**Internalizing external capital markets:**

**Evidence from Swedish corporate groups**

Caglar Kaya[1,*], Paulo Ribeiro[2,*]

[1] Center for Corporate Governance, Department of Accounting, Copenhagen Business School, DENMARK, and Research Institute of Industrial Economics; Stockholm, SWEDEN

[2]Insper; São Paulo, BRAZIL

*Correspondences:

ck.ccg@cbs.dk

paulosor1@insper.edu.br

## Abstract[1,2]

Financially constrained firms that face moral hazard concerns may not have sufficient pledgeable income or liquidity to invest in projects with positive net present value. We hypothesize that internal capital markets can help minimize this effect through within-group lending. We investigate whether and how financially unconstrained firms within corporate groups raise funds from external capital markets and, in turn, use their internal capital markets to alleviate their affiliates' financial constraints. To examine the effects of internal capital markets on investments and other firm outcomes, we use a rich 15-year dataset of all the limited liability companies in Sweden. We contribute to the literature by analyzing how this channel allows corporate group firms to mitigate financial constraints through internalizing external capital markets within a corporate group in the financial and legal setting of a developed country. Internal capital markets give corporate groups significant advantages over firms that do not belong to a group. Our findings suggest that financially constrained group firms use funds from intragroup loans to invest more, increase their cash cushion, and decrease their external debt. We obtain these findings in a developed country with strong creditor rights and deep external capital markets.

*Keywords: Internal capital markets, corporate business groups, intragroup loans, financial constraints.*

[1] This is a very preliminary draft, therefore, please do not share this document without the authors' consent.

[2] The authors are grateful to the Research Institute of Industrial Economics (Institutet för Näringslivsforskning - IFN), Stockholm for access to the dataset and Center for Corporate Governance – Copehangen Business School for financial support. The authors also thank Lars Persson, Magnus Henrekson, Joacim Tåg, Pehr-Johan Norbäck, Jens Josephson, Martin Olsson, and Dagmar Muller at IFN, Heitor Almeida, George Pennacchi, Tatyana Deryugina, Rustom Irani, Neil Pearson, Joshua Pollet at the University of Illinois Urbana-Champaign, Marco Bonomo, Bernardo Ricca, Felipe Iachan, Walter Novaes, Igor Cunha, and other seminar participants at Insper for their valuable comments. We would like to thank Thomas A. Gavin, Professor Emeritus, Cornell University, for help with editing this paper.

*JEL classification: G30, G32, G34, L20*

## 1. Introduction

Corporate groups can overcome the financing frictions that some of their financially constrained group firms may face through internal capital markets. We investigate the use of internal capital markets by Swedish corporate groups in which intragroup loans serve as crucial means of fund transfer from parent firms that are better financially to affiliate firms that are constrained financially.

Intragroup loans may perform four non-mutually exclusive functions (Desai et al., 2004, Gopalan et al., 2007). First, they enable corporate groups to fund investment opportunities across group firms. Second, intra-group loans are a way to provide support for financially troubled firms. Third, intragroup loans let corporate groups tunnel resources toward group firms with higher insider ownership. Fourth, corporate groups utilize intragroup loans opportunistically to facilitate tax minimization. Primarily, multinational corporate groups benefit from intragroup loans for tax purposes because they are exposed to variations in tax incentives between different countries. The first two functions represent the bright side of internal capital markets, whereas the last two are related to an internal capital market's dark side.

This study focuses mainly on the second function of internal capital markets within the setting of a developed country, Sweden. Unlike previous literature, our paper investigates the functioning of internal capital markets in funding financially constrained affiliate firms when there is a developed external capital market with enhanced legal rights for both creditors and borrowers.

Group firms that are facing, for instance, moral hazard concerns do not have enough pledgeable income or liquidity to invest in projects with positive net present value. We hypothesize that internal capital markets may help corporate group firms minimize the effect of being financially constrained through within-group lending. However, one firm within the corporate group, which is usually called the "flagship", "parent," or "locomotive company" of the group, should be less financially constrained, or not at all, to provide alternative funding to its financially constrained affiliates and subsidiaries. The parent companies' financial strength can be observed because they are the firms that usually set the relationships with financial markets and banks.

These parent companies usually support their affiliate companies in two ways. The first way is that they borrow directly from external capital markets, such as through issuing bonds or obtaining bank loans and, then, they transfer these funds to the group firms through intragroup loans. The second way is that parent companies provide a letter of guarantee to their group companies as collateral, while affiliate companies borrow almost exclusively from banks. Group affiliation allows companies to share collateral and debt capacity that could help them borrow more from the banks (Santioni et al., 2020). To test the hypothesis that internal capital markets enable firms to alleviate financial limitations, we specifically analyze how financially sound parent firms that manage corporate groups make financial decisions to lessen their affiliates' financial constraints.

Our example comes from a large, well-known conglomerate called Alphabet in the U.S., where we diagram the potential flow of capital of financially constrained firms that hypothetically find funds for themselves in the case where these firms belong to a business conglomerate, a corporate group (Figure A). In this study, we analyze, for example, whether

Calico, the affiliate company, raises capital through intercompany loans (hereafter, called intragroup loans) after Google, its parent company, obtains funds from external capital markets. In this example seen in Figure A, Calico is a financially constrained small biotech company owned by Alphabet Corporate Group. Google, which is a vast internet-related service and products company, is the financially unconstrained parent company in the group.

Overall, we investigate whether and how financially unconstrained firms in the corporate groups raise funds through external capital markets to alleviate their affiliates' and subsidiaries' financial constraints. We contribute to the literature by providing empirical evidence for the channel that involves internalizing external capital markets to mitigate financial constraints within corporate groups. This paper's findings may also contribute to the policy debate about the regulations for intragroup loans. On the one hand, intragroup loans may be subject to tax planning and profit shifting. On the other hand, these loans can diminish economic frictions, which would improve investments at the firm level.

