Cash holding and control-oriented finance

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Abstract

We critically reassess the notion that high liquid asset holding by firms faced with weak investor protection is evidence of managerial rent extraction. We show that firms facing agency problems may establish tight controls over management through concentrated ownership. Using data on Belgian listed firms between 1991 and 2006, we find a strong positive association between ownership concentration and cash holding. This indicates a precautionary motive on the part of the controlling shareholders who highly value control. We also find that firm market valuation is positively affected by the amount of cash held by firms. On the other hand, managerial ownership has no impact. These results are consistent with the hypothesis that firms' owners are pursuing a rational strategy to mitigate agency costs in the face of weak investor protections.

1 Introduction

In this paper we investigate the effect of ownership structure on cash holdings and how the market values the cash held by firms.[1] One prominent view regarding the amounts of cash held by firms, in the tradition of Berle & Means (1932), focuses on the possible conflict of interests between managers and shareholders. Jensen (1986) argues that agency problems are particularly severe in firms with substantial large free cash flows. Similarly, if as argued by Myers & Rajan (1998) liquid assets are relatively easy to transform into private benefits for managers, then we would expect that when governance structures are weak managers will lead the firm to hold relatively high levels of liquid assets.

A number of international cross-country studies have been interpreted as lending support for the view that relatively high cash holdings are a symptom of managerial rent extraction. For instance, Dittmar, Mahrt-Smith & Servaes (2003) find that cash holding tends to be high in countries with relatively weak investor protection. Kusnadi & Wei (2011) argue that legal protection of investors results in lower levels of cash held by firms. Pinkowitz, Stulz & Williamson (2006) find that cash reserves are valued less in countries with weak investor protection since controlling insiders in these countries have greater ability to extract private benefits from cash holdings. Kalcheva & Lins (2007) make a direct link between cash holdings and managerial ownership. First, they find some evidence of a positive association between the fraction of shares held by management and cash holdings. Second, they show that firm values are lower when controlling managers hold more cash and

[1] We use the terms cash and liquid assets throughout the paper indifferently.

external country-level shareholder protection is weak. They interpret their results as evidence of managerial agency problems when external shareholder protections are poor.

In this paper we critically reassess these findings and offer an alternative explanation of the motives of cash holdings by studying Belgian listed firms. The Belgian case is interesting because by common metrics the Belgian corporate system is characterized by poor investor protection (e.g., La Porta, Lopez-de Silanes, Shleifer & Vishny 1998). At the same time Belgium has inherited a control-oriented financial system. This features high levels of ownership concentration and a continuing prominence of family firms, even several generations after their foundation.[2] This is facilitated in part by a well-developed system of voting alliances which allows a greater voting power and in part by control devices that makes it harder for hostile takeovers to take place (Becht & Röell 1999). In this context, the role of the stock market to finance new investments is not as prominent as in market-oriented economies which enjoy liquid capital markets (Franks & Mayer 1995). Instead, growth opportunities requiring external finance are pursued principally through debt finance. This use of leverage by owners with long investment horizons can create a strong precautionary motive for cash holding. This tendency may be reinforced by shareholder risk aversion if control is maintained only at the cost of under-diversification. Goergen & Renneboog (2001) argue that in Belgium often a large proportion of the controlling shareholders' wealth is invested in the firm with a long term commitment. As a consequence relatively high cash holding may be a constrained optimal policy for

[2]For some firms it is the fourth generation who is in charge.

such owners whose long-term returns are threatened by the loss of control through distressed issuance of outside equity or bankruptcy.

In this study we carefully construct a data set of Belgian listed firms from 1991 to 2006 which allows us to determine the degree to which control rights are concentrated in blocks of shares and also whether a controlling ownership block has family links to the firm's founder. We find evidence to support the hypothesis that relatively high levels of cash holding are a reflection of a rational strategy by owners who seek value through long-term control. First, we show that shareholding is very concentrated, but managerial shareholding tends to be very small compared to the controlling shareholders. In more than 85% of the cases observed, no manager reports share ownership in the firm.[3] In contrast, on average the controlling shareholder block holds 54% of shares. Second, shareholders concentrate control rights by joining in voting alliances.[4] Our data indicated that in almost one third of our observations there is a voting alliance of shareholders who commit to act in unison. Controlling shareholders in voting alliances hold on average 55% of the shares against 53% for large controlling shareholders who are not part of any voting alliance. Third, our data show that debt financing is very high in Belgian listed firms. The median of the ratio of debt to assets is 36%, which is higher than for any country reported by Rajan and Zingales (1995) in their international comparison of leverage in listed firms. Fourth, liquid asset holding

[3]The Belgian disclosure law of 1989 requires shareholders to notify the Banking Commission when their shareholding reaches 5%. But many firms have statutes that require notification of any holding that reaches a threshold of 3%.

[4]To the best of our knowledge no cross-country study on ownership and cash holdings has considered voting alliances. This is probably due to the fact that data available from the usual providers like *Bureau Van Dijk* report shareholders individually without making any link between them through the voting blocks alliances.

is positively associated with ownership concentration. On the other hand, there is no significant effect of managerial ownership on the amount of cash held by firms. A robustness test indicates that under-diversified controlling shareholders are associated with more cash holdings. Fifth, we find that the amount of cash held by firms is positively associated with firm's market value.

Our study contributes to the literature on the determinants of cash holdings and the role of corporate governance in firms' cash holdings (see for instance, Nikolov & Whited 2014, Liu, Mauer & Zhang 2014, Iskander-Datta & Jia 2012, Kusnadi & Wei 2011, Harford, Mansi & Maxwell 2008, Kalcheva & Lins 2007, Pinkowitz et al. 2006, Ozkan & Ozkan 2004, Dittmar et al. 2003, Opler, Pinkowitz, Stulz & Williamson 1999, Bates, Kahle & Stulz 2009, Mikkelson & Partch 2003, Han & Qiu 2007). It brings a different perspective than other studies which assume that cash holdings reflect choices taken by relatively powerful managers.[5] In our sample, we find share ownership achieves a degree of concentration where it is likely that managers are effectively monitored. In addition, managerial shareholding is quasi-inexistent and if managers are shareholders typically they are part of voting coalitions.

The remainder of the paper is organized as follows. Section 2 develops our hypotheses. Section 3 presents the data. Section 4 is devoted to our estimation methodology. In Section 5 we present our main results. Section 6 explores extensions. Finally, Section 7 concludes.

[5]It differs for instance from Kalcheva & Lins (2007) who also have Belgium in their cross-country study, but who focus on the effect of managerial ownership on cash holdings.

2 Hypotheses

In this section, we develop more explicitly our argument of why, in a control-oriented financial system, firms facing agency problems may establish tight controls over management through concentrated ownership and why this creates a strong precautionary motive for holding greater amounts of cash than would be the case in the absence of agency problems. This is the consequence of inside shareholders assigning a high control premium to equity implying that issuing outside equity is particularly costly. Then under an optimal dividend and cash retention policy in the face of costly outside equity issuance and costly bankruptcy, the firm will seek to maintain a relatively large cash buffer. This has been demonstrated by Anderson and Carverhill (2012) using an infinite horizon model. A value-maximizing firm follows an optimal dynamic dividend policy that aims at holding a cash buffer at a state dependent target level. They retain earnings when cash holdings fall short of the target, and they pay out any excess of earnings beyond what is needed to maintain cash at the targeted amount. When earnings fall short of contracted interest payments they finance debt service following a pecking order rule: first draw down cash, second issue more debt if the firm is below debt capacity and third issue outside equity. All else equal the targeted amount of cash will be higher, the higher is the cost of external finance.[6]

In applying this analysis to the case of control-oriented finance as in Belgium, we note that the costs of share issuance will be relatively high in firms whose incumbent shareholders place a high value on control. This is

[6]For a discussion of other theoretical frameworks that give rise to a precautionary motive for cash, see Kimball (1992).

because issuing shares to service debt when there is a shortfall of cash flows will imply a dissipation of control rights. Therefore, such firms target higher levels of cash. This amount of cash holding is higher than would be optimal in the absence of agency problems. However, it is second-best optimal. That is, in the face of agency problems it gives the owner a higher value than if he held a lower amount of cash.

Note that this precautionary motive for holding cash holds for value maximizing shareholders. The precautionary motive would be reinforced if shareholders were risk averse. This well may be the case when concentrated ownership is achieved at the cost of under-diversification of the controlling shareholders' wealth. Concentrated ownership does not necessarily imply risk aversion. For example, a large, diversified private equity fund may own a controlling block of shares. However this has not been a common mode of ownership in Belgium. In part this is for historical reasons. Many of the largest Belgian firms trace their origins to the industrial development in Belgium during the late 19th Century and in many cases they are still family firms in the sense that the owners have links to the founding owner. Furthermore, this structure has been protected against change by various take-over protections that have been in place from time to time.[7] And this has not

[7]For instance, this applies in the case of a large controlling shareholder who owns a mono-holding company with the only purpose of controlling the listed firm. A concrete example is the firm *Solvay* which is held by the founding families *Solvay* and *Janssen*, and the mono-holding *Solvac*. *Solvac* is listed but it has registered shares that can only be held by private investors. *Solvac* signed an agreement with *Sofina S.A.*, *Deutsche Bank AG*, and *Generale de Banque S.A.* to impede any hostile takeover bids for *Solvay*. *Sofina S.A.* on the other hand is controlled by the families *Boel*, *Solvay*, and *Janssen* (Becht & Mayer 2001). The three families are linked by marriages (Verduyn 2013). Another example is the use of foundations incorporated in The Netherlands. These are known in Dutch as the *Stichting AdministratieKantoor*. They are used as an effective anti-takeover defense (see e.g., The Wall Street Journal Cohen 2006, Raice & Patrick 2015).

been dissipated over the years through inheritance by successive generations of heirs because there has been an effective coordinating mechanism through voting alliances which are both explicit and legal.

