity, mitigating asymmetric informational problems that could intensify firm's financial constraint situation.

We thus further differentiate the effect of board between family-controlled and non-family-controlled firms, presented as *CF*LUS*FD* in columns (4a) and (4b) of Table 2. The results show that the coefficient of *CF*LUS* loses significance after interacting this variable with family control, suggesting that family-controlled firms seem not decrease investment-cash flow sensitivity when largest ultimate shareholders are also members of the board.

Similar results are found when LUS variable represents the effect of CEO in investment-cash flow sensitivity. For columns (5a) and (5b), the coefficient of *CF*LUS*FD*, in which *LUS* is equal to CEO, is negative and significant for KZ_{FC} firms, but insignificant for WW_{FC} firms (column 5a: $\beta = -.14$, $p<.10$; column 5b: $\beta = -.10$, $p>.10$), while columns (6a) and (6b) show that the interaction term *CF*LUS*FD* is insignificant at conventional levels for both groups of firms.

The insignificance of the *CF*LUS*FD* may arise from a competing effect between family control and board/CEO of family firms in investment-cash flow sensitivity. On the one hand, the presence of controlling family in the board or as CEO is often associated as a way of minority shareholders' expropriation (La Porta et al., 1999), which could increase investment-cash flow sensitivity. On the other hand, family controlling may be closer to bondholders, reducing asymmetric information with external market and leading to lower financial costs that could intensify firm's financial constraint situation (Anderson & Reeb, 2003). Therefore, the effect of family control in investment-cash flow sensitivity of financially constrained firms becomes insignificant when the controlling family shareholder is also a member of the board or CEO. As argued by Kuo and Hung (2012), family controlled firms with high investment opportunities but subject to high levels of asymmetric information tend to mitigate investment-cash flow sensitivity because family control acts as a corporate governance mechanism to alleviate asymmetric information between firms and external market.

Another interesting result reported in Table 2 is the effect of corporate governance in investment decisions of WW_{FC} firms. From columns (2b) to (6b), the coefficients of *CG* variable are positive and significant, implying that better governance practices for firms classified as financially constrained by WW index are likely to raise the investment rate. This evidence is in line with Lins, Strickland and Zenner (2005), Billett, Garfinkel and Jiang (2011) and Francis et al (2013) which find that good practices of corporate governance helps to mitigate financial constraints.

Table 3 presents the results for firms classified as financially unconstrained by KZ and WW indexes. Columns (1a) and (1b) show that the coefficient of CF is insignificant for financially unconstrained firms when ownership structure variables are not included in investment models. However, for WW_{FUC} groups, the relationship between investment and cash flow becomes significant in columns (2b), (4b), (5b) and (6b), probably due to the effect of interactions terms with cash flow.

[Insert Table 3 about here]

Columns (2a) and (2b) of Table 3 show that *CF*FD* has a negative effect in investment decisions, however this coefficient is only significant for firms grouped by WW index (column 2a: $\beta = -.12$, $p>.10$; column 2b: $\beta = -.40$, $p<.10$). In contrast to constrained firms, the active involvement of ultimate owners in the board seems to have no direct effect in investment rate since the coefficient of *CF*LUS* is insignificant at conventional levels, as presented in columns (3a) and (3b). The effect of *CF*LUS*FD* is positive and significant for both groups of firms (column 4a: $\beta = .80$, $p<.05$; column 4b: $\beta = 1.12$, $p<.05$), signaling that family controllers increase investment-cash flow sensitivity of unconstrained firms when they are members of the board. These results suggest that ultimate owners actively involved in the board of directors of family firms increase agency problems.

Columns (5a) and (5b) of Table 3 report the effect of CEO on investment rate, showing that the coefficient of *CF*LUS* is insignificant for unconstrained firms of KZ index, but negative and significant for those of WW_{FUC} group (column 5a: $\beta = .05$, $p>.10$; column 5b: $\beta = -.58$, $p<.05$). The results remain the same after the inclusion of the interaction term with family control (*CF*LUS*FD*), as shown in columns (6a) and (6b). This suggests that ultimate owners in top management positions mitigate investment-cash flow sensitivity of unconstrained firms of WW index, however, it is not influenced by whether the controlling shareholder represents a family or not.