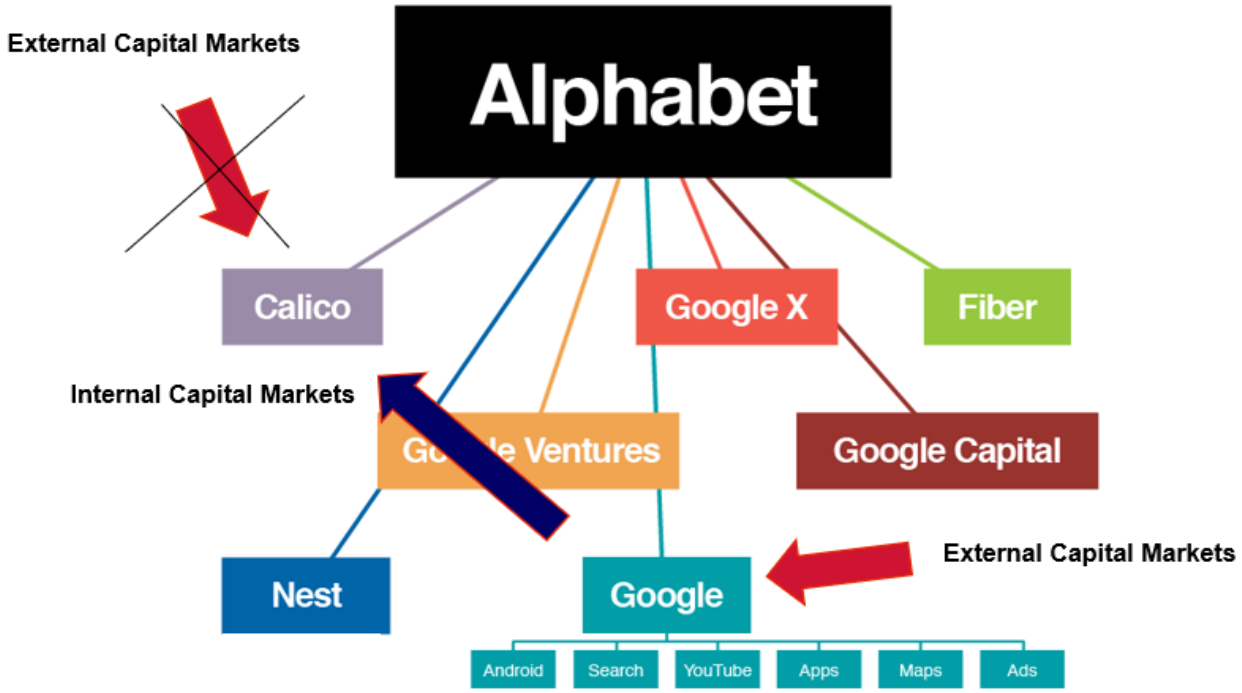


**Figure A. Diagram with the flow of capital.** The figure describes a possible flow of capital in which financially constrained firms finance themselves when these firms belong to a business conglomerate. For didactic reasons, we use a more well-known ownership structure (Alphabet conglomerate) to explain the mechanism we investigated.

There are studies in the literature on business groups that focus on the role of internal capital markets. However, their efforts have been limited by relatively short-horizon, small samples, and specific settings (Blanchard et al., 1994; Lamont 1997; and Gopalan et al., 2007). Previous studies either employed a developing country's data (Lamont 1997) or a U.S. multinational company's dataset (Desai et al., 2004) to investigate the functioning of internal capital markets in corporate groups. Findings in these previous studies also need to be tested in a developed country as well. One should understand whether companies use internal capital markets only to cope with underdeveloped capital market conditions and an unfavorable legal environment, as in the of a developing country, or whether they benefit from tax differences between countries as in the case of a multinational corporate group.

This paper also adds to the literature by analyzing a comprehensive dataset that includes both private and public firms' data and consists of information on several small enterprises. Our dataset covers a long period of 15 years, roughly 300,000 firms, almost 1.5 million observations, and approximately 100,000 distinct ownership relations in corporate groups.

Moreover, we propose a novel instrumental variable to evaluate the effects of internal capital markets on various firm outcomes, such as investment, leverage, liquidity, employment, productivity, and corporate governance measures. This new instrument can track the capital path through intragroup loans, from the external capital raising of the financially unconstrained firm in the corporate group to the capital usage by the financially constrained affiliate at the end.

The findings in this paper suggest that their internal capital markets give corporate groups significant advantages over stand-alone firms when some group firms experience financial constraints. This study shows that parent firms use the capital they obtain by issuing more equity in the groups' internal capital markets rather than the funds they borrow. A 1%-point increase in the average parent's equity is associated with an average improvement of 3% in the affiliate's average internal debt, which represents a 23% growth in the affiliate's average internal debt. Parent firms do not tend to increase their external debt by borrowing from financial markets and lending to their financially constrained group firms.

By conducting an instrumental variable analysis, we also investigate to what extent and in which different ways the financially constrained affiliates employ internal funds from the parent firms. After they obtain intragroup loans, these affiliate firms increase their investments, pay back their external debt, or hold these funds as additional liquidity. For an affiliate firm, a one standard deviation increase in its internal debt implies a 0.98 standard deviation increase in its investments, a 0.67 standard deviation decrease in its external debt, or a 2.12 standard deviation

increase in its cash holdings. In turn, they do not pay extra dividends, conforming to the existence of strict corporate governance rules in many corporate groups in Sweden. Indeed, we observe a reduction in payouts, which corroborates the idea that financially constrained affiliates need and demand liquidity from the other group firms.

By focusing on different sub-samples, this study also points out that financially constrained firms with a private parent firm benefit from the internal capital markets more than financially constrained firms with a publicly listed parent firm. Furthermore, we also obtain results indicating that the affiliate firm's management may use this extra liquidity from intragroup loans for its benefit. By evaluating the effects of internal capital markets on corporate governance, we find that once the affiliate firms receive more intragroup loans, they raise the salaries of their managers and employees. A 1%-point increase in internal debt causes wages to grow by 4.7% in the case of managers and 1.6% in the case of employees.

Our findings are consistent throughout different settings. We obtain qualitatively similar outcomes even if we restrict our sample to multi-industry conglomerates against same-industry groups. However, the economic impact of internal capital markets on capital usage is higher for affiliates in multi-industry conglomerates than for the affiliates in same-industry conglomerates. This result is consistent with the fact that diversified conglomerates benefit more from internal capital markets.

The rest of the paper is organized as follows. Section 2 summarizes the related literature. Section 3 presents a theoretical model to develop the paper's main hypothesis. Section 4 describes the data and provides descriptive analyses of the sample. Section 5 discusses the identification strategy and reports the main empirical results. Section 6 provides an instrumental

variable approach, and Section 7 reports further empirical analyses. Finally, Section 8 provides conclusions.

## 2. Literature Review

There is ongoing interest in the recently published literature about complex corporate groups and conglomerate structures and their effects on financial constraints. Lamont's research (1997) was the first study that provides a causal interpretation of the internal, within-group financing alternatives. Lamont (1997) used a dataset that covers the 1986 oil price shock period. He observes a decline in investment amounts concentrated in non-oil company units that were subsidized by the oil-related business units of the oil-driven (flagship) company's group. This evidence is consistent with the view that large, diversified conglomerates usually overinvest in and subsidize underperforming group segments, affiliates, and subsidiaries.