Now what are the empirical implications of this analysis that we can test using data on Belgian firms?

Hypothesis 1. *We should expect to find a positive association between share concentration and cash holdings.*

Firms facing relatively high agency costs tend to acquire more control rights in order to better monitor management. They would assign a higher control premium to the shares implying a higher cost of external finance and higher targeted and realized cash holdings.

In control-oriented corporate systems with limited access to external financing cash holdings provide a cushion to face key financing decisions as well as a means to be able to face possible hostile takeovers. The importance of control is discussed in Holmén, Knopf & Peterson (2007) for Swedish firms. Most notably, they find that less diversified controlling institutional shareholders are significantly less likely to have their firms taken over, and they show that these shareholders are primarily concerned with control and not diversification. Thus the precautionary motive for shareholders is strongly related to the eventuality of the loss of control over the firm. In Belgium, it is not uncommon that large controlling shareholders reach the point to delist their firms from the stock market with no other obvious reason than the fear of losing the control. This was the case, for instance, with the firm *BMT* where the controlling family *Seynaeve* decided to delist it in 2004.[8] The beer

[8]The family *Seynaeve* controlled *BMT* with almost 40% of shares via her privately

company *Duvel Moortgat* had the same fate, its controlling family decided to delist it and pay 120 billion Euros in cash for it (Vandendooren 2012).[9] In effect, the insiders value their shares more highly than do the outside investors without the same interest in control.

Hypothesis 2. *We should expect to find zero association between managerial shareholdings and cash holdings.*

If ownership concentration effectively establishes shareholder control over management, it can prevent asset substitution of liquid assets and keep the choice of cash holding under shareholder control. The owners of the firm may reward managers with shares, e.g., to incentivise higher effort. However doing so would not affect the choice of liquid asset holdings.

Hypothesis 3. *We should expect to find a positive association between cash holding and firm value in family firms.*

A successful entrepreneurial firm may generate more growth opportunities than it can finance through retentions or debt. Thus at some point it may be faced with the choice of either grow with outside equity and eventually face loss of control or grow more slowly but retain control. Often these

owned company and which is incorporated in the Netherlands. In 2003 the family formed a voting block with the other shareholders in the firm making the share ownership of this voting coalition to reach almost 51%.

[9]The family *Moortgat* held the company via its foundation which is incorporated in the Netherlands. This foundation is what is known in Dutch as *"Stichting AdministratorKantoor"*. These structures made the news, for instance in The Wall Street Journal, because of their role as an effective anti-takeover defense (see, for instance Cohen 2006, Raice & Patrick 2015). In 2006 the family owned 64.13% of shares via her foundation, one cousin and board member owned 10.13%, other family members held 0.76%, and the company itself had an auto-control of 0.65%. All these shareholders were in the same voting block making the percentage of share ownership, altogether, almost 76%.

problems become particularly telling as the firm matures and the question of succession arises. Franks, Mayer, Volpin & Wagner (2012) provide evidence suggesting that within-family succession of CEOs is prevalent among continental European family-firms as compared to the UK where non-family succession is more frequent. Sraer & Thesmar (2007) document the fact that in France family-firms tend to be smaller than non-family-firms after controlling for age of firm and other factors. Also using French data, Bach (2009) links the growth of firms to succession choices and finds that firms favoring within-family succession tend to grow more slowly than do firms favoring non-family succession. Consequently, many established family firms may be operating at close to their debt capacity. If that is the case, the analysis of Anderson & Carverhill (2012) shows that good performance and therefore increases in firm value are associated with increases in cash holdings.

3 Data

3.1 Governance data

We carefully construct a cleaned ownership data set which we collect for our sample period from 1991 to 2006 from the printed annual reports of listed firms. We supplement this with notifications from the Documentation and Statistics Department of the Brussels Stock Exchange collected in conformity with the 1989 law on ownership disclosure. We also use the annual publication from ING bank (Banque Bruxelles Lambert, previously) on the ownership positions of Belgian listed firms, when available. The resulting database better suits our research than do the already existing ones, namely,

BDPart, available in the Documentation and Statistics Department of Brussels Stock Exchange, and the Financial Reports of Belgian firms from the National Bank of Belgium (NBB, henceforth). Specifically in the former, every time there is a change in the ownership composition, the previous data is overwritten, so it has no historical memory. In the latter, only Belgian shareholders are reported with no indication given about foreign shareholders. Furthermore, a comparison of the printed annual reports and the NBB data revealed frequent discrepancies in ownership information. It is worth noting that starting from 1997 ownership positions of listed firms are reported in the database "Belfirst" from Bureau Van Dijk. However, we found several mistakes in the data reported by this source. This database cannot be used as it is and needs an almost manual clean up.

The year 1991 is our starting period because from that date all firms were required to report ownership information including all holdings greater than 5% (or 3% if the firm writes this into its statutes).[10] Under this law all reporting shareholders are also required to report whether or not they participate in a shareholder voting alliance and to identify the make-up of that alliance. Shares may be held by individuals or by firms. In the latter case, the reporting firm is required to indicate whether they belong to a business group, which under Belgian law is a collection of firms that is consolidated for the purposes of taxation. Our data ends in 2006 because after this year there were major changes in the disclosure law which might interfere with the effects we want to study in the current paper.

[10]The Belgian disclosure law was adopted in 1989, but for the years 1989 and 1990, some of the firms enjoyed a "grace period", where the shareholders of these firms were not obliged to notify the Banking Commission, but by the end of 1991 ownership disclosure was mandatory for all firms.

3.1.1 Controlling shareholder

Based on the reports of the different share-ownership and to identify the largest controlling shareholder we aggregate shareholding within the same voting alliance or within the same business group. Then we calculate the size and type of the largest block of shares for each firm in each year. There are three possible types of largest controlling shareholders: (1) business groups which are based on shareholdings only of firms within the same business group, (2) voting alliances which are based on shareholdings of firms, business groups and individuals who belong to the same voting alliance, and (3) independent stakes which could be firms or individuals who belong neither to business groups or voting alliances.

From Table 1 we see that the level of ownership concentration in Belgian listed firms is very high. On average the largest shareholders hold 54% of equities. In three quarters of the observations the level of concentration is 40% or more.

3.1.2 Shareholder diversification

As discussed above, the precautionary incentive to hold cash in the firm may be reinforced by shareholder risk aversion if the controlling shareholder's wealth is highly concentrated in the firm. In order to provide evidence of under-diversification of largest shareholders in Belgian listed firms we follow Faccio, Marchica & Mura (2011) in using information provided in regulatory filings to determine the number of declared holdings of the controlling block holders. In our implementation of this, in addition to the above data sources, we use various other sources and undertake a detailed examination

of the composition of the contolling shareholders' portfolios.[11] With the information gathered we construct a dummy variable indicating whether a shareholder is under diversified or not. Our classification indicates that out of 1648 firm/year observations 1218 are firms where the controlling shareholder appears to have one share ownership which is the listed firm. On the other hand, 430 firm/year observations are diversified controlling shareholders who have more than one stock in their portfolios. Further explanation on data collection and variable construction are in Appendix A. However, we should point out that a limitation of any measurement of under-diversification based on declared ownership is that the controlling block may itself be a legal entity which itself is held by a number of persons and that we are not able to directly observe these owners' personal portfolios.[12]

3.1.3 Family firms

Our starting point for identifying family-firms are the shareholder reports in accordance with the law of 1989 on ownership disclosure. In the declaration of control to the Banking Commission it is said clearly that the shareholder is a family group. We supplement this with information on ultimate ownership of stakes held by firms to determine cases of control by a family-firm indirectly

[11] We use various data sources including the depository of the annual accounts of Belgian firms at the National Bank of Belgium database known as the *"Centrale des Bilans"*, *Bureau Van Dijk* databases: *Belfirst* and *Amadeus*, data on families wealth from Verduyn (2013) as well several press articles from the online archives of the Belgian financial press like *Trends-Tendances*.

[12] Ideally, we would like to observe the composition of the portfolios of the members in the controlling shareholder blocks, along the lines of the study by Mueller (2008). Such data are rarely obtainable generally and are not available in the case of Belgian firms.

through a pyramid.[13] In this latter case we determine whether there is a known link to the family of the founding owner(s). This is close to Sraer & Thesmar (2007) who define a family-firm as one where the founder or the heir is in control. This procedures differs from that of Faccio & Lang (2002) who assume that an ownership block held by an unlisted company represents de facto a family.[14]

3.1.4 Managerial ownership

We compute managerial share holding as the total reported shares owned by the member of the board of directors including the chairman, the managing director and the administrative director. In some cases it is observed that all members of the board are associated with a voting alliance. In all such cases all reporting managers are members of the same voting alliance. For these cases managerial share holding is the total shares in that alliance.

Remarkably, in 1409 cases (86% of all observations) there is no reporting manager (see Table 2, Panels A and B). Thus the level of managerial shareholding is low as compared to the high degree of reported ownership concentration. It turns out that in the Belgian context large managerial share holdings are almost always associated with family-firms. The median share ownership of a reporting manager in family-firms is of 64%, while in non-family-firms the median of share ownership of a reporting manager is of

[13] The disclosure law applies directly to the owners of the voting rights, as well as to those investors who control voting rights indirectly via a pyramidal structure of intermediate companies. Hence, when it is a family who is on the top of the pyramid this is indicated in the declaration of control.

[14] More details on family-firm data and comparison with Faccio & Lang (2002) procedure of classifying firms are in the Appendix.

41% (Table 2, Panel A).