The effect of pyramidal ownership in investment-cash flow sensitivity

To test how pyramidal ownership is related to investment-cash flow sensitivity of constrained and unconstrained firms, we estimate the investment model described in eq. (4). The results are presented in Table 4.

[Insert Table 4 about here]

The coefficient difference of *CF* between pyramidal and non-pyramidal firms, represented as *CF*PD*, is negative and significant for constrained firms grouped by KZ index (column 1: $\beta = -.15$, $p=.067$), but it is insignificant at conventional levels for WW_{FC} firms (see column 2). The result for former group of firms supports Hypothesis 3 that pyramidal firms may benefit from an internal transfer of funds which could mitigate asymmetric informational problems. However, the same is not observed for WW_{FC} firms.

Columns (3) and (4) of Table 4 report the results for unconstrained firms and show that for both group of firms the pyramidal effect over investment-cash flow sensitivity is not significant. To better understand how pyramidal ownership is related to investment-cash flow sensitivity, we disentangle the effect of family control considering high and low levels of divergence between voting rights and cash flow rights from the effect of pyramid. We first re-

estimate the investment model by considering family-controlled and non-family controlled pyramidal firms, represented by *PD*FD* and *PD**(1-*FD*), respectively. Table 5 displays the estimated results for the additional tests.

[Insert Table 5 about here]

For financially constrained firms, we note in columns (1a) and (1b) that pyramidal-family controlled firms are not sensitive to cash flow, suggesting that these firms may not suffer with asymmetric informational problems which could intensify financial constraints. Even when we distinguish between the effects of high and low divergence between control rights and cash flow rights, the results remain insignificant at conventional levels (see columns (2a) and (2b)). This means that pyramid-family controlled firms play an important role to mitigate the dependence of internal funds to support investment decisions when they face financial constraint. Besides, the finding is not influenced by the level of divergence between the rights of controlling family shareholder.

Considering the groups of unconstrained firms, the results in columns (3a) and (3b) show that the effect of *CF*PD*FD* is negative and significant. Thus, investment-cash flow sensitivity from unconstrained firms decreases when they belong to pyramidal-family controlled arrangements. Additionally, the coefficients of *CF*PD*FD*High_Div* and *CF*PD*FD*Low_Div* are negative and significant in columns (4a) and (4b), except for the last variable in column (4a) which is insignificant. The results evidence that the significant negative effect of *CF*PD*FD* is observed in unconstrained firms with both high and low divergence.

Another interesting result of Table 5 is related to the negative and significant effect of *CF*PD*(1-FD)* in firms grouped by KZ index (both constrained and unconstrained ones). It reflects that the moderating effect of pyramidal-family controlled firms in investment decisions may be related to pyramidal arrangements rather than family control.

In sum, the results are in support of the "internal capital market" hypothesis for constrained firms, but they are not consistent with the fact of pyramidal unconstrained firms tend to increase agency problems. As proposed by Ang, Peter, Masulis, and Zein (2014), a possible explanation is that firms tend to benefit from the support of internal capital market to fund their investment decisions even when there is an exogenous shock from external market. The authors produce evidences that internal capital market works as an important alternative source of capital, expanding firms' financing strategies. The negative effect of pyramidal ownership in investment-cash flow sensitivity is also in line with Masulis, Pham and Zein (2011) which show that pyramids are a relevant country-level feature of firms in markets with limited availability of capital, such as Brazil. Therefore, even when firms do not face financial constraint they may be benefitting from this source of capital provided by pyramidal group to take advantage of good growth investment opportunities.

Robustness Check

The effect of other types of blockholders

Studies as Pindado et al (2011), Kuo and Hung (2012) have pointed out that sometimes the effect of controlling family may be reflecting the effect of other types of blockholders rather than be a specific family characteristic. Attig, Guedhami and Mishra (2008) show that multiple large shareholders may act as an internal governance proxy, mitigating agency and asymmetric information problems. Besides, as argued by Kuo and Hung (2012), family firms may have a second large shareholder that influences the family owners' decisions, and therefore, family firms with another blockholder may behave in a different way when compared with family firms without multiple large shareholders. In contrast to these arguments, La Porta et al. (1999) suggest that the decision of family-controlled firms seems not to be impacted by other types of

investors while non-family firms with concentrated ownership have their decisions monitored by other large shareholders.