On the other hand, internal capital markets may provide more efficient access to the required capital and create financial synergies for firms than the prevailing external markets. The higher efficiency in the internal capital markets might be the reason why companies prefer mergers and acquisitions and create conglomerates that consist of many subsidiaries and affiliates. They set up corporate groups and use internal capital markets to overcome financial frictions in the business world. By examining the causes and consequences of differences between external and internal costs of finance in a sample of multinational corporations, Desai et al. (2004) show that multinational firms appear to employ internal capital markets opportunistically to overcome imperfections in external capital markets. Their cross-country sample of U.S. multinational firms' foreign affiliates study asserts that internal capital markets

can facilitate tax minimization and provide an alternative financing source when external financing is costly. Desai et al. (2004) find that the estimated elasticity of external borrowing to an increase in the tax rate is lower than the estimated tax elasticity of internal group borrowing. They also conclude that U.S. affiliates borrow less externally and more from parent companies in countries with weaker creditor rights and shallow capital markets.

Corporate groups employ internal capital markets to support their financially troubled firms. By examining the evidence of bankruptcy in corporate group firms, Gopalan et al. (2007) investigate the use of internal capital markets in a developing country, India. They document that in Indian Business Groups, intragroup loans are essential means of transferring cash across group firms and are typically used to finance weaker group firms. On the other hand, Gopalan et al. (2007) argue that there is no evidence of group loans being used to fund investment opportunities or to tunnel cash toward group firms with higher insider ownership.

While analyzing the determinants of group affiliation, Belenzon et al. (2013) find that those Western European countries with less developed financial markets have a higher percentage of firms affiliated with a corporate group in more capital-intensive industries. The authors also find that this relationship between less developed financial markets and group affiliation is more noticeable for young, small firms, and for affiliates of large, diversified groups. In short, Belenzon et al. (2013) conclude that firms are more likely to be affiliated with a corporate group when access to the internal capital market is most needed.

The link between corporate group affiliation and financial constraints is, therefore, an important channel that deserves further research. Firms might be more likely to belong to a corporate group when they access financing more quickly through their internal capital markets. Past studies, such as Buchuk et al. (2014) and Almeida et al. (2015), corroborate this

conditionality. The financing through internal capital markets is probably less costly than that one obtained through external capital markets, not only in a setting of multinational group firms (Desai et al., 2004) or in a developing country's creditor rights and legal environment (Gopalan et al., 2007), but also in a developed country with more substantial creditor rights and deeper capital markets. Moreover, maintaining borrowing relationships with external capital markets through a parent company is more efficient and less costly in terms of economies of scale for corporate groups.

Firms that borrow internally have higher investment, leverage, and profitability than other firms that borrow externally (Buchuk et al., 2014). In turn, as observed by Belenzon et al. (2013), capital-intensive firms and small firms in business groups tend to receive more intragroup loans than other firms outside business groups. Finally, internal capital markets may help to mitigate the adverse effects of a large financial shock on investment, firm performance, and growth (Almeida et al., 2015).

Accordingly, as pointed out by Masulis et al. (2020), using internal capital markets to support incubation activities is an effective strategy for conglomerates to overcome the challenges in obtaining external financing that new affiliates face. Corporate groups use internal capital markets to incubate difficult-to-finance projects, thus making it feasible for them to scale up. Hence, the intragroup financing policy is essential for affiliates and parent companies when financing new investments, experiencing organic growth, or making new acquisitions.

Intragroup lending can also be motivated by tunneling[3] or by a financing advantage. The minority shareholders of the lending firm can be harmed by the opportunistic behavior of the controlling shareholder if tunneling prevails. However, the evidence from Buchuk et al.'s (2014) study supports the financing advantage hypothesis.

Most recently, Larrian et al. (2018) and Santioni et al. (2020) provided additional evidence consistent with the hypothesis that group affiliation eases credit constraints. Larrian et al. (2018) find that when firms that formerly belonged to a business group become stand-alone, they reduce their leverage and investments. Santioni et al. (2020) show that affiliates survive the financial distress of the 2008 financial and euro crises better than stand-alone firms. These outcomes are consistent with both collateral cross-pledging[4] and capital misallocation in groups. However, it is still ambiguous in the literature if the financing of affiliates by parent companies comes from abundant cash flows, excessive leverage, cheaper equity funding, or other types of capital raising. Our study aims to address this question empirically. We also present additional evidence regarding how corporate groups overcome financial constraints by utilizing their internal capital markets in a developed market where access to the external capital market is relatively easy and financial frictions are less than those in developing markets.

## 3. Theoretical Framework

The capital structure irrelevance proposition from Modigliani and Miller (1958) allows us to infer that internal capital markets cannot generate additional market value to a firm without

[3] The tunneling hypothesis predicts that loans go from the firms in which the controlling shareholder has weaker cash flow rights toward the firms in which he/she has stronger cash flow rights (Johnson et al., 2000; Bertrand et al. 2002)

[4] The assets of one firm can be used as collateral for the debt of the other firm.

economic frictions. We relax the assumption of frictions by considering a moral hazard two-stage model taken from Holmström and Tirole (1997) and adapted by Tirole (2010) to incorporate internal capital market features. There are dates $t = 1$ and $t = 2$. For each date, there is a project with a fixed investment, which are equal to $I_1$ and $I_2$, respectively. For simplicity, we assume that there is no discounting between the dates, the agents are risk-neutral, no relation exists between the projects, and both projects are identical except for the fixed cost. We also assume $I_1 > I_2$. The manager that owns each project has initial wealth $A$ at $t = 1$. Each project yields $R$ with probability $p$ and nothing with probability $1 - p$[5].

Since this is a moral hazard problem, the manager can misbehave and, in that case, obtain a private benefit $B$. The project's probability of success depends on the manager's behavior. The probability of success is $p_H$ if the manager behaves, and $p_L$ otherwise. Denote $\Delta p \equiv p_H - p_L$. We assume that both projects have positive net present value (NPV) in the case where the manager behaves, that is, $p_H R > I_t \; \forall t$. However, if the manager misbehaves, the projects face negative NPV, which means $p_L R + B < I_2 < I_1$. We also assume the following:

$$I_2 < p_H \left(R - \frac{B}{\Delta p}\right) < I_1 - A \qquad \textbf{(1)}$$

$$2p_H \left(R - \frac{B}{\Delta p}\right) > (I_1 + I_2) - A$$

**(2)**

The first restriction **(1)** implies that the manager cannot fund the first project fully due to the lack of enough (expected) pledgeable income, denoted by $p_H \left(R - \frac{B}{\Delta p}\right)$. The second inequality equation **(2)** tells us that the second project generates enough pledgeable income to

[5] The manager is protected by the limited liability rights.

fund itself and the first project's fixed cost. From the perspective of the moral hazard literature (for the foundation of information asymmetry in corporate finance, see Jensen and Meckling, 1976), the lender's individual rationality[6] is not satisfied for the date-1 project. However, for the date-2 project, individual rationality is satisfied.