3.2 Firm level accounting data

Our sample consists of all active Belgian listed firms except those in the banking, insurance and real estate sectors. During the sample period there were some listed firms in liquidation which we exclude. This selection process leaves us with a sample of 1648 annual observations of 196 firms for the period 1991 to 2006. Accounting variables, from 1991 to 1996, are from the year-end annual accounts of firms available from the database called "Centrale des Bilans" edited by the NBB. Then from 1997 to 2006 we use the database called "Belfirst" available from Bureau Van Dijk. From these sources we construct our dependent variable cash holdings and the rest of our explanatory variables: total debt, investment in financial fixed assets, R&D expenditures, working capital, cash flow, capital expenditures, firms' size which we construct by using total assets, and firms' age. To construct our proxy for the market valuation of the firm we use market-to-book value. We obtain year-end market value from the Brussels Stock Exchange. We also use daily stock prices data from *Datastream* to compte the standard deviation of stock returns as a measure of firm's risk.

Table 1 reports the descriptive statistics for our sample. One thing to note is the the median leverage (ratio of total debt to total assets) in our sample is 36%. This is higher than the median leverage for any country reported in Table 2 of Rajan' and Zingales' international comparison of leverage in listed firms (Rajan & Zingales 1995). It is consistent with our argument that Belgian firms have tended to grow using debt rather than outside equity.

4 Estimation methodology

We use a panel data model to explore the relation between different measures of ownership and cash holdings by firms. We report the results of the OLS, fixed effects, and random effects models. In most of our specifications, the Hausman tests favor the fixed effects model over the random effects one. Using firm fixed effects helps controlling for the possible effect of time-invariant unobserved heterogeneity at firm-level.

Our main specification testing the effect of large controlling shareholders on cash holdings is the following:

$$\begin{aligned} Cash_{it} =& \theta_0 + \theta_1 Largest\ Shareholder_{it} + \theta_2 Age_{it} + \theta_3 Size_{it} + \theta_4 Total\ debt_{it} \\ &+ \theta_5 Financial\ fixed\ assets_{it} + \theta_6 Capital\ expenditures_{it} + \theta_7 Working\ capital_{it} \\ &+ \theta_8 Cash\ flow_{it} + \theta_9 R\&D_{it} + \delta_i + \varepsilon_{it}, \end{aligned} \tag{1}$$

where, for firm i and year t $Cash_{it}$ stands for cash in hand and at bank, and marketable securities scaled by total assets, $Largest\ Shareholder_{it}$ is the percentage of the shareholdings of the largest shareholder in the firm either she/he is an individual or a voting block, Age_{it} is firm's age expressed in log, $Size_{it}$ is measured by the log of total assets, $Total\ debt_{it}$ is the sum of short-term and long-term debt scaled by total assets, $Financial\ fixed\ assets_{it}$ is the ratio of shareholdings of the firm in tied firms and firms with which there exists a participation link scaled by total assets[15], $Capital\ expenditures_{it}$ are

[15]The firms tied to another firm are: the firms that control it, the firms that it controls, the firms with which it forms a consortium, the other firms that, to the knowledge of the

new acquisitions of tangible assets scaled by total assets, $Working\ capital_{it}$ is computed net of cash and is scaled by total assets, $Cash\ flow_{it}$ is earnings before interest and taxes scaled by total assets, $R\&D_{it}$ are expenses in R&D scaled by total assets, δ_i is a firm effect (which is either fixed, random, or omitted depending upon whether the estimation method is FE, RE or OLS), and ε_{it} is a residual.

In Equation 1 we make no distinction between large controlling shareholders. They could be one entity, for instance one firm or one person, as well as a voting block which is a collection of shareholders. With this equation we test our Hypothesis 1. To explore more in depth the type of shareholders, for instance whether being in voting block has an impact on cash holdings, we augment the above equation with a dummy variable which takes on the value of one if the largest shareholder is a collection of several shareholders organized in a voting coalition and zero otherwise. We also add an interacted term between largest shareholder variable and voting block dummy.

We consider a variation on Equation 1 by including a dummy variables for managerial ownership. This allows us to test Hypothesis 2. In a similar manner we also explore the effect of the presence of large shareholders, voting blocks, or families.

To study the relationship between cash holding and firm value we use the

board, are controlled by one of the firms mentioned above. The firms with which there exists a participation link are the firms, other than tied firms, in which the firm or its subsidiary holds a direct or indirect participation.

following basic specification.

$$\begin{aligned} \textit{Tobin's } Q_{it} =& \theta_0 + \theta_1 \textit{Cash}_{it} + \theta_2 \textit{Largest Shareholder}_{it} + \theta_3 \textit{Age}_{it} + \theta_4 \textit{Size}_{it} \\ &+ \theta_5 \textit{Total debt}_{it} + \theta_6 \textit{Financial fixed assets}_{it} + \theta_7 \textit{Capital expenditures}_{it} \\ &+ \theta_8 R\&D_{it} + \delta_i + \varepsilon_{it}, \end{aligned} \tag{2}$$

where, for firm i and year t *Tobin's* Q_{it} is computed as market-to-book value and is our proxy for market firm's value, $Cash_{it}$ stands for cash in hand and at bank, and marketable securities scaled by total assets, $\textit{Largest Shareholder}_{it}$ is the percentage of the direct shareholdings of the largest shareholder in the firm either she/he is an individual or a voting block, Age_{it} is firm's age expressed in log, $Size_{it}$ is measured by the log of total assets, $\textit{Total debt}_{it}$ is the sum of short-term and long-term debt scaled by total assets, $\textit{Financial fixed assets}_{it}$ is the ratio of shareholdings of the firm in tied firms and firms with which there exists a participation link scaled by total assets, $\textit{Capital expenditures}_{it}$ are new acquisitions of tangible assets scaled by total assets, $R\&D_{it}$ are expenses in R&D, scaled by total assets, δ_i is a firm fixed effect, and ε_{it} is a residual. In a particular version of this model we explore whether the relation between firm value and cash holding differs for family firms as compared to non-family firms. To do so we augment the specification using a dummy variable *Family*. Our hypothesis 3 is tested as the prediction of a positive partial correlation between firm value and the interaction of *Cash* and *Family*. We also estimate other specifications where we include different interacted terms between *Cash*, *Largest Shareholder*, *Voting blocks*, and *Manager*.

5 Results

5.1 Preliminary analysis

Table 2 summarizes mean and median of liquid assets and share concentration for our sample in three two-way classifications. In Panel A we classify firms as family-firms versus non-family ones and as firms with share-owning managers versus without share-owning managers. In Panel B the classification is based on firms with voting blocks versus firms without voting blocks and on with share-owning managers versus without share-owning managers. In Panel C, we group based on family ownership status and presence or not of voting blocks.

The first striking observation from Table 2 is the very high level of ownership concentration. In almost every category of firm (family versus non-family, with voting block versus without voting block) the mean controlling shareholding exceeds 50% of the shares. The exception is when there is a reporting manager, in which case the controlling shareholder typically holds about 47% of the share, still a very concentrated holding. Second, we observe that significant managerial share ownership is the exception rather than the rule. There are reporting managers in only 239 out of 1648 observations overall. When we analyze the different types of classifications in Table 2 we notice that family-firms come first in terms of ownership concentration when shareholders are organized in voting blocks. Their ownership is as high as 61 percent against 51 percent in the absence of voting blocks (Panel C). Note that family-firms represent one third of our sample.

Panels A or B show no significant difference in cash holdings in the pres-

ence of a reporting manager or not. This is preliminary evidence that does not support the view that powerful managers use their prerogatives to push firms towards holding more liquid assets.

5.2 Cash holdings and governance

We test our different hypotheses using panel data models. We report our results for OLS, fixed effects and random effects models. However, we limit our comments to the results of fixed effects specifications since the Hausman tests favor them.

Table 3 reports our results for the baseline cash holding regressions. Our first major result is that *Largest shareholder* enters with a positive and significant coefficient in all the specifications. This supports our Hypothesis 1 that increased shareholder control obtained through concentrated ownership is associated with higher level of cash holding. The presence or not of voting blocks does not alter the effect of concentration on cash holding. However, we find for family firms, with or without voting blocks, the effect of increased concentration (i.e., higher share in the controlling) block has not significant effect on cash holding.

The rest of control variables we include in the estimations are in line with previous literature. *Total debt* and *Working capital* are negatively related to the cash held by firms which is consistent with the argument that they play the role of substitutes for cash. For instance, studies like Opler et al. (1999), Kim, Mauer & Sherman (1998), or Ozkan & Ozkan (2004) find a negative relationship between leverage and liquid asset holdings. Also, Opler et al. (1999) argue that firms use factoring and securitization as a means of

raising liquidity. Accordingly, firms with high working capital are expected to hold less cash. Our results also show that firms with more investment in financial fixed assets hold less cash. This finding is consistent with Opler et al. (1999), who use the number of reported lines of business segments to measure whether firms have non-core assets that could be liquidated in periods of economic distress. More generally, industrial cross-shareholding may indicate the existence of an internal capital market that operates among related firms. This seems to be the case with our variable *Financial fixed assets* which represents the amounts invested by the firms in tied firms and firms with which there exists a participation link. Like in Opler et al. (1999), we find that firms with more cash flows hold more cash. This is consistent with the view that firms with high cash flow will accumulate a larger cash buffer, in line with the results of Anderson & Carverhill (2012) for firms approaching debt capacity. Regarding *Capital expenditures*, whereas firms may hold financial slack in anticipation of investment opportunities, they draw down these resources at the time the investments are made. As expected we find a negative association between cash and new investments; however, it is not statistically significant. We find no significant effect of R&D, age or size on cash holdings.

In Table 4, we turn our attention to managerial ownership and its effect on cash holdings. The introduction of the dummy variable *Manager* has essentially no effect on the cash holding regression results. *Manager* is insignificant, and this variable interacted with *Largest shareholder* is also insignificant. At the same time, the variable *Largest shareholder* continues to enter positively and is significant. This supports the Hypothesis 2 and

undermines the interpretation of cash holding in systems with weak investor protections as a manifestation of managerial rent extraction. These remarks hold as well when we allow for family firm effects (columns 4-6) or voting alliance effects (columns 7-9).