Given this discussion, we evaluate two tests to investigate whether our results are affected by other types of blockholders. In our first approach we include in investment models binary variables related to different types of controlling shareholder, such as: firms controlled by shareholder's agreement; State control, and foreign control. For the second test, we follow Pindado et al (2011) and define blockholding as a non-family ultimate owner who has more than 20 percent of firm's stake. We create a miscellaneous dummy variable (*Misc*) that takes value 1 if the firm has more than one blockholder, and 0 otherwise. The *Misc* variable is interacted with cash flow and included as explanatory variable in empirical models to investigate its impact in investment-cash flow sensitivity.

The sample distribution of blockholders (not reported) shows that, for constrained firms, 46% of KZ_{FC} and 26% of WW_{FC} have another blockholder. The percentage of unconstrained firms grouped by KZ index is quite similar to constrained firms in this same index (48%), however, for WW index, more than 62% of unconstrained firms have at least one second large shareholder. The estimated results of the two approaches show that both miscellaneous variable and other types of controlling shareholder do not affect the results obtained for family control and the active involvement of this shareholder in the board or as CEO, and pyramidal (pyramidal-family) ownership[3]. In line with La Porta et al (1999), this implies that the decisions of family firms are not influenced by another blockholder and the interest variables effects on the investment models are driven by the influence of family ownership rather than other general controlling shareholder.

The impact of financial constraint indexes in the estimated results

The results showed in earlier section provide evidence that the significance of the relationships among family control, pyramidal ownership, and investment decisions may differ according to the financial constraint index employed. For instance, the interest variables in estimated models for WW_{FC} firms are predominantly insignificant while in some situations they are significant for KZ_{FC}.

Conflicts in the results are likely to derive from the weight that the WW index places on firms' size. Hadlock and Pierce (2010) prefer the WW index to the KZ index because size is a strong sign of financial constraint.[4] Firms' size, measured here by total assets, is significantly correlated with financial and governance variables, which directly influence the likelihood of financial constraint. Actually, total assets are strongly correlated with the WW index (ρ=0.84, significant at 0.1%), indicating that this index may be operating as a proxy for firm's size.[5]

Indeed, as observed before in Table 1, using the WW index, unconstrained firms (WW_{FUC}) are, on average, more than twenty-one times larger than the constrained firms (WW_{FC}). Taking into account both indexes, the firm's size of KZ_{FC} firms is around seven times greater than those of WW_{FC} firms. Likewise, the financially unconstrained WW firms are nearly twice as large as unconstrained ones by the KZ index. No wonder that the estimation results are different.[6] We can thus infer that the impact of some ownership structures and governance mechanisms on investment decisions in Brazilian public companies may vary according to the degree of financial constraint and hence with the firm's size.

To investigate whether firms' size classification shows similar results in comparison to the WW groups, we re-estimate the main regressions from Tables 2-5 classifying firms according to their size. Firms in the first tercile of total assets represent small firms, and those in the third tercile are called as large firms. The estimations (in supporting information) show that the coefficients of *CF*FD*LUS* are insignificant for small firms when LUS represents both the presence of ultimate owners in the board, and CEO. For large firms, the estimated results of

eq(3) show that the coefficient of this variable is positive and significant when *LUS* is equal board variable (β = .70, p<.10), and the effect of *CF*FD* is also negative and significant (β = -.58, p<.10).

The estimated results of eq(4) show that the effect of pyramid in investment-cash flow sensitivity (*CF*PD*) of small firms is also insignificant at conventional levels. This insignificant effect does not change when we disentangle the effect of pyramid between family and non-family controlled firms and according to the level of divergence between control rights and cash flow rights. However, for large firms, we observe that the coefficient of *CF*PD*FD* is negative and significant (β = -.64, p<.05), and remains significant when the effect of *FD* is differentiated between high (β = -.56, p<.05) and low divergence (β = -.88, p<.05). Therefore, we can conclude that the results obtained for financially constrained and unconstrained firms grouped by WW index are potentially driven by the firms' size.