To finance the project at $t = 1$, the manager has the option to give the lender control rights over the date-2 project's income. The control rights determine the financing decision in $t = 2$. Having control rights over the date-2 project's income can give the lender enough incentive to finance the first project at $t = 1$. At this point, the internal capital market case is the situation when the lender holds the control rights over the date-2 project and makes the financing decision about the date-1 project. We refer to the situation of the lender financing both projects in return for having control rights in the second project as an instance of an internal capital market. In this case of the internal capital market, sharing the date-2 project's profit with the lender makes the first project feasible and viable for the manager. On the other hand, we have the external capital market case when the manager keeps all control rights over the date-2 project's return, and the lender has no incentive to finance the date-1 project. In this scenario, the financing decision of the project at $t = 1$ depends only on the external capital market.

We start with the case when internal capital markets do not exist. We assume that the existing capital markets are competitive[7]. In this situation, project 2 has enough pledgeable income, and the manager can raise capital to finance project 2. Hence, the manager obtains $p_H R - I_2$. In this case, the lender has no gains from project 2. The lack of revenue from project 2

[6] The individual rationality is defined as the necessary condition that ensures managers are able to borrow from lenders. That is, the lenders, at least, break even.
[7] This hypothesis implies that the loan, if any, makes zero profit. There are enough number of lenders such that there is no profit left to the one who provides capital to finance the project.

implies that project 1, in which the manager does not have enough pledgeable income to borrow, does not receive financing. The external capital markets lead to inefficient credit rationing once project 1's NPV is positive.

Now, we move to the case where internal capital markets exist. We still assume that capital markets are competitive. In period t=2, the manager and the lender bargain over the project's profits on this date. Let $\theta$ denote the bargaining power of the lender in that negotiation. Therefore, $1-\theta$ represents the bargaining power of the manager. $\theta$ can be viewed as the probability that the lender chooses the date-2 contract.

If $\theta = 1$, the lender pays the manager the minimum required incentive to make him behave, which is $\frac{B}{\Delta p}$ in the case of success, and zero otherwise[8]. Then, the lender's expected payoff is $p_H\left(R - \frac{B}{\Delta p}\right) - I_2$. If $\theta = 0$, the manager keeps the same $p_H R - I_2$ as in the external capital market situation, and there is no money left for the lender. Thus, for $0 \leq \theta \leq 1$, the lender receives $\theta\left[p_H\left(R - \frac{B}{\Delta p}\right) - I_2\right]$.

Therefore, we can conclude that a sufficiently high $\theta$, that permits financing at $t = 1$, exists. The $\theta$ that allows for financial constraints' alleviation is the one that satisfies the following inequality:

$$-\left[(I_1 - A) - p_H\left(R - \frac{B}{\Delta p}\right)\right] + \theta\left[p_H\left(R - \frac{B}{\Delta p}\right) - I_2\right] \geq 0$$

**(3)**

[8] $\frac{B}{\Delta p}$ satisfies the incentive compatibility constraint, which provides the condition that is required for the manager to behave. We denote $R_b$ as the portion of profit that goes to the manager. Then, the incentive compatibility constraint would be $p_H R_b \geq p_L R_b + B$.

Under the circumstance in which inequality **(3)** is satisfied, internal capital markets provide the required pledgeable income to make the investment feasible. In other words, internal capital markets are an alternative mechanism to alleviate a firm's financial constraints and, thereby, these firms could invest in positive NPV projects that would not have been viable otherwise.

Another perspective provided by Scharfstein and Stein (2000) and Gertner et al. (1994) argues that an internal capital market exposes the manager to a "holdup problem". Suppose that the date-2 project requires the manager to pay a private fixed cost, $C$, at time $t = 1$, where $p_H\left(\frac{B}{\Delta p}\right) < C < p_H R - I_2$. This fixed cost, $C$, is a sunk cost for the manager. In the case of $\theta = 1$, the first inequality tells us that the manager has no incentive to invest through the internal capital market. In contrast, the second inequality implies that investing is optimal if the manager can raise capital externally.

The theoretical reasoning from the model above leads us to our main hypothesis, as follows: Does an internal capital market help an affiliate firm within a corporate group by alleviating its financial constraints through intragroup loans provided by the parent firm? Based on the theoretical model above, we expect internal capital markets to help a financially constrained affiliate to make the formerly unfeasible positive-NPV investment once the affiliate raises capital through internal group loans. Otherwise, the affiliate firm would miss these investments. Furthermore, provided that the hypothesis holds, we examine the question of how parent firms finance themselves externally to transfer capital to their affiliates. Do parent firms issue more equity or borrow from financial markets to support group companies? Unfortunately, the moral hazard model presented above gives us no clue about what to expect empirically regarding this question's answer. However, from the pecking order theory (Majluf and Myers, 1984) and tradeoff theory (Kraus and Litzbenger, 1973; Myers, 1984), we know that companies

prefer debt over equity under general conditions. We investigate whether parent firms follow the same financing order in providing group firms with intragroup loans.

As mentioned in Section 2, internal capital markets have both bad and good sides. There are two main branches of theoretical explanations depending on the features of internal capital markets. One group argues that internal capital markets provide an efficient capital allocation, whereas the other group claims that internal capital markets cause firms to operate inefficiently. According to the first group's reasoning, internal capital markets play a role in distributive cash transfers among a conglomerate's divisions. For instance, Gertner et al. (1994) argue that the ownership aspect of internal capital allocation leads to more monitoring than any external funding source, such as banking. Moreover, Stein (1997) shows that the better information possessed by headquarters can make internal capital markets a more efficient way to allocate funds among divisions, especially for subsidiaries in the same industry.

However, Stein (1997) also provides a reason supporting the second group that rejects the efficiency of internal capital markets. He stresses that misbehavior may arise from the competition among different divisions for the limited corporate funds. Excessive lobbying or collusion between some divisions (Rajan et al. 2000; Scharfstein and Stein 2000) may cause an inefficient distribution of intragroup funds. The financially stronger divisions in a corporate group may utilize those funds to improve and to sustain the survival of the weak division.