Finally we turn to the relation of firm value and cash holding. Table 5 presents the results of the estimations of the effect of *Cash* on *Tobin's Q*. In columns 1-3 we find a significant positive relationship of *Cash* and firm value. This carries over to the fixed effect results reported in column 8 where we have included family and voting alliance effects. *Largest shareholder* enter positively and is significant, and the interaction term between *Family* and *Cash* is positive and highly significant. The effects of the other control variables are in line with previous literature studying different effects on firm value. We conclude that our results support our Hypothesis 3.

6 Extensions

6.1 Shareholder diversification and risk aversion

In this section we consider a variety of extensions of our basic cash holding regressions. First, we explore whether controlling shareholder risk aversion might account for our findings. As already argued above a value maximizing controlling shareholder will have a precautionary motive for holding cash when outside equity finance is seen as very costly. This would be reinforced if controlling shareholders are risk averse and have established their controlling block only at the cost of having wealth heavily concentrated in the firm's shares. In principle, the effect of risk aversion could be relatively more im-

portant quantitatively than the effect of control premia assigned to outside equity.

To explore this idea we have developed an approach along the lines of Faccio et al. (2011) who develop a meaure of under-diversification based on numbers of holdings that surpass a declaration threshold. Specifically as discussed in Section 3.1.2 we used available information on ownership declarations to construct an indicator variable for firms whose controlling block holder is under-diversified. At the same time we also introduce a control variable for level of firm risk-taking. Specifically we use the estimated volatility of the firm's stock returns. As stock returns are not available for all firms in our data set, we are able to construct this variable only for a sub-sample.

The results are presented in Table 6. In columns 1-3 we present the result for the full sample, omitting the control for stock return volatility. In the OLS regression the interaction between *Largest shareholder* and the *Non-Diversified* dummy is insignificant while *Largest shareholder* is positive and significant, as in in our benchmark results of Table 3. In the Fixed Effect and Random Effect results the opposite is true. We interpret this is some supporting evidence that controlling shareholder risk aversion may account for the observed levels of cash holding. We estimate the same model in the reduced sample in columns 4-6, and the model with a control for share return volatility included in columns 7-9. The results are qualitatively the same. So it appears there is some robust evidence in favour of the risk aversion hypothesis. However, we caution against pushing that interpretation too far because in our case (as in almost all other applications) the data do

not allow us to observe the degree of diversification on the comprehensive personal portfolios of shareholders.

6.2 Is there a tax based explanation for cash holdings in Belgian firms?

Foley, Hartzell, Titman & Twite (2007) show that tax reasons play a prominent role in holding cash by multinational US firms and their affiliates. More specifically, they show that affiliates in countries with low tax rates hold more cash than other affiliates of the same firm.

We investigate tax motives in holding cash by looking at firms related to coordination centers.[16] Coordination centers were created in Belgium in 1982, in order to give incentives, mainly very attractive tax incentives, to multinational groups to relocate their financial operations in Belgium and to favor employment. Coordination centers allow multinational groups to carry out a large variety of financial and managerial services on a roughly tax-free basis. To investigate the effect of coordination centers on cash holdings we introduce an interaction variable between a dummy variable, *Coordination Center*, which takes on a value of one if the firm is associated with a coordination center and zero otherwise and *Largest shareholder*. We rerun the full model. The results are in Table 7 Columns (2). The interacted variable *Coordination Center* Largest shareholder* it is not statistically significant in the fixed effects model. From these results we cannot conclude that coordination centers have an impact on cash holdings.

[16]Since 2008 these centers are officially prohibited by law (some continue until 31 December 2010 under certain conditions), but they were in effect during our sample period and they played an active role.

6.3 The second largest shareholder block

In principle, the effective control of a large shareholder may be diminished by the presence of other large shareholders. To explore this, we calculate the share holding of a second large shareholder. If the second shareholder has any impact, we expect either a negative relationship between cash holdings and share holding of the second shareholder or a smaller coefficient on the variable relative to the first largest one. However, as has been argued by Zwiebel (1995) it may be that large investors "create their own space," i.e., by holding large blocks they deter other block investors from locating in the same firm. It appears that something like this operates in Belgium. In our sample firms' ownership is highly concentrated, and in almost all cases where there is a second largest declared shareholder she/he is very small.

Out of 1648 observations (from 1991 to 2006) almost half of the observations (807) have no declared second shareholder. When there exists a second shareholder in the firm its share ownership is very small compared to the first one as we can observe from Table 1. On average a second shareholder holds about 5% of equities while the leading one has 54%.

The variable *Second shareholder* is calculated as the size of the second largest reported block of shares, taking into account institutional ownership and voting alliances. The results of the full model augmented by this variable are reported in Columns (5), of Table 7. The estimated coefficient is never significant. Thus there is no evidence of any effect of the presence of a second block. The coefficient estimates of other variables in the model are not affected by the inclusion of *Second shareholder*. We also tried a specification where we use a dummy variable for the second shareholder instead of

percentage of shares. The results are not significant.

7 Concluding remarks

In this paper we study the case of a strongly control-oriented financial system to see what effect the share ownership and governance structures have on firms' decisions to hold liquid assets. We find evidence of a positive association between ownership concentration and the level of liquid asset holding. In addition we find that firms' market valuation is positively associated with cash held by firms. These results are evidence that liquid asset holding is influenced by a precautionary motive on the part of the controlling shareholders. This may be due to a high control premium which makes outside equity issuance very costly for insiders. And this may be reinforced by insiders' risk aversion if they are unable to diversify their personal wealth while maintaining control of the firm.

Previous observations of relatively high cash holdings in the face of poor investor protections have generally been viewed as evidence of managerial rent extraction (for instance, Dittmar et al. 2003, Pinkowitz et al. 2006, Kalcheva & Lins 2007). Our analysis raises significant doubts about this interpretation in the context of a control-oriented financial system such as the Belgian system we study. Indeed, our results indicate that in spite of relatively weak investor protections, there exist large shareholders who have the ability and the incentives to control manager (see eg., La Porta et al. 1998, Shleifer & Vishny 1986, Shleifer & Vishny 1997). Significant shareholding by managers is the exception rather than the rule. When there are managers

with significant stakes in the firm, we find this has no effect on cash holding. Hence our results confirm our hypothesis that in a corporate system like in Belgium managers are monitored by large controlling shareholders and as such there is no association between managerial ownership and the amount of cash held by the firm. There is no evidence that high liquid asset holding are due to independent managers keeping assets in liquid form that allows them to extract rents.

We do find evidence that liquid asset holding motivated by a precautionary motive is mitigated somewhat by the operation of an internal capital market as manifested most notably by cross share holdings among a group of firms.

We further investigate the effect for firms of being related to coordination centers on cash holdings. Firms are linked to these centers mainly for taxes reasons. However, our results indicate no significant effect on holding of liquid assets. There is also no significant effect of a second shareholder on the cash held by firms.

While the ownership structures found in the Belgian case that we have studied in detail contrast strongly with those found in the largest US and UK firms, many of these features are present in other countries of continental Europe and elsewhere. Our results suggest that effective control is often obtained through high ownership concentration. This suffices to constrain managers, but its by-product is a relatively high precautionary motive to hold cash because insiders assign a high control premium to equity or risk aversion or both.

References

Anderson, W., R. & Carverhill, A. (2012), 'Corporate liquidity and capital structure', *Review of Financial Studies* **25**, 797–837.

Bach, L. (2009), 'Why are family firms so small? Theory and evidence from France', *Working Paper, Paris School of Economics* .

Bates, Thomas, W., Kahle, Kathleen, M. & Stulz, R. (2009), 'Why do U.S. firms hold so much more cash than they used to?', *Journal of Finance* **64**, 1985–2021.

Becht, M. & Mayer, C. (2001), *The control of corporate Europe*, ECGN, Oxford University Press, chapter Introduction, pp. 1–45.

Becht, M. & Röell, A. (1999), 'Blockholdings in Europe: An international comparison', *European Economic Review* **43**(4-6), 1049–1056.

Berle, A. A. & Means, G. C. (1932), *The modern corporation and private property*, Macmillan, New York.

Cohen, A. (2006), 'Going Dutch has new meaning in corporate takeover battles', *The Wall Street Journal* .

Dittmar, A., Mahrt-Smith, J. & Servaes, H. (2003), 'International corporate governance and corporate cash holdings', *Journal of Financial and Quantitative Analysis* **38**(1), 111–133.

Faccio, M. & Lang, L. (2002), 'The ultimate ownership of Western European corporations', *Journal of Financial Economics* **65**(3), 365–395.

Faccio, M., Marchica, M.-T. & Mura, R. (2011), 'Large shareholder diversification and corporate risk-taking', *The Review of Financial Studies* **24**(11), 3601–3641.

Foley, C., F., Hartzell, C., J., Titman, S. & Twite, G. (2007), 'Why do firms hold so much cash? A tax-based explanation', *Journal of Financial Economics* **86**, 579–607.

Franks, J. & Mayer, C. (1995), *Trends in Business Organization: Do Participation and Cooperation Increase Competitiveness?*, Tubingen: Mohr, repr. in A. Soppe, J. Spronk, E. Vermeulen and A. Vorst (eds.), chapter Ownership and Control.

Franks, J., Mayer, C., Volpin, P. & Wagner, F., H. (2012), 'The life cycle of family ownership: International evidence', *Review of Financial Studies* **25**(6), 1675–1712.

Goergen, M. & Renneboog, L. (2001), *Corporate governance and economic performance*, Oxford University Press, chapter Country report: Corporate governance and economic performance - Belgium, pp. 85–95.

Han, S. & Qiu, J. (2007), 'Corporate precautionary cash holdings', *Journal of Corporate Finance* **13**, 43–57.