Conclusions

This paper focuses on the effects of family control and pyramidal ownership in investment decisions for both financially constrained and unconstrained firms by using data from Brazilian public companies over the period 1997-2007. Two financial constraint indexes are employed to classify firms *a priori*: the KZ index and the WW index. Regarding ownership features, the last index seems to provide a more clear-cut discrimination between those two groups of firms, probably because of the high correlation of WW index with the firm's size.

Among financially constrained firms, there is little difference between how investment decisions are sensitivity to internal resources of family and non-family controlled firms. This is also observed when we examine the active involvement of the controlling family in the board of directors or as CEO in investment-cash flow sensitivity. However, for unconstrained firms, we find that family control increases investment-cash flow sensitivity when the controlling

family is a member of the board. We interpret this finding as evidence that family firms may expropriate the wealth of minority shareholders of financially unconstrained firms.

Taking into account indirect ownership, we observe that the investments of pyramidal firms of both constrained and unconstrained firms are not sensitive to cash flow. We interpret this result as a consequence of the barriers around long-term fund in Brazil, which propitiates an internal capital markets among firms of pyramidal arrangements.

Besides, results turn out to be sensitive to the choice of the financial constraint index. Reclassifying the sample by the median and quartiles values of the indexes does not alter the sensitivity to that index, possibly because firm's size is a component of the WW index but not of the KZ index (Hadlock & Pierce, 2010). As robustness, we re-estimate our investment models classifying firms according their size, and we find similar results for large (small) firms and unconstrained (constrained) firms of WW index. This finding indicates that our results of WW index are potentially driven by firms' size rather than other features of financial constraint.

This study shed further light on the role of the relationships among family, pyramidal ownership, financial constraint, and investment decisions for Brazilian firms. One possible limitation of the paper is the size of its sample, as we run separate regressions for the subsamples of financially constrained and unconstrained firms. However, as pointed out by Hayakawa (2007) and Soto (2009), the system-GMM estimator in small samples may yields less biased and more efficient estimates vis-à-vis other panel data estimators.

Notes

[1] Level 1 required better disclosure, information about insiders' ownership and share trading, approval of related party contracts on the shareholders meeting, a tender offer in case of delisting, and free float of at least 25% of the outstanding shares. Companies on Level 2 had to comply with the following additional commitments: voting rights to preferred shareholders in events such as spin-offs and mergers, equal treatment to minority common shareholders in case of control transfers, disclosure of financial statements and balance sheets in accordance with the U.S. GAAP or the IFRS, arbitration by independent referees in disputes with shareholders, and independent directors composing at least 20% of the board. Firms listed on the Novo Mercado, the premium corporate governance segment, had to comply with Level 2 requirements and the rule of "one share-one vote."

[2] Considering the whole sample, almost 43% are family firms, 5% are state-controlled firms, 62% are owned through pyramidal schemes, 54% and 38% have a largest ultimate shareholder who is a director and the CEO, respectively, and less than 9% are listed on the premium governance segments.

[3] We are providing these estimations as support information.

[4] Devereux and Schiantarelli (1990), Gilchrist and Himmelberg (1995), and Almeida and Campello (2004) use firm's size to distinguish financially constrained (small) from unconstrained (large) firms. For Schiantarelli (1996), "*size is highly correlated with the fundamental factors that determine the probability of being constrained*," arguing that small firms usually are young and have short collateral and track records, being therefore at disadvantage to get access to external finance.

[5] The correlation between KZ index and firms' size is negatively significant at 1% (ρ=-0.20).

[6] Sorting the four groups according to their total asset average, $WW_{FUC} > KZ_{FUC} > KZ_{FC} > WW_{FC}$.