In conclusion, we derive the fact from the theoretical framework that internal capital markets lead us to a tradeoff. From one point of view, they allow financially constrained firms to invest optimally. In contrast, from another point of view, they raise holdup concerns, resulting in an inefficient allocation of resources.

## 4. Data

To identify financially constrained firms, first, we need to measure pledgeable income or liquidity. Farre-Mensa and Ljungqvist (2016) find that firms typically classified as financially constrained do not actually behave as if they are constrained. Only small private firms appear to face severe financial constraints and to have difficulties in financing their operations and investments. However, it is not possible to include small private companies in many empirical corporate finance studies that focusing on the topic of financial constraints due to the lack of accessible and available data.

Here, we have a chance to analyze small and medium-sized firms owing to a unique dataset from Sweden, which includes financial statement data from both small and medium-sized companies and large corporate groups. This rich dataset also contains detailed information about the ownership structure and accounting data for all limited liability companies in Sweden between 1998 and 2012. The data frame ends in 2012.

We obtain data from the Research Institute of Industrial Economics (IFN). The data's primary source is the Swedish Companies Registration Office. This office is the government agency that keeps track of limited liability corporations in Sweden. The database contains the following information:

(a) registry information about the firms' company status, e.g., industry, age;

(b) complete accounting information: at the firm-level and corporate group-level;

(c) information on the ownership structure: holdings, parents, affiliates, mergers, splits;

(d) information on corporate events, e.g., bankruptcy, liquidation, and;

(e) corporate governance data: board members and CEOs' bonuses and salaries.

This vast dataset needed cleaning, arrangement, and filtering. This dataset also includes very small-sized enterprises. Therefore, we drop the firms which do not have a holding firm status and have less than two employees. Moreover, we exclude non-profit-oriented legal entities. As a common practice in the corporate finance literature, we exclude companies operating in the banking, insurance, and utility sectors. We scrutinize the dataset meticulously in terms of accounting standards. We trim from the sample the firms that do not report total asset accounts and provide negative balances for some main accounts in the financial statements, such as property, plant, and equipment (PPE), sales, main liability accounts, etc. Then, more importantly, we exclude the firm-year observations when the fundamental accounting equation, i.e., the equality of total assets with total liabilities and equity, is not satisfied.

Furthermore, we prefer to exclude any outlier firm-year observations, such as a growth rate of 1,000 % for total assets or sales. The original data span is from 1989 to 2015. However, we exclude the years before 1998 due to the substantial changes in accounting standards in 1997. Additionally, we do not have consolidated group financial statements, so we must exclude the last three years in the dataset (i.e., 2013, 2014, and 2015). In short, we only focus on the period from 1998 to 2012. In our analysis, whenever we use any variable denoted in monetary terms other than a ratio, we always deflate these values with the Swedish CPI Index. We choose the base year as 2010 in the CPI Index.

According to the ownership structure, the dataset consists of 287,727 firms. These firms are either public firms or private firms. The total number of firm-year observations in the sample is 1,701,627. We also classify these companies based on the criterion of whether they belong to a corporate group or are a stand-alone firm. We should note that during the sample period, these

characteristics of the companies might change. Some companies either go to public through initial public offerings, or they are acquired and become private firms; that is, a takeover occurs. Moreover, regarding the classification of belonging to a corporate group, some stand-alone companies are acquired by corporate groups during the sample period. Therefore, the numbers of the firms in the categories of public firms vs. private firms and corporate group firms vs. stand-alone firms may vary across time.

**Table I - Panel A** depicts the firms' classification according to these criteria for the whole sample period. As expected, there are many more private companies than public firms. The number of stand-alone firms is almost 50% higher than the number of firms that belong to a corporate

**Table I - Number of firms**

**Table I** presents a classification of firms according to several criteria for the whole sample period. **Panel A** classifies firms into the following four groups: public, private, corporate, and stand-alone. **Panel B** categorizes corporate group companies into three categories: affiliates/subsidiaries, parent firms, and holding firms.

| **Classification** | | **Public** | **Private** |
|---|---|---|---|
| *Panel A: Full sample* | | | |
| **Overall** | ***287,727*** | **1,005** | **287,475** |
| **Corporate** | **133,076** | 905 | 132,972 |
| **Standalone** | **202,345** | 241 | 202,222 |
| *Panel B: Corporate firms only* | | | |
| | Affiliate | Parent | Holding |
| **Corporate** | 72,503 | 15,560 | 60,078 |
| Private | 72,424 | 15,389 | 59,825 |
| Public | 174 | 365 | 592 |

group. Stand-alone firms are more common among private firms. On the other hand, many public firms belong to a corporate group. Moreover, **Table I - Panel B** classifies corporate group companies into three sub-groups: affiliates/subsidiaries, parent firms, and holding firms. Most private firms are affiliates or subsidiaries in this sample, whereas most public firms have a holding firm status.

A total of 99.7% of the firm-year observations in the dataset belong to private companies, which is expected because the sample covers all limited liability companies in Sweden. Moreover, approximately one-third of the sample companies belong to corporate groups. Some of them are either subsidiaries or affiliates owned by other group companies. On the other hand, some companies are either parent companies or holding companies that own shares in the group companies. Only 15% of the firm-year observations of the affiliate companies are also classified as firm-year observations of parent companies. These parent companies are also listed in the dataset as affiliate companies because they are also owned by another parent company. Therefore, 85% of the firm-year observations belong to companies that have only affiliate firm status.

Regarding the links among group companies in this dataset, every holding company is a parent company. However, not all parent companies are holding companies. Most parent companies are holding companies, but some parent companies are also affiliate firms, so they are not holding companies. In this paper, we focus on internal capital markets in which financing goes mostly from financially unconstrained group firms (most of the time, either a parent firm or a holding company) to financially constrained firms. Therefore, the separation of the status between a holding firm and a parent firm does not matter for this study's topic. In the rest of the paper, we perform descriptive analyses and regressions by categorizing the firms into two groups

based on their status in the corporate group (i.e., parent firms and affiliate firms). We do not perform any specific analysis based on the status of being a holding firm.

The characteristics of being a private firm versus a public firm or a stand-alone firm versus belonging to a corporate group are essential factors in determining the firms' decisions to finance and to invest. Being a private or public firm and belonging to a corporate group or doing business alone definitely influences the business models of companies. Analyzing the firm characteristics separately in these subsamples would have been more appropriate. Therefore, we can provide summary statistics of the variables according to the different categories of firms, thanks to the richness of the dataset. In all the summary statistics tables, the variables are ratios except when their unit of measure is mentioned explicitly. We calculate these ratios based on the data from the financial accounts of the balance sheets and income statements. All these ratios are normalized with total assets unless otherwise stated.