Harford, J., Mansi, A., S. & Maxwell, F., W. (2008), 'Corporate governance and firm cash holdings in the US', *Journal of Financial Economics* **87**, 535–555.

Holmén, M., Knopf, J. D. & Peterson, S. (2007), 'Trading-off corporate control and personal diversification through capital structure and merger activity', *Journal of Business Finance and Accounting* **34**(9), 1470–1495.

Iskander-Datta, E, M. & Jia, Y. (2012), 'Cross-country analysis of secular cash trends', *Journal of Banking and Finance* **36**, 898–912.

Jensen, M. C. (1986), 'Agency costs of free cash flow, corporate finance and takeovers', *American Economic Review* **76**(2), 323–339.

Kalcheva, I. & Lins, K. V. (2007), 'International evidence on cash holdings and expected managerial agency problems', *Review of Financial Studies* **20**(4), 1087–1112.

Kim, C.-S., Mauer, D. C. & Sherman, A. E. (1998), 'The determinants of corporate liquidity: Theory and evidence', *Journal of Financial and Quantitative Analysis* **33**, 305–334.

Kimball, Miles, S. (1992), *New Palgrave Dictionary of Money and Finance*, London: MacMillan Press, chapter Precautionary motives for holding assets.

Kusnadi, Y. & Wei, John, K. (2011), 'The determinants of corporate cash management policies: Evidence from around the world', *Journal of Corporate Finance* **17**, 725–740.

La Porta, R., Lopez-de Silanes, F., Shleifer, A. & Vishny, R. (1998), 'Law and finance', *Journal of Political Economy* **106**, 1113–1155.

Liu, Y., Mauer, D. & Zhang, Y. (2014), 'Firm cash holdings and CEO inside debt', *Journal of Banking and Finance* **42**, 83–100.

Mikkelson, W. H. & Partch, M. M. (2003), 'Do persistent large cash reserves hinder performance?', *Journal of Financial and Quantitative Analysis* **38**(2), 275–294.

Mueller, E. (2008), 'How does owners' exposure to idiosyncratic risk influence the capital structure of private companies?', *Journal of Empirical Finance* **15**, 185–198.

Myers, S. C. & Rajan, R. (1998), 'The paradox of liquidity', *Quarterly Journal of Economics* **5**, 733–771.

Nikolov, B. & Whited, T. M. (2014), 'Agency conflicts and cash: Estimates from a dynamic model', *Journal of Finance* **69**(5), 1883–1921.

Opler, T., Pinkowitz, L., Stulz, R. & Williamson, R. (1999), 'The determinants and implications of corporate cash holdings', *Journal of Financial Economics* **52**, 3–46.

Ozkan, A. & Ozkan, N. (2004), 'Corporate cash holdings: An empirical investigation of UK companies', *Journal of Banking and Finance* **28**, 2103–2134.

Pinkowitz, L., Stulz, R. & Williamson, R. (2006), 'Does the contribution of corporate cash holdings and dividends to firm value depend on governance? A cross-country analysis', *Journal of Finance* **61**(6), 2725–2751.

Raice, S. & Patrick, M. (2015), 'The rise of the 'Stichting', an obscure takeover defense', *The Wall Street Journal* .

Rajan, R. & Zingales, L. (1995), 'What do we know about capital structure? Some evidence from international data', *Journal of Finance* **50**, 1421–1460.

Shleifer, A. & Vishny, R. W. (1986), 'Large shareholders and corporate control', *Journal of Political Economy* **95**, 461–488.

Shleifer, A. & Vishny, R. W. (1997), 'A survey of corporate governance', *Journal of Finance* **52**(2), 737–783.

Sraer, D. & Thesmar, D. (2007), 'Performance and behavior of family firms: Evidence from the French stock market', *Journal of the European Economic Association* **5**(4), 09–751.

Vandendooren, S. (2012), 'Les trois frère Moortgat: Les maîtres de la Duvel', *Trends-Tendances* .

Verduyn, L. (2013), *Les 200 familles les plus riches de Belgique*, Editions Jourdan.

Zwiebel, J. (1995), 'Block investment and partial benefits of corporate control', *Review of Economic Studies* **62**, 161–185.

Table 1: Descriptive statistics

Variable	N	Mean	Q1	Median	Q3
Liquid assets	1648	0.10	0.01	0.03	0.13
Largest shareholder	1648	0.54	0.40	0.54	0.70
Manager's shares	1648	0.01	0.00	0.00	0.00
Second shareholder	1648	0.05	0.00	0.01	0.08
Age (in years)	1648	55	23	64	79
Size	1648	18.78	17.47	18.51	20.08
Leverage	1648	0.38	0.16	0.36	0.55
Financial fixed assets	1648	0.49	0.22	0.52	0.73
Capital expenditure	1648	0.02	0.00	0.00	0.02
Working capital	1648	0.16	0.01	0.06	0.25
Cash flow	1648	0.04	0.00	0.03	0.08
R&D expenditure	1648	0.00	0.00	0.00	0.00
Market-to-book value	1648	1.17	0.54	0.90	1.44
Firm risk	1078	0.03	0.017	0.02	0.03
Total assets growth	959	0.16	-0.02	0.04	0.14

Liquid assets is cash in hand and at bank, and marketable securities divided by total assets. *Largest shareholder* variable is the percentage of the shareholdings of the largest shareholder in the firm either he is an individual or a voting coalition. *Manager's shares* is the percentage of the reported shareholdings of a company's managers regardless of his rank in the board. *Second shareholder* is the percentage of the shareholdings of the second shareholder in the firm. *Age* is the age of the firm in number of years. *Size* is measured by the log of total assets. *Leverage* is the sum of short-term and long-term debt, divided by total assets. *Financial fixed assets* is the ratio of shareholdings of the firm in tied firms and firms with which there exists a participation link divided by total assets. *Capital expenditure* are new acquisitions of tangible assets, divided by total assets. *Working capital* is computed net of cash and is divided by total assets. *Cash flow* is earnings before interest and taxes divided by total assets. *R&D expenditure* are expenses in R&D, divided by total assets. *Market-to-book value* is the market capitalisation of the firm divided by total assets. *Firm risk* is the standard deviation of the stock returns of firms. *Total assets growth* is growth rate of total assets.

Table 2: Selected descriptive statistics by reporting manager, by family-firm, and by voting block

Panel A: Mean (Median) of controlling block size and liquidity per firms reporting & non-reporting managerial ownership and family & non-family-firms											
	Reporting manager			Non-reporting manager			Mean difference t test		Total Reporting Man & Non-Rep Man		
	Num. Obs	Block	Liquidity	Num. Obs	Block	Liquidity	Block	Liquidity	Num Obs	Block	Liquidity
Family firm	87	57%	0.08	464	54%	0.09	0.11	0.34	551	54%	0.09
		(64%)	(0.02)		(54%)	(0.03)				(55%)	(0.02)
Non-family-firm	152	42%	0.11	945	55%	0.10	<.01	0.37	1097	53%	0.10
		(41%)	(0.04)		(55%)	(0.03)				(53%)	(0.03)
Mean difference t-test (p value)		<.01	0.06		0.18	0.45				0.43	0.17
Total Family & Non-Family	239	47%	0.10	1409	55%	0.10	<.01	0.91	1648	54%	0.10
		(49%)	(0.03)		(55%)	(0.03)				(54%)	(0.03)
Panel B: Mean (Median) of controlling block Size and liquidity per firms reporting/non-reporting managerial ownership and voting block (VB)/non voting block (Non-VB)											
	Reporting manager			Non-reporting Manager			Mean difference t test		Total Reporting Man & Non-Rep Man		
	Num. Obs	Block	Liquidity	Num. Obs	Block	Liquidity	Block	Liquidity	Num Obs	Block	Liquidity
Voting block	117	48%	0.11	410	57%	0.11	<.01	0.78	527	55%	0.11
		(44%)	(0.04)		(54%)	(0.05)				(53%)	(0.05)
No-voting block	122	47%	0.08	999	53%	0.09	<.01	0.76	1121	53%	0.09
		(50%)	(0.02)		(55%)	(0.02)				(55%)	(0.02)
Mean difference t-test (p value)		0.79	0.11		<.01	<.01				<.03	<.01
Total VB & Non-VB	239	47%	0.10	1409	55%	0.10	<.01	0.91	1648	54%	0.10
		(49%)	(0.03)		(55%)	(0.03				(54%)	(0.03)
Panel C: Mean (Median) of controlling block Size and liquidity per family/non-family and voting block (VB)/non voting block (Non-VB)											
	Family firms			Non-family-firms			Mean difference t test		Total Family & Non-Family		
	Num. Obs	Block	Liquidity	Num. Obs	Block	Liquidity	Block	Liquidity	Num Obs	Block	Liquidity
Voting block	183	61%	0.09	344	52%	0.12	<.01	0.03	527	55%	0.11
		(62%)	(0.03)		(51%)	(0.06)				(53%)	(0.05)
No-voting block	368	51%	0.09	753	54%	0.09	0.06	0.87	1121	53%	0.09
		(54%)	(0.02)		(55%)	(0.03)				(55%)	(0.02)
Mean difference t-test (p value)		<.01	0.55		0.36	<.01				<.03	<.01
Total VB & Non-VB	551	54%	0.09	1097	53%	0.10	0.43	0.17	1648	54%	0.10
		(55%)	(0.02)		(53%)	(0.03)				(54%)	(0.03)

Mean difference t test are p-values.