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TABLE 1
Summary Statistics

Panel A: Financial variables

Variables	KZ_{FUC}		KZ_{FC}		Difference	WW_{FUC}		WW_{FC}		Difference
	Mean	S.D	Mean	S.D	KZ	Mean	S.D	Mean	S.D	test for WW
	(1)		(2)		(1)-(2)	(3)		(4)		(3)-(4)
I	0.02	0.22	-0.03	0.27	0.04***	0.04	0.25	0.00	0.29	0.04***
CF	0.35	0.33	-0.05	0.36	0.40***	0.26	0.24	0.00	0.42	0.26***
SG	0.13	0.38	0.08	0.39	0.04*	0.18	0.51	0.04	0.31	0.15***
Debt	1.78	1.90	2.36	2.15	0.58***	1.63	1.66	2.45	2.35	0.82***
TA	4.51	6.98	2.70	4.80	1.80***	8.14	8.30	0.37	0.65	7.77***
ROA	0.06	0.07	-0.08	0.18	0.13***	0.05	0.06	-0.07	0.18	0.12***
ROE	0.11	0.30	-0.07	0.65	0.18***	0.11	0.27	-0.05	0.63	0.16***
No. obs.	561.00		562.00			699.00		699.00		

Panel B: Corporate governance and ownership variables

Variables	KZ_{FUC}		KZ_{FC}		Difference	WW_{FUC}		WW_{FC}		Difference
	Mean	S.D	Mean	S.D	test for KZ	Mean	S.D	Mean	S.D	test for WW
	(1)		(2)		(1)-(2)	(3)		(4)		(3)-(4)
Divergence	0.23	0.21	0.27	0.23	0.04***	0.23	0.23	0.25	0.21	0.02**
FD	0.37	0.48	0.44	0.50	0.07**	0.28	0.45	0.60	0.49	0.32***
Board	0.50	0.50	0.54	0.50	0.04	0.38	0.49	0.73	0.44	0.35***
CEO	0.34	0.48	0.35	0.48	0.00	0.21	0.41	0.54	0.50	0.33***
CG	0.10	0.31	0.06	0.24	0.04***	0.17	0.38	0.03	0.16	0.15***
No. obs.	561.00		562.00			699.00		699.00		

This table display summary statistics for variables and the difference means tests between financially constrained and unconstrained firms. *I* denotes investment rate; *CF* is cash flow normalized by lagged capital stock (*K*); *SG* is sales growth; *Debt* is total debt normalized by lagged capital stock; *TA* is total assets; ROA is return on assets and ROE is return on stockholder's equity; *FD* is the family control dummy variable that takes value 1 if the ultimate owner is a controlling family, and 0 otherwise; *PD* is a dummy variable for firms belonging to pyramidal business groups; *Board* is a dummy variable for the largest ultimate shareholder (LUS) who is a director; *CEO* is a dummy variable for LUS who is the CEO; *CG* is a dummy variable for firms listed on premium corporate governance listing segments; *Divergence* is the difference between voting rights and cash flow rights. ***, **, *, refer to significance levels at 1%, 5% and 10%, respectively.

TABLE 2
The impact of family control in investment-cash flow sensitivity of Constrained firms