**Table II** describes the summary statistics for the whole sample. On average, firms in the sample finance their assets as follows: 36.3 % with equity and 63.7 % with debt. Although the leverage ratio is 63.7 % on average, which implies a higher indebtedness level, one should consider this leverage ratio together with the cash holding-asset ratio that is 23.7 %. The netted-off ratio would be 40 %, which is consistent with the findings of Lemmon et al. (2008). They categorize the U.S. publicly listed firms that have survived at least 20 years in four groups: very high-, high-, medium-, and low-leveraged firms. The average book leverage ratios they calculate for these groups are 35 %, 30 %, 25 %, and 19 %, respectively. Moreover, the sample firms have an 8.3 % return on equity on average.

**Table III** shows the summary statistics of the variables for the public companies in which equity financing comprises 54.7 % of total assets and debt financing makes up 45.3 % of

total assets. Moreover, Table III also provides us with the summary statistics of the variables that belong to private firms. A median private firm funds 32.1 % of its assets with equity and 67.9 % of its assets with debt.

We provide summary statistics of the variables for the subsamples of stand-alone firms and corporate group firms in **Table A2** in the appendix. In terms of the capital structure, one of the main differences between stand-alone firms and corporate group firms is that the internal debt financing among corporate groups (11.5 %) is much higher than that among stand-alone firms (0.4 %). In addition, stand-alone firms hold almost twice as much cash and cash equivalent assets compared with corporate group firms on average.

## Table II – Summary statistics

**Table II** reports the summary statistics. All variables (except size, age, number of employees, and productivity) are reported in terms of the percentage of total assets. The variables' definitions are provided in **Table A1** of the appendix. The table's columns show the mean, 10th percentile, median, 90th percentile, standard deviation, and the number of observations for each variable in our dataset for the whole sample. Each year, all variables are winsorized at the 1% and 99% levels and by firm status (private or public).

| Variable | Mean | 10th percentile | Median | 90th percentile | SD | N |
|---|---|---|---|---|---|---|
| Cash Holdings | 23.7 | 0.1 | 14.6 | 63.5 | 25.3 | 1,701,147 |
| Investment | 4.2 | 0.0 | 1.2 | 13.2 | 8.6 | 1,320,725 |
| Size | 13,605 | 530 | 2,740 | 20,781 | 176,581 | 1,701,627 |
| Leverage | 63.7 | 27.9 | 67.9 | 92.5 | 24.6 | 1,701,146 |
| Tangibility | 20.0 | 0.0 | 7.7 | 63.4 | 25.2 | 1,701,084 |
| Profitability | 8.3 | -19.6 | 11.7 | 57.6 | 72.7 | 1,701,345 |
| Age | 15 | 3 | 12 | 33 | 13 | 1,701,194 |
| External Debt | 11.7 | 0.0 | 0.0 | 43.5 | 19.8 | 1,700,994 |
| Internal Debt | 4.7 | 0.0 | 0.0 | 15.6 | 13.6 | 1,701,001 |
| Payout | 20.6 | 0.0 | 0.0 | 57.5 | 62.7 | 1,578,648 |
| Intangible Assets | 0.8 | 0.0 | 0.0 | 0.0 | 4.5 | 1,701,145 |
| Executive Remuneration | 17.0 | 0.0 | 7.9 | 47.0 | 24.1 | 1,582,042 |
| Executive Bonus | 0.0 | 0.0 | 0.0 | 0.0 | 0.3 | 1,643,552 |
| Employees Paycheck | 32.2 | 0.0 | 19.7 | 81.2 | 39.1 | 1,635,002 |
| Employees Bonus | 0.0 | 0.0 | 0.0 | 0.0 | 0.0 | 1,643,545 |
| Number of Employees | 12 | 2 | 4 | 18 | 111 | 1,593,731 |
| Productivity | 1,528 | 407 | 997 | 3,015 | 1,806 | 1,481,794 |

Furthermore, **Table IV** depicts the summary statistics separately for the subsample of corporate group companies: parent companies and affiliates/subsidiaries. According to Table IV, parent companies are on average more profitable and pay higher dividends than affiliates. On the other hand, affiliates are larger in terms of size (total assets), hold more cash, and have higher leverage than parent firms. These findings are understandable since affiliates are mostly the companies that do the businesses, whereas some parent firms are just holding companies without any specific production or operation role. These fundamental characteristics confirm the general assumption that parent companies are usually less financially constrained.

## Table III - Comparison of the main characteristics between private and public firms.

**Table III** reports the mean, median, and number of observations for private and public firms separately. All variables (except size, age, number of employees, and productivity) are reported in the percentage of total assets. **Table A1** in the Appendix provides the definition of each variable. This table also reports the differences in the means and medians for each variable. *, **, *** indicate significance at the 10%, 5% and 1% levels, using heteroscedasticity-consistent standard errors. All variables are winsorized at the 1% and 99% levels each year and by firm status (private or public).

| Variable | Mean | Median | N | Mean | Median | N | Difference in Means | Difference in Medians |
|---|---|---|---|---|---|---|---|---|
| | Private | | | Public | | | | |
| Cash Holdings | 23.7 | 14.6 | 1,696,313 | 15.9 | 5.7 | 4,834 | 7.8*** | 8.9*** |
| Investment | 4.2 | 12.8 | 1,316,521 | 3.3 | 0.8 | 4,204 | 0.9*** | 12.0*** |
| Size | 11,187 | 2,728 | 1,696,793 | 862,290 | 57,827 | 4,834 | -851,103*** | -55,099*** |
| Leverage | 63.7 | 67.9 | 1,696,312 | 45.3 | 44.4 | 4,834 | 18.4*** | 23.5*** |
| Tangibility | 20.0 | 7.8 | 1,696,252 | 10.4 | 1.2 | 4,832 | 9.6*** | 6.6*** |
| Profitability | 8.4 | 11.8 | 1,696,511 | -25.3 | 0.0 | 4,834 | 33.7*** | 11.8*** |
| Age | 15 | 12 | 1,696,360 | 20 | 14 | 4,834 | -5*** | -2*** |
| External Debt | 11.7 | 0.0 | 1,696,160 | 9.9 | 0.0 | 4,834 | 1.8*** | - |
| Internal Debt | 4.6 | 0.0 | 1,686,167 | 7.9 | 0.6 | 4,834 | -3.3*** | -0.6*** |
| Payout | 20.5 | 0.0 | 1,574,386 | 51.8 | 0.0 | 4,262 | -31.3*** | - |
| Intangible Assets | 0.8 | 0.0 | 1,696,311 | 6.5 | 0.0 | 4,834 | -5.7*** | - |
| Executive Remuneration | 17.0 | 7.9 | 1,577,400 | 3.3 | 1.4 | 4,642 | 13.7*** | 6.5*** |
| Executive Bonus | 0.0 | 0.0 | 1,638,813 | 0.0 | 0.0 | 4,739 | - | - |
| Employees Paycheck | 32.2 | 19.8 | 1,630,295 | 16.3 | 5.4 | 4,725 | 15.9*** | 14.4*** |
| Employees Bonus | 0.0 | 0.0 | 1,638,807 | 0.0 | 0.0 | 4,738 | - | - |
| Number of Employees | 12 | 4 | 1,589,070 | 137 | 10 | 4,661 | -125*** | -6*** |
| Productivity | 1,524 | 996 | 1,477,423 | 2,986 | 1,325 | 4,371 | -1,462*** | -329*** |