Table 3: The effect of large blockholders on cash holdings

	OLS	FE	RE	OLS	FE	RE	OLS	FE	RE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Largest shareholder	0.028**	0.046**	0.044**	0.029*	0.053**	0.047**	0.036*	0.089***	0.085***
	(0.014)	(0.020)	(0.018)	(0.015)	(0.022)	(0.020)	(0.019)	(0.024)	(0.022)
Voting block				0.016	0.029	0.019	0.013	0.047*	0.029
				(0.020)	(0.024)	(0.022)	(0.021)	(0.024)	(0.023)
Largest Shareholder*Voting block				-0.006	-0.039	-0.019	-0.000	-0.121***	-0.074*
				(0.038)	(0.040)	(0.037)	(0.041)	(0.044)	(0.040)
Family							0.005	-0.001	0.030
							(0.016)	(0.028)	(0.024)
Largest shareholder*Family							-0.024	-0.151***	-0.148***
							(0.030)	(0.045)	(0.040)
Family*Largest Shareholder*Voting block							-0.001	0.118***	0.092***
							(0.024)	(0.026)	(0.025)
Age	-0.001	0.021	-0.003	-0.001	0.021	-0.002	-0.002	0.017	-0.005
	(0.003)	(0.014)	(0.007)	(0.003)	(0.014)	(0.007)	(0.003)	(0.014)	(0.007)
Size	-0.004*	-0.003	-0.003	-0.004*	-0.003	-0.003	-0.004*	-0.002	-0.003
	(0.002)	(0.005)	(0.003)	(0.002)	(0.005)	(0.003)	(0.002)	(0.005)	(0.003)
Total debt	-0.090***	-0.024	-0.043***	-0.090***	-0.023	-0.043***	-0.090***	-0.019	-0.041***
	(0.022)	(0.016)	(0.014)	(0.022)	(0.016)	(0.014)	(0.022)	(0.016)	(0.014)
Financial fixed assets	-0.295***	-0.246***	-0.265***	-0.292***	-0.246***	-0.264***	-0.291***	-0.242***	-0.259***
	(0.016)	(0.017)	(0.016)	(0.017)	(0.017)	(0.016)	(0.017)	(0.017)	(0.016)
Capital expenditures	-0.230***	-0.045	-0.073	-0.231***	-0.044	-0.072	-0.231***	-0.059	-0.081*
	(0.084)	(0.048)	(0.047)	(0.086)	(0.048)	(0.047)	(0.085)	(0.047)	(0.047)
Working capital	-0.208***	-0.251***	-0.251***	-0.208***	-0.252***	-0.251***	-0.207***	-0.255***	-0.248***
	(0.024)	(0.028)	(0.025)	(0.025)	(0.028)	(0.025)	(0.024)	(0.028)	(0.025)
Cash flow	0.037*	0.042***	0.035**	0.038*	0.041***	0.035**	0.039*	0.046***	0.039***
	(0.022)	(0.014)	(0.014)	(0.022)	(0.015)	(0.014)	(0.022)	(0.014)	(0.014)
R&D	0.345**	-0.142	0.176	0.358**	-0.137	0.181	0.360**	-0.165	0.148
	(0.144)	(0.429)	(0.241)	(0.145)	(0.429)	(0.241)	(0.145)	(0.424)	(0.240)
Constant	0.365***	0.218***	0.334***	0.366***	0.208**	0.329***	0.369***	0.215**	0.336***
	(0.041)	(0.084)	(0.060)	(0.041)	(0.084)	(0.060)	(0.041)	(0.083)	(0.060)
Observations	1648	1648	1648	1648	1648	1648	1648	1648	1648
R^2	0.335	0.157		0.336	0.158		0.337	0.182	
Hausman test		0.0000			0.0000			0.0000	

This Table presents the estimations of the effect of large controlling shareholders on cash holdings in panel data model. Columns (1) to (3) estimate the effect of the largest shareholder on cash. Columns (4) to (9) include the effect of families and voting blocks. *Largest shareholder* is the percentage of shareholding of the largest controlling shareholder in the firm. *Voting block* is a dummy variable taking into account whether there is a voting coalition in the firm or not. *Family* is a dummy variable taking into account firms related or not to families. *Age* is firm age expressed in log. *Size* is measured by the log of total assets. *Total debt* is the sum of short-term and long-term debt, divided by total assets. *Financial fixed assets* is the ratio of shareholdings of the firm in tied firms and firms with which there exists a participation link divided by total assets. *Capital expenditures* are new acquisitions of tangible assets, divided by total assets. *Working capital* is computed net of cash and is divided by total assets. *Cash flow* is earnings before interest and taxes divided by total assets. *R&D* are expenses in R&D, divided by total assets. Robust standard errors in parentheses: *** p<0.01, **p<0.05, * p<0.1.

Table 4: The effect of managerial ownership on cash holdings

	OLS	FE	RE	OLS	FE	RE	OLS	FE	RE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Manager	-0.015	0.032	0.031	-0.049*	0.019	-0.003	0.001	0.042	0.044
	(0.021)	(0.030)	(0.026)	(0.026)	(0.038)	(0.033)	(0.031)	(0.037)	(0.032)
Largest shareholder	0.024	0.055**	0.053***	0.018	0.077***	0.073***	0.029*	0.057**	0.053**
	(0.015)	(0.022)	(0.020)	(0.019)	(0.025)	(0.023)	(0.015)	(0.023)	(0.021)
Manager*Largest shareholder	0.011	-0.066	-0.061	0.074	-0.005	0.025	-0.016	-0.043	-0.046
	(0.039)	(0.051)	(0.045)	(0.056)	(0.067)	(0.060)	(0.053)	(0.063)	(0.056)
Family				-0.019	-0.010	0.014			
				(0.016)	(0.029)	(0.026)			
Largest shareholder*Family				0.016	-0.112**	-0.090**			
				(0.032)	(0.047)	(0.042)			
Manager*Family				0.108**	0.000	0.061			
				(0.045)	(0.061)	(0.054)			
Manager*Largest shareholder*Family				-0.172**	-0.105	-0.157*			
				(0.081)	(0.102)	(0.092)			
Voting block							0.042	0.035	0.027
							(0.028)	(0.027)	(0.025)
Manager*Voting block							-0.062	-0.054	-0.058
							(0.048)	(0.059)	(0.053)
Largest Shareholder*Voting block							-0.046	-0.034	-0.019
							(0.052)	(0.044)	(0.042)
Manager*Largest Shareholder*Voting block							0.090	-0.002	0.009
							(0.088)	(0.095)	(0.087)
Age	-0.002	0.020	-0.003	-0.002	0.022	-0.005	-0.002	0.018	-0.002
	(0.003)	(0.014)	(0.007)	(0.004)	(0.014)	(0.007)	(0.003)	(0.014)	(0.007)
Size	-0.004*	-0.003	-0.003	-0.004*	-0.004	-0.004	-0.004**	-0.003	-0.004
	(0.002)	(0.005)	(0.003)	(0.002)	(0.005)	(0.003)	(0.002)	(0.005)	(0.003)
Total debt	-0.091***	-0.023	-0.043***	-0.091***	-0.018	-0.040***	-0.090***	-0.024	-0.043***
	(0.022)	(0.016)	(0.014)	(0.022)	(0.016)	(0.014)	(0.022)	(0.016)	(0.014)
Financial fixed assets	-0.296***	-0.246***	-0.264***	-0.297***	-0.244***	-0.262***	-0.293***	-0.248***	-0.265***
	(0.016)	(0.017)	(0.016)	(0.016)	(0.017)	(0.016)	(0.017)	(0.017)	(0.016)
Capital expenditures	-0.227***	-0.048	-0.076	-0.218***	-0.051	-0.074	-0.223***	-0.045	-0.072
	(0.085)	(0.048)	(0.047)	(0.082)	(0.048)	(0.047)	(0.083)	(0.048)	(0.047)
Working capital	-0.208***	-0.251***	-0.251***	-0.209***	-0.261***	-0.254***	-0.205***	-0.255***	-0.252***
	(0.024)	(0.028)	(0.025)	(0.024)	(0.028)	(0.025)	(0.024)	(0.028)	(0.025)
Cash flow	0.036*	0.042***	0.036**	0.038*	0.042***	0.036**	0.037*	0.040***	0.035**
	(0.022)	(0.015)	(0.014)	(0.022)	(0.014)	(0.014)	(0.022)	(0.014)	(0.014)
R&D	0.337**	-0.137	0.177	0.351**	-0.137	0.129	0.337**	-0.112	0.160
	(0.145)	(0.429)	(0.241)	(0.145)	(0.426)	(0.242)	(0.150)	(0.429)	(0.242)
Constant	0.377***	0.221***	0.332***	0.387***	0.244***	0.355***	0.378***	0.222***	0.331***
	(0.043)	(0.084)	(0.060)	(0.043)	(0.084)	(0.061)	(0.043)	(0.085)	(0.061)
Observations	1648	1648	1648	1648	1648	1648	1648	1648	1648
R^2	0.335	0.158		0.338	0.174		0.338	0.163	
Hausman test		0.0001			0.0000			0.0011	

This Table presents the estimations of the effect of managerial ownership in Columns (1) to (3), then with interactions with families in Columns (4) to (6) and with voting blocks in Columns (7) to (9) on cash holdings. *Manager* is a dummy variable for managerial ownership. *Largest shareholder* is the percentage of shareholding of the largest controlling shareholder in the firm. *Family* is a dummy variable taking into account firms related or not to families. *Voting block* is a dummy variable taking into account whether there is a voting coalition in the firm or not. *Age* is firm age expressed in log. *Size* is measured by the log of total assets. *Total debt* is the sum of short-term and long-term debt, divided by total assets. *Financial fixed assets* is the ratio of shareholdings of the firm in tied firms and firms with which there exists a participation link divided by total assets. *Capital expenditures* are new acquisitions of tangible assets, divided by total assets. *Working capital* is computed net of cash and is divided by total assets. *Cash flow* is earnings before interest and taxes divided by total assets. *R&D* are expenses in R&D, divided by total assets. Robust standard errors in parentheses: *** p<0.01, **p<0.05, * p<0.1.