	KZ_{FC}						WW_{FC}					
			LUS=Board		LUS=CEO				LUS=Board		LUS=CEO	
Dep. Var: I_{it}	(1a)	(2a)	(3a)	(4a)	(5a)	(6a)	(1b)	(2b)	(3b)	(4b)	(5b)	(6b)
CF	0.11**	0.14	0.19***	0.19**	0.18**	0.20***	0.11*	0.18**	0.12	0.15**	0.18**	0.19**
	(0.05)	(0.09)	(0.07)	(0.08)	(0.08)	(0.07)	(0.06)	(0.07)	(0.09)	(0.07)	(0.08)	(0.08)
FD		0.09		0.15		0.14*		0.08		-0.10		0.05
		(0.06)		(0.11)		(0.09)		(0.09)		(0.22)		(0.14)
CF*FD		-0.06		-0.01		-0.09		-0.12		-0.06		-0.04
		(0.09)		(0.40)		(0.22)		(0.11)		(0.22)		(0.11)
LUS			-0.06	-0.06	-0.06	-0.10			-0.06	-0.17	-0.10	-0.15
			(0.07)	(0.06)	(0.10)	(0.10)			(0.08)	(0.11)	(0.18)	(0.15)
CF*LUS			-0.14*	-0.24	-0.14*	-0.26			-0.01	0.15	-0.10	0.11
			(0.08)	(0.16)	(0.08)	(0.26)			(0.09)	(0.17)	(0.12)	(0.24)
LUS*FD				-0.04		0.02				0.24		0.05
				(0.13)		(0.12)				(0.23)		(0.13)
CF*LUS*FD				0.14		0.22				-0.14		-0.18
				(0.35)		(0.36)				(0.29)		(0.28)
CG		0.06	0.00	-0.01	-0.02	0.01		0.51**	0.57**	0.51**	0.63*	0.52*
		(0.08)	(0.10)	(0.10)	(0.11)	(0.07)		(0.23)	(0.24)	(0.21)	(0.37)	(0.30)
Divergence		-0.21	-0.16	-0.23*	-0.11	-0.27*		-0.29	-0.23	-0.36**	-0.13	-0.31
		(0.13)	(0.14)	(0.13)	(0.16)	(0.14)		(0.29)	(0.16)	(0.16)	(0.42)	(0.42)
$I_{i,t-1}$	-0.10	-0.12	-0.13	-0.14	-0.13	-0.14	-0.06	-0.08	-0.06	-0.06	-0.03	-0.02
	(0.10)	(0.08)	(0.11)	(0.11)	(0.11)	(0.09)	(0.14)	(0.13)	(0.15)	(0.15)	(0.22)	(0.20)
$(I_{i,t-1})^2$	0.11	0.12*	0.13	0.14	0.12	0.14*	0.08	0.07	0.05	0.04	0.02	-0.01
	(0.08)	(0.06)	(0.09)	(0.11)	(0.10)	(0.08)	(0.11)	(0.09)	(0.11)	(0.12)	(0.18)	(0.17)
SG	-0.02	0.01	-0.01	0.00	0.02	0.01	-0.07	-0.10	-0.09	-0.11	-0.08	-0.08
	(0.05)	(0.06)	(0.05)	(0.05)	(0.06)	(0.05)	(0.04)	(0.08)	(0.08)	(0.09)	(0.08)	(0.08)
Debt	0.13***	0.12***	0.13***	0.12***	0.12***	0.12***	0.16***	0.12***	0.11***	0.10***	0.12***	0.08***
	(0.04)	(0.03)	(0.03)	(0.03)	(0.05)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.03)	(0.02)
Size	-0.05	0.02	0.02	0.03+	0.01	0.03+	0.03	0.06	0.04	0.03	0.00	0.03
	(0.05)	(0.02)	(0.02)	(0.02)	(0.03)	(0.02)	(0.05)	(0.04)	(0.04)	(0.04)	(0.05)	(0.05)
Constant	0.21	-0.70**	-0.53	-0.71***	-0.40	-0.75***	-0.89	-1.18**	-0.84	-0.59	-0.35	-0.59
	(0.64)	(0.29)	(0.34)	(0.24)	(0.36)	(0.25)	(0.61)	(0.53)	(0.55)	(0.51)	(0.64)	(0.54)
m_2	0.39	0.57	0.46	0.38	0.54	0.72	0.76	0.79	0.81	0.70	0.92	0.87
Sargan	0.94	0.65	0.81	0.81	0.83	0.56	0.56	0.12	0.33	0.29	0.29	0.27

This table reports the estimation results of eq(3) for constrained firms. Robust standard errors are shown in parentheses. See Table 1 for the definitions of the variables. m_2 denotes de p-value of serial correlation test of order 2. *Sargan* denotes the p-value of the test of over-identifying restriction. ***, **, * refer to significance levels at 1%, 5% and 10%, respectively.