## Table IV - Comparison of the main characteristics between affiliate and parent firms.

**Table IV** reports the mean, median, and number of observations by affiliate and parent firms separately. All variables (except size, age, number of employees, and productivity) are reported in the percentage of total assets. **Table A1** defines each variable in the appendix. This table also reports the differences in the means and medians for each variable. *, **, *** indicate significance at the 10%, 5% and 1% levels, using heteroscedasticity-consistent standard errors. All variables are winsorized at the 1% and 99% levels each year and by firm status (private or public).

| Variable | Mean | Median | N | Mean | Median | N | Difference in Means | Difference in Medians |
|---|---|---|---|---|---|---|---|---|
| | Affiliate | | | Parent | | | | |
| Cash Holdings | 18.7 | 9.2 | 383,915 | 15.3 | 4.4 | 264,231 | 3.4*** | 4.8*** |
| Investment | 3.5 | 1.3 | 304,031 | 1.9 | 0.0 | 208,844 | 1.6*** | 1.3*** |
| Size | 34,373 | 7,511 | 383,970 | 19,308 | 3,857 | 264,278 | 15,065*** | 3,654*** |
| Leverage | 69.1 | 74.8 | 383,915 | 54.0 | 58.1 | 264,231 | 15.1*** | 16.7*** |
| Tangibility | 17.3 | 5.5 | 383,894 | 13.5 | 0.8 | 264,221 | 3.8*** | 4.7*** |
| Profitability | 4.1 | 11.5 | 383,932 | 8.9 | 9.0 | 264,260 | -4.8*** | 2.5*** |
| Age | 19 | 14 | 383,837 | 14 | 11 | 264,188 | 4*** | 3*** |
| External Debt | 10.3 | 0.0 | 383,900 | 11.3 | 0.0 | 264,199 | -1.0*** | - |
| Internal Debt | 13.1 | 1.3 | 383,903 | 9.2 | 0.0 | 264,198 | 3.9*** | 1.3*** |
| Payout | 18.1 | 0.0 | 368,088 | 30.5 | 0.0 | 201,770 | -12.4*** | - |
| Intangible Assets | 1.3 | 0.0 | 383,915 | 0.5 | 0.0 | 264,230 | 0.8*** | - |
| Executive Remuneration | 7.8 | 2.4 | 345,727 | 5.3 | 0.0 | 246,612 | 2.5*** | 2.4*** |
| Executive Bonus | 0.0 | 0.0 | 363,809 | 0.0 | 0.0 | 254,598 | - | - |
| Employees Paycheck | 41.8 | 28.3 | 362,415 | 11.6 | 0.0 | 252,795 | 30.2*** | 28.3*** |
| Employees Bonus | 0.0 | 0.0 | 163,807 | 0.0 | 0.0 | 254,595 | - | - |
| Number of Employees | 32 | 9 | 349,498 | 8 | 1 | 248,083 | 25*** | 8*** |
| Productivity | 2,209 | 1,381 | 349,496 | 1,725 | 1,036 | 136,151 | 484*** | 345*** |

The summary statistics tables show a clear pattern regarding how the firms in the sample allocate their funds between different assets. Overall, in this sample, private firms, in comparison with public firms, appear to keep more cash holdings that consist of cash and cash equivalents[9] in their balance sheet, as seen in **Table III**. This empirical finding is consistent with other findings in the literature. Most of our sample firms are small-to-medium-sized private firms. Thus, these small-to-medium-sized enterprises (SMEs) are usually financially constrained. These SMEs are likely to hold more cash in their balance sheet than large public firms based on our analysis of the composition of assets in the balance sheet.

Our results show that both external debt financing from financial markets and internal debt financing within the group are relevant as sources of finance. As seen in **Table A2** in the appendix, external debt and internal debt, on average, represent 10.7% and 11.5%, respectively, of total assets for firms in the corporate groups. On the other hand, external debt of stand-alone firms is 12.3% of their total assets. However, their internal debt, which consists of debt from shareholders, generates only 0.4% of total assets on average.

Interestingly, we notice that the internal debt of affiliate firms (13.1% of total assets) is, on average, greater than the external debt of affiliate firms (10.3% of total assets). We find the opposite is true for parent companies. Thus, the primary source of debt leverage for affiliate firms is internal capital markets.

[9] In this dataset, cash and cash equivalents consist of cash, bank balances, and short-term investments.

## 5. Identification strategy and empirical results

### 5.1. Analysis of the investment sensitivity of cash

We estimate the investment sensitivity of cash by following Fazzari et al. (1998). We assess the differential effects of cash holdings on investment when (i) a firm is a small private firm, (ii) it belongs to a corporate group, (iii) or it belongs to a small private corporate group firm. To do so, we use two dummy variables called "small-private" and "corporate" in the panel regressions.

We use the panel data methodology, and we use firm-year observations in the regressions. The general regression specification is then as follows:

$$\begin{aligned} \boldsymbol{Capex_{it}} = \boldsymbol{\alpha} &+ \boldsymbol{\beta_1 Cash_{it-1}} \\ &+ \boldsymbol{\beta_2 Cash_{it-1} \times Small\_Private_{it}} \\ &+ \boldsymbol{\beta_3 Cash_{it-1} \times Corporate_{it}} + \boldsymbol{\beta_4 Cash_{it-1} \times Small\_Private_{it}} \\ &\times \boldsymbol{Corporate_{it}} \\ &+ \partial_1 Small\_Private_{it} + \partial_2 Corporate_{it} + \partial_3 Small\_Private_{it} \times Corporate_{it} \\ &+ \lambda' Controls_{it-1} + \gamma_i + \gamma_t + \gamma_{st} + \gamma_{mt} + \varepsilon_{it} \end{aligned}$$

where $Controls_{i,t-1}$ is the vector of the control variables of firm $i$ in year $t-1$, and $\gamma_i$, $\gamma_t$, $\gamma_{st}$, and $\gamma_{mt}$ are the firm, year, time-varying industry, and time-varying municipality fixed effects, respectively.