Table 5: The effect of cash holdings on firm market valuation

	OLS	FE	RE	OLS	FE	RE	OLS	FE	RE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Cash	0.835***	0.723***	0.712***	1.043	1.409***	1.355***	-0.449	1.514**	0.863
	(0.257)	(0.185)	(0.176)	(0.657)	(0.492)	(0.460)	(0.905)	(0.663)	(0.633)
Largest shareholder	-0.428***	0.421***	0.179	-0.396**	0.522***	0.284*	-0.685***	0.571***	0.191
	(0.126)	(0.148)	(0.134)	(0.155)	(0.162)	(0.151)	(0.161)	(0.174)	(0.161)
Cash*Largest Shareholder				-0.344	-1.127	-1.061	1.902	-1.189	-0.267
				(0.980)	(0.749)	(0.702)	(1.432)	(0.969)	(0.938)
Voting block*Largest Shareholder							0.292**	0.083	0.081
							(0.124)	(0.148)	(0.140)
Cash*Largest Shareholder*Voting block							-2.369	3.542*	2.451
							(1.938)	(2.028)	(1.775)
Largest shareholder*Family							0.824***	-0.011	0.403**
							(0.131)	(0.217)	(0.170)
Cash*Family							3.995**	2.523**	3.274***
							(1.724)	(1.246)	(1.023)
Cash*Voting block							1.255	-2.511**	-1.767
							(1.017)	(1.214)	(1.107)
Voting block*Family							0.002	-0.481	-0.267
							(0.282)	(0.320)	(0.310)
Cash*Largest Shareholder*Family							-6.116**	-3.867*	-4.991***
							(2.941)	(2.044)	(1.712)
Cash*Family*Voting block							-6.377***	0.599	-0.270
							(2.392)	(2.005)	(1.851)
Voting block*Family*Largest Shareholder							-0.858*	0.023	-0.157
							(0.462)	(0.512)	(0.499)
Cash*Largest Shareholder*Family*Voting block							10.683***	-0.423	0.790
							(3.817)	(3.183)	(2.878)
Age	-0.201***	-0.145	-0.237***	-0.201***	-0.148	-0.237***	-0.172***	-0.141	-0.225***
	(0.034)	(0.103)	(0.052)	(0.034)	(0.103)	(0.052)	(0.034)	(0.104)	(0.051)
Size	-0.021	-0.303***	-0.149***	-0.021	-0.303***	-0.150***	-0.021	-0.310***	-0.146***
	(0.015)	(0.033)	(0.023)	(0.015)	(0.033)	(0.023)	(0.015)	(0.033)	(0.023)
Capital expenditures	1.560***	0.297	0.365	1.556***	0.295	0.363	1.563***	0.295	0.414
	(0.513)	(0.345)	(0.345)	(0.511)	(0.345)	(0.345)	(0.472)	(0.343)	(0.344)
R&D	6.695**	3.973	3.142*	6.684**	3.975	3.155*	7.444**	3.997	3.346*
	(3.037)	(3.099)	(1.782)	(3.041)	(3.098)	(1.783)	(3.229)	(3.077)	(1.752)
Financial fixed assets	0.362***	0.197	0.201*	0.367***	0.216*	0.217*	0.371***	0.220*	0.211*
	(0.116)	(0.120)	(0.111)	(0.116)	(0.121)	(0.111)	(0.112)	(0.120)	(0.111)
Total debt	-0.566***	-0.621***	-0.570***	-0.562***	-0.621***	-0.566***	-0.534***	-0.607***	-0.561***
	(0.170)	(0.109)	(0.100)	(0.170)	(0.109)	(0.100)	(0.171)	(0.109)	(0.100)
Constant	2.458***	7.227***	4.699***	2.432***	7.169***	4.640***	2.328***	7.284***	4.515***
	(0.284)	(0.600)	(0.448)	(0.299)	(0.601)	(0.450)	(0.304)	(0.601)	(0.445)
Observations	1648	1648	1648	1648	1648	1648	1648	1648	1648
R^2	0.098	0.102		0.098	0.103		0.144	0.123	
Hausman test		0.0000			0.0000			0.0000	

This Table presents the estimations of the effect of cash amounts on firm's market valuation. Columns (1) to (3) show results of cash and largest shareholders variable, Columns (4) to (6) include the interaction between cash and largest shareholders variables, and Columns (7) to (9) investigate this effect when family firms and voting blocks are included. *Cash* are liquid assets to total assets. *Largest shareholder* is the percentage of shareholding of the largest controlling shareholder in the firm. *Voting block* is a dummy variable taking into account whether there is a voting coalition in the firm or not.*Family* is a dummy variable taking into account firms related or not to families. *Age* is firm age expressed in log. *Size* is measured by the log of total assets. *Capital expenditures* are new acquisitions of tangible assets, divided by total assets. *R&D* are expenses in R&D, divided by total assets. *Financial fixed assets* is the ratio of shareholdings of the firm in tied firms and firms with which there exists a participation link divided by total assets. *Total debt* is the sum of short-term and long-term debt, divided by total assets. Robust standard errors in parentheses: *** p<0.01, **p<0.05, * p<0.1.

Table 6: Cash holding: The effects of under-diversification and firm risk

	All sample			Reduced sample due to missing values					
	OLS	FE	RE	OLS	FE	RE	OLS	FE	RE
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
Largest shareholder	0.035**	0.026	0.025	0.022	0.036	0.024	0.022	0.034	0.022
	(0.017)	(0.023)	(0.020)	(0.021)	(0.027)	(0.024)	(0.021)	(0.027)	(0.024)
Largest shareholder *Non-Diversified	-0.008	0.026**	0.024**	0.001	0.034**	0.034**	0.001	0.037**	0.036**
	(0.013)	(0.013)	(0.012)	(0.017)	(0.016)	(0.015)	(0.017)	(0.016)	(0.015)
Age	-0.002	0.018	-0.003	-0.003	0.040**	0.005	-0.003	0.040**	0.006
	(0.003)	(0.014)	(0.007)	(0.004)	(0.018)	(0.009)	(0.004)	(0.018)	(0.009)
Size	-0.004*	-0.003	-0.003	-0.003	-0.006	-0.004	-0.003	-0.006	-0.003
	(0.002)	(0.005)	(0.003)	(0.003)	(0.005)	(0.004)	(0.003)	(0.006)	(0.004)
Total debt	-0.089***	-0.024	-0.044***	-0.073**	-0.043**	-0.051***	-0.074**	-0.048**	-0.055***
	(0.022)	(0.016)	(0.014)	(0.032)	(0.019)	(0.017)	(0.033)	(0.019)	(0.018)
Financial fixed assets	-0.296***	-0.247***	-0.266***	-0.299***	-0.222***	-0.242***	-0.300***	-0.223***	-0.243***
	(0.016)	(0.017)	(0.016)	(0.022)	(0.022)	(0.020)	(0.022)	(0.022)	(0.020)
Capital expenditures	-0.229***	-0.048	-0.075	-0.241**	-0.075	-0.100	-0.241**	-0.076	-0.100*
	(0.084)	(0.048)	(0.047)	(0.109)	(0.062)	(0.061)	(0.109)	(0.062)	(0.061)
Working capital	-0.208***	-0.252***	-0.251***	-0.231***	-0.248***	-0.250***	-0.230***	-0.246***	-0.248***
	(0.024)	(0.028)	(0.025)	(0.031)	(0.033)	(0.030)	(0.031)	(0.033)	(0.030)
Cash flow	0.037*	0.041***	0.035**	0.035	0.040**	0.034**	0.035	0.039**	0.033**
	(0.022)	(0.014)	(0.014)	(0.025)	(0.016)	(0.016)	(0.025)	(0.016)	(0.016)
R&D	0.345**	-0.205	0.149	0.084	-0.293	0.131	0.082	-0.320	0.119
	(0.144)	(0.430)	(0.241)	(0.174)	(0.819)	(0.286)	(0.174)	(0.819)	(0.286)
Firm risk							0.030	0.145	0.131
							(0.219)	(0.125)	(0.123)
Constant	0.366***	0.229***	0.336***	0.360***	0.189*	0.299***	0.358***	0.175*	0.286***
	(0.041)	(0.084)	(0.060)	(0.057)	(0.099)	(0.073)	(0.063)	(0.099)	(0.074)
Observations	1648	1648	1648	1078	1078	1078	1078	1078	1078
R^2	0.335	0.160		0.330	0.154		0.330	0.155	
Hausman test		0.0000			0.0068			0.0098	

This Table presents the estimations of the effect of largest shareholders on cash holdings in panel data model including controls for the level of largest shareholders under diversification. Columns (1) to (3) use the full sample like we do for the main estimations and include controls for largest shareholders under diversification. Columns (4) to (6) use the reduced sample when firm risk is included (without including the variable for firm risk), then Columns (7) to (9) includes firm risk variable. *Largest shareholder* is the percentage of shareholding of the largest controlling shareholder in the firm. *Largest shareholder*Non-Diversified* is the largest controlling shareholder variable interacted with the under diversification dummy variable. *Age* is firm age expressed in log. *Size* is measured by the log of total assets. *Total debt* is the sum of short-term and long-term debt, divided by total assets. *Financial fixed assets* is the ratio of shareholdings of the firm in tied firms and firms with which there exists a participation link divided by total assets. *Capital expenditures* are new acquisitions of tangible assets, divided by total assets. *Working capital* is computed net of cash and is divided by total assets. *Cash flow* is earnings before interest and taxes divided by total assets. *R&D* are expenses in R&D, divided by total assets. *Firm risk* is the standard deviation of daily stock returns. Robust standard errors in parentheses: *** p<0.01, **p<0.05, * p<0.1.