TABLE 3
The impact of family control in investment-cash flow sensitivity of Unconstrained firms

	KZ_{FUC}						WW_{FUC}					
			LUS=Board		LUS=CEO				LUS=Board		LUS=CEO	
Dep. Var: I_{it}	(1a)	(2a)	(3a)	(4a)	(5a)	(6a)	(1b)	(2b)	(3b)	(4b)	(5b)	(6b)
CF	0.11	0.17	0.10	0.09	0.11	0.10	0.16	0.27*	0.27	0.31*	0.28**	0.33*
	(0.07)	(0.12)	(0.13)	(0.14)	(0.07)	(0.12)	(0.13)	(0.15)	(0.19)	(0.17)	(0.13)	(0.17)
FD		0.02		0.23		0.02		0.21*		0.33		0.12
		(0.08)		(0.24)		(0.10)		(0.12)		(0.22)		(0.10)
CF*FD		-0.12		-0.84**		-0.08		-0.40*		-0.83*		-0.29
		(0.18)		(0.40)		(0.20)		(0.23)		(0.45)		(0.32)
LUS			-0.06	-0.08	-0.05	-0.04			0.19	0.20*	0.26	0.16
			(0.08)	(0.17)	(0.05)	(0.11)			(0.14)	(0.12)	(0.19)	(0.10)
CF*LUS			0.01	0.04	0.05	-0.13			-0.42	-0.58**	-0.68**	-0.68*
			(0.13)	(0.24)	(0.12)	(0.23)			(0.28)	(0.26)	(0.32)	(0.40)
LUS*FD				-0.19		-0.10				-0.40		0.07
				(0.27)		(0.11)				(0.26)		(0.21)
CF*LUS*FD				0.80**		0.29				1.12**		0.34
				(0.37)		(0.36)				(0.53)		(0.53)
CG		0.01	0.03	0.06	0.02	0.04		0.11	0.07	0.09	0.05	0.07
		(0.04)	(0.05)	(0.05)	(0.05)	(0.04)		(0.07)	(0.07)	(0.07)	(0.09)	(0.08)
Divergence		0.21	0.26	0.15	0.20	0.16		-0.10	0.07	0.03	-0.06	-0.05
		(0.15)	(0.16)	(0.20)	(0.17)	(0.13)		(0.13)	(0.13)	(0.13)	(0.16)	(0.13)
$I_{i,t-1}$	0.12	-0.03	-0.01	-0.03	0.04	0.04	0.04	-0.03	-0.05	-0.11	-0.09	-0.06
	(0.10)	(0.11)	(0.11)	(0.12)	(0.10)	(0.10)	(0.13)	(0.11)	(0.13)	(0.14)	(0.15)	(0.11)
$(I_{i,t-1})^2$	-0.23*	-0.05	-0.12	-0.07	-0.20*	-0.16*	0.01	-0.02	0.02	0.04	0.08	0.00
	(0.13)	(0.15)	(0.12)	(0.13)	(0.11)	(0.10)	(0.14)	(0.12)	(0.14)	(0.12)	(0.13)	(0.12)
SG	0.28***	0.27**	0.31***	0.34***	0.29***	0.29***	0.12	0.16*	0.17*	0.19**	0.18*	0.19**
	(0.10)	(0.11)	(0.11)	(0.10)	(0.10)	(0.11)	(0.10)	(0.09)	(0.10)	(0.09)	(0.09)	(0.09)
Debt	0.05	0.08**	0.05	0.07*	0.04	0.06*	0.13**	0.13***	0.13**	0.13**	0.13**	0.13**
	(0.04)	(0.03)	(0.03)	(0.04)	(0.03)	(0.04)	(0.06)	(0.05)	(0.06)	(0.06)	(0.05)	(0.06)
Size	-0.01	0.02	-0.01	-0.01	-0.01	0.00	-0.02	-0.01	0.00	0.01	0.03	0.01
	(0.02)	(0.02)	(0.02)	(0.02)	(0.02)	(0.03)	(0.08)	(0.05)	(0.04)	(0.03)	(0.06)	(0.04)
Constant	0.07	-0.44	-0.01	0.05	-0.08	-0.19	-0.04	-0.19	-0.38	-0.37	-0.71	-0.50
	(0.38)	(0.32)	(0.34)	(0.36)	(0.28)	(0.53)	(1.16)	(0.67)	(0.51)	(0.48)	(0.82)	(0.64)
m_2	0.18	0.45	0.29	0.34	0.24	0.28	0.37	0.22	0.19	0.24	0.14	0.16
Sargan	0.42	0.41	0.35	0.52	0.50	0.89	0.74	0.29	0.31	0.46	0.34	0.46

This table reports the estimation results of eq(3) for constrained firms. Robust standard errors are shown in parentheses. See Table 1 for the definitions of the variables. m_2 denotes de p-value of serial correlation test of order 2. *Sargan* denotes the p-value of the test of over-identifying restriction. ***, **, * refer to significance levels at 1%, 5% and 10%, respectively.