Table 7: The effect of coordination centers and the second shareholder on cash holdings

	OLS	FE	RE	OLS	FE	RE
	(1)	(2)	(3)	(4)	(5)	(6)
Largest shareholder	0.031**	0.032	0.046**	0.029**	0.051**	0.043**
	(0.014)	(0.026)	(0.020)	(0.014)	(0.023)	(0.020)
Coordination Center*Largest Shareholder	-0.013	0.038	-0.008			
	(0.011)	(0.043)	(0.026)			
Second shareholder				0.005	0.020	-0.002
				(0.040)	(0.050)	(0.046)
Age	-0.001	0.022	-0.003	-0.001	0.021	-0.003
	(0.003)	(0.014)	(0.007)	(0.003)	(0.014)	(0.007)
Size	-0.003	-0.003	-0.003	-0.004	-0.003	-0.003
	(0.002)	(0.005)	(0.003)	(0.002)	(0.005)	(0.003)
Total debt	-0.089***	-0.025	-0.043***	-0.090***	-0.023	-0.043***
	(0.022)	(0.016)	(0.014)	(0.022)	(0.016)	(0.014)
Financial fixed assets	-0.293***	-0.246***	-0.264***	-0.296***	-0.246***	-0.264***
	(0.017)	(0.017)	(0.016)	(0.016)	(0.017)	(0.016)
Capital expenditures	-0.229***	-0.046	-0.072	-0.230***	-0.044	-0.073
	(0.084)	(0.048)	(0.047)	(0.084)	(0.048)	(0.047)
Working capital	-0.208***	-0.250***	-0.251***	-0.209***	-0.251***	-0.251***
	(0.024)	(0.028)	(0.025)	(0.024)	(0.028)	(0.025)
Cash flow	0.037*	0.041***	0.036**	0.037*	0.041***	0.035**
	(0.022)	(0.015)	(0.014)	(0.022)	(0.015)	(0.014)
R&D	0.352**	-0.146	0.177	0.344**	-0.134	0.175
	(0.143)	(0.429)	(0.241)	(0.144)	(0.430)	(0.241)
Constant	0.349***	0.209**	0.329***	0.365***	0.212**	0.334***
	(0.048)	(0.085)	(0.062)	(0.042)	(0.085)	(0.061)
Observations	1648	1648	1648	1648	1648	1648
R^2	0.335	0.158		0.335	0.157	
Hausman test		0.0000			0.0000	

This Table presents the estimations of the effects of coordination centers in Columns (1) to (3) and the second shareholder in Columns (4) to (9) on cash holdings. *Largest shareholder* is the percentage of shareholding of the largest controlling shareholder in the firm. *Coordination center* is a dummy variable taking into account the fact that a firm is related to these centers or not. *Second shareholder* is the percentage of shareholding of the second shareholder in the firm. *Age* is firm age expressed in log. *Size* is measured by the log of total assets. *Total debt* is the sum of short-term and long-term debt, divided by total assets. *Financial fixed assets* is the ratio of shareholdings of the firm in tied firms and firms with which there exists a participation link divided by total assets. *Capital expenditures* are new acquisitions of tangible assets, divided by total assets. *Working capital* is computed net of cash and is divided by total assets. *Cash flow* is earnings before interest and taxes divided by total assets. *R&D* are expenses in R&D, divided by total assets. Robust standard errors in parentheses: *** p<0.01, **p<0.05, * p<0.1.

A Diversification of the largest controlling shareholders

A.1 Data sources

We collect data on the composition of portfolios of the largest shareholders from several sources depending on their type and nationality.[17] Indeed, the largest shareholder could be a Belgian firm, a non-Belgian firm, or a physical person. When the largest shareholder is a Belgian firm, we use two data sources. For the period from 1991 to 1996, we use the depository of the annual accounts of all Belgian firms at the National Bank of Belgium database known as the *"Centrale des Bilans"*. In addition to annual accounts, this database also contains the participations/subsidiaries of firms. Then for the period from 1997 to 2006, we use the *Belfirst* database from *Bureau Van Dijk* which contains amongst other data the participations/subsidiaries of Belgian firms.[18] When the largest shareholders are European firms we use *Bureau Van Dijk's Amadeus* database. It turns out that the largest shareholders are foreign shareholders in only 28 percent of firm/year observations. Amongst these foreign largest shareholders 23 percent are from the neighboring countries namely, The Netherlands, France, and Luxembourg. When the largest shareholders are physical persons[19], there is no systematic and ready database to use. In that case we gather information from several sources. One of these sources is a book written by the Belgian journalist Verduyn

[17] If the largest shareholder is a voting block we investigate the portfolio composition of the largest shareholder in that voting block.

[18] Data from *Bureau Van Dijk* starts in 1997.

[19] More than 9 percent of firm/year observations in our sample.

(2013). He presents the wealthiest Belgian families in the format of a hit-parade based on their estimated wealth. The book is full of information about different aspects of Belgian corporate system. It provides the history of families, which generation of the family is in charge, the different relations between the different families through marriages and alliances, how the businesses evolved and developed, the various changes the firms went through like mergers, liquidations, listing and delisting from the stock exchange, in addition to many other informative stories and anecdotes. The estimation of families' or individuals' wealth presented is based on the professional wealth, i.e., all the family belongings in terms of businesses.[20] Another rich source on families' wealth and businesses are the Belgian financial press, such as the magazine *Trends-Tendances* where many details about Belgian families, their wealth, their firms, their investments, etc, are discussed weekly. Hence, to establish whether the families and their members are diversified or not we also consulted press articles mainly from the online archives of *Trends-Tendances* magazine.[21] In 2007 *Trends-Tendances* published a hit-parade of the 100 wealthiest Belgian families in the fashion of *Forbes Magazine*. This classification showed that the estimations made by *Ludwig Verduyn* or by *Trends-Tendances* are accurate. Indeed, *Forbes Magazine* in its hit-parade of the wealthiest personalities in the world included *Albert Frère* and his estimated wealth which was similar to the earlier estimations provided by *Ludwig Verduyn* and by *Trends-Tendances*. These data sources are very rich and we are confident that they are accurate. Nonetheless, we should ac-

[20] This journalist also has a website, *derijkstebelgen.be*, which reports news and updates on the evolution of families' businesses and wealth.

[21] These online archives go back in time to the nineties.

knowledge that it is likely that not every single item of the wealth of these families and/or individuals is included in these estimations. They might, for instance, also own expensive real estate, luxury cars, art, etc., but this will remain by no means comparable to the wealth they invest in their firms.

A.2 Under-diversification variable

Using the information gathered from our different sources, we are able to establish whether the largest shareholder has participation interests in other firms than the listed firm in our sample, or not. This allows us to construct a dummy variable for the under-diversification of the controlling shareholders. We opt for a dummy variable instead of the number of participation interests used in Faccio et al. (2011), because, unlike them we were not able to establish the number of participation interests with certainty. Even the number of participations has its limitations, as the authors acknowledge, since the use of the number of participation interests as a proxy for diversification rests on the assumption that the larger the number of firms an investor has in its portfolio, the more likely it is that she is diversified. Thus, this measure does not account for the weights of each investment in the portfolio and may overstate (understate) the level of diversification (non-diversification). Nevertheless, its advantage is that it allows measuring "portfolio diversification without requiring any further information about the portfolio (such as the portfolio structure or returns distribution)" (Faccio et al. (2011), page 3608).

B Family-firm data

Any analysis of firm behavior which distinguishes family-firms from non-family-firms will be sensitive to precisely how firms are classified into these groupings. One of the most ambitious attempts in this direction is the study of the ownership of listed Western European corporations by Faccio & Lang (2002) (F&L, henceforth). According to their methodology, a firm is considered a family-firm if the controlling shareholder is identified as a family (including an individual) or if it is an unlisted company. Recently Franks et al. (2012) have undertaken a more detailed analysis of the largest firms, both listed and private, in each of France, Germany, Italy and the UK. Unlike F&L, their data allows them to trace the ultimate ownership of private as well as listed companies through ownership chains involving both listed and private companies. When they compare their data with the F&L data for their four countries they find that out of the 1359 companies identified by F&L as family owned 532 (or 39%) are not family-firms by the Franks et al. (2012) methodology. In 380 (or 28%) of the cases there is an unambiguous misclassification, generally as a result of F&L's assumption that control by a private firm implies family ownership. In the remaining 11% of cases there is an ambiguous listing status or there is no information available to assign ultimate ownership.

Many studies interested in investigating different aspects of family-firms use F&L data. For instance, Kalcheva & Lins (2007) use F&L data to study the managerial agency problem related to cash holdings for a cross-country sample including Belgium which is the country of our current investigation.[22]

[22]Kalcheva & Lins (2007) cross-country sample also includes countries for which Franks

The Kalcheva & Lins (2007) measure of insider control is defined as the "control rights held by the management group and its family." Thus, if F&L classify the firm as family controlled then Kalcheva & Lins (2007) assign the associated shares as being held by management. This might result in a misclassification for two reasons. Either it may be that the controlling block is held by a private company which is not controlled by a family. Or even if the controlling block is family controlled, it may be that no family member is involved in the management of the firm.

Our sample is drawn from Belgian listed firms which presents an interesting case in this context because under the law on shareholding disclosure introduced in 1989, shareholders are required to declare whether they are part of a voting alliance which could be a family group. Furthermore, many Belgian firms are very old by international standards with origins that can be traced to the 19th century. The matters of family succession and wealth of Belgian dynasties are widely followed and commented upon in the Belgian press. As a result, we can draw upon a variety of sources of supplementary information when verifying the classification of firms into family-firms and non-family-firms.

When we undertake the comparison of our data set with the classifications of F&L, in line with Franks et al. (2012) we find numerous cases of misclassification by F&L. Specifically, there are 8 cases of firms considered family-firms by F&L because they find the ultimate owner is a private company but where we find no such link to a family group. In 5 of these cases, the firms are state-owned. Furthermore, there are 7 firms that F&L consider not

et al. (2012) report family-firm misclassifications by F&L.

family controlled where we are able to confirm that they are in fact family controlled. In addition to all these inconsistencies, the year of data selection is not 1999, as claimed in their paper, but a mix of years between 1996 and 1999.