TABLE 4
The effect of pyramidal ownership in investment-cash flow sensitivity

	Constrained firms		Unconstrained firms	
	KZ_{FC}	WW_{FC}	KZ_{FUC}	WW_{FUC}
VARIABLES	(1)	(2)	(3)	(4)
CF	**0.20*****	0.09	**0.34***	**0.39***
	(0.07)	(0.07)	**(0.18)**	**(0.21)**
PD	0.16**	0.11	0.13	0.19*
	(0.08)	(0.10)	(0.08)	(0.10)
CF*PF	**-0.15***	0.10	-0.32	-0.37
	(0.08)	(0.13)	(0.20)	(0.26)
m_2	0.51	0.98	0.42	0.18
Sargan	0.85	0.22	0.52	0.37

This table reports the estimation results of eq(4). Robust standard errors are shown in parentheses. See Table 1 for the definitions of the variables. m_2 denotes de p-value of serial correlation test of order 2. *Sargan* denotes the p-value of the test of over-identifying restriction. ***, **, * refer to significance levels at 1%, 5% and 10%, respectively.

TABLE 5
The effect of family-pyramidal ownership in investment-cash flow sensitivity

	Constrained Firms				Unconstrained Firms			
	KZ_{FC}		WW_{FC}		KZ_{FUC}		WW_{FUC}	
	(1a)	(2a)	(1b)	(2b)	(3a)	(4a)	(3b)	(4b)
CF	0.21***	0.21***	0.07	0.08	0.36**	0.35**	0.40**	0.43**
	(0.08)	(0.08)	(0.07)	(0.07)	(0.16)	(0.14)	(0.18)	(0.21)
PD*FD	0.17**		0.12		0.15		0.34***	
	(0.09)		(0.09)		(0.10)		(0.13)	
CF*PD*FD	-0.09		0.09		-0.37*		-0.66**	
	(0.11)		(0.13)		(0.19)		(0.31)	
PD*(1-FD)	0.12	0.11	0.14	0.10	0.20**	0.20**	0.14	0.17*
	(0.08)	(0.07)	(0.10)	(0.10)	(0.10)	(0.08)	(0.09)	(0.09)
CF*PD*(1-FD)	-0.20*	-0.18*	0.19	0.19	-0.36*	-0.33*	-0.25	-0.34
	(0.10)	(0.11)	(0.16)	(0.15)	(0.20)	(0.18)	(0.23)	(0.24)
PD*FD*High_Div		0.12		0.05		0.12		0.32**
		(0.09)		(0.11)		(0.10)		(0.13)
CF*PD*FD*High_Div		-0.14		0.03		-0.36*		-0.75**
		(0.12)		(0.13)		(0.20)		(0.32)
PD*FD*Low_Div		0.26**		0.19**		0.24***		0.30**
		(0.11)		(0.09)		(0.09)		(0.14)
CF*PD*FD*Low_Div		-0.01		0.14		-0.40		-0.60*
		(0.14)		(0.13)		(0.27)		(0.32)
m_2	0.48	0.58	0.16	0.82	0.53	0.66	0.86	0.18
Sargan	0.88	0.89	0.60	0.42	0.51	0.89	0.15	0.54

This table reports the estimation results of eq(4) when we disentangle the effect of family control and high divergence from pyramid. Robust standard errors are shown in parentheses. See Table 1 for the definitions of the variables. High_Div (Low_Div) is equal to 1 if the divergence between control and cash flow rights is higher (lower) than the median value. m_2 denotes de p-value of serial correlation test of order 2. *Sargan* denotes the p-value of the test of over-identifying restriction. ***, **, * refer to significance levels at 1%, 5% and 10%, respectively.