In **Table V**, we present our estimates from the regression model above. These regressions provide the estimated coefficients showing the differential effects of holding cash on a firm's investments, proxied by capital expenditure, while considering whether a firm is a small and private company or belongs to a corporate group. When we run these regressions, we also control for size, leverage, tangibility, profitability, and age. We also employ the firm, year,

industry, and municipality fixed effects. We choose to interact the industry and municipality fixed effects with the year fixed effects in all the regression specifications.

In these regressions, we use a measure for being financially constrained that we derive from the study of Farre-Mensa and Ljungqvist (2016) as another explanatory variable. We call this variable "small-private" and measure it with a dummy variable indicating whether a company is both a small and a private firm. We determine the definition of a small firm as a firm in the sample's first tercile by size.

In column (1) of Table V, we observe that an increase in the previous year's cash holdings increases the current year's investment, as measured by capital expenditure. A 1%-point increase of total assets in cash holdings leads to a 0.6 %-point increase of total assets in investment. In this first regression, we control for a set of firm characteristics, and we use all fixed effects. This finding is consistent with the prediction of the financial constraint hypothesis because our dataset contains many small and private firms. The financial constraint hypothesis argues that small-private firms invest more if they have more pledgeable income or liquidity, as shown by restriction Equation (1) from Section 3.

In column (2) of Table V, we verify that the financial constraint hypothesis holds only for small-private firms, but not for large and public firms. Keeping more cash on the balance sheet seems inefficient for large and public firms, which are financially unconstrained. The negative and statistically significant coefficient (-0.003) of lagged cash holdings in column (2) shows that holding more cash reduces the capital available for investment and, therefore, lowers capital expenditures in large and public companies. However, this negative coefficient is counterbalanced with a positive and statistically significant coefficient (0.026) of the interaction

variable of lagged holdings *x* small-private, implying that holding more cash for small private firms increases investment in these firms.

In the third regression, whose results are depicted in column (3) of **Table V**, we substitute the small-private dummy in the second column with a new dummy variable that indicates whether a firm is affiliated with a group. Then, we interact the main independent variable (i.e., cash holdings) with this group's affiliation dummy. Although the estimated coefficient for cash holdings is still statistically significant at a 1 % level with a coefficient of 0.8 percentage points, we should consider this effect together with the impact stemming from the interaction variable of the cash holdings *x* group. The cash holdings x corporate group affiliation interaction variable's estimated coefficient is negative (-0.7 percentage points of total assets). Therefore, the total effect of cash holdings on investment for group companies is one-tenth of a percentage point of total assets, implying that holding cash does not influence substantially investments for firms that belong to a corporate group.

The results of the most comprehensive model are presented in **Table V** - column (4). This regression specification uses both the small-private and corporate group affiliation dummy variables and their interacted variables with the main explanatory variable of cash holdings. We find that belonging to a corporate group diminishes the liquidity dependence of the financially constrained firms because the estimated coefficient is negative and equal to 0.7 % points at the 1 % statistical significance level. This finding implies that a corporate group firm can invest more than a stand-alone firm with the same amount of cash holdings. We still keep this inference by observing the sign and statistical significance of the last coefficient, which measures the interaction of cash holdings with the small-private dummy and corporate group dummy. The estimated coefficient is negative, 0.6 percentage points at the 1 percent statistical significance

level. Thus, the coefficient is not large enough quantitatively to turn around the positive effect of the former coefficient. We can argue that group affiliation increases incentives to make more investments for corporate group firms compared with stand-alone firms.

### Table V – Investment x cash holdings sensitivity regressions

**Table V** shows the panel regressions following Fazzari, Hubbard, and Petersen's (1998) specification and uses Farre-Mensa and Ljungqvist's (2016) small-private definition of financially constrained firms. We control for size, leverage, tangibility, profitability, and age. The control variables' definitions are presented in **Table A1** in the appendix. All regressions include firm, year, industry-year, and municipality-year fixed effects. All control variables are lagged by one period with respect to the dependent variable. Standard errors are two-way clustered by firm and year. *, **, *** indicate significance at the 10%, 5% and 1% levels. The *p*-values are reported in parentheses.

| | **Dependent Variable: Investment** | | | |
|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** |
| **Lagged Cash Holdings** | 0.006*** | -0.003*** | 0.008*** | -0.004*** |
| | (0.000) | (0.002) | (0.000) | (0.002) |
| **Small-Private** | - | -0.035*** | - | -0.036*** |
| | | (0.000) | | (0.000) |
| **Lagged Cash Holdings x Small-Private** | - | 0.026*** | - | 0.027*** |
| | | (0.000) | | (0.000) |
| **Corporate** | - | - | -0.005*** | -0.007*** |
| | | | (0.000) | (0.000) |
| **Lagged Cash Holdings x Corporate** | - | - | -0.007*** | -0.001 |
| | | | (0.000) | (0.600) |
| **Small-Private x Corporate** | - | - | - | 0.002 |
| | | | | (0.168) |
| **Lagged Cash Holdings x Small-Private x Corporate** | - | - | - | -0.006** |
| | | | | (0.032) |
| **Control Variables** | Yes | Yes | Yes | Yes |
| **Firm Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Year Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Industry x Year Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Municipality x Year Fixed-Effect** | Yes | Yes | Yes | Yes |
| **R-squared** | 0.388 | 0.393 | 0.388 | 0.393 |
| **N** | 1,253,193 | 1,253,193 | 1,253,193 | 1,253,193 |

It is crucial to notice that the interaction of the cash holdings variable and corporate group dummy variable is no longer statistically significant and is economically much less sound. This finding provides us with supportive evidence that the only channel in which the corporate group affects the relation between liquidity and investment is through the alleviation of financial constraints. We explore this further in Section 7. In summary, consistent with the literature, we find favorable empirical descriptive evidence that financially constrained firms alleviate their financial restrictions when they belong to a corporate group.

### 5.2. The analysis of internal debt finance on specific firm outcomes

Furthermore, in **Table VI**, we extend our research by running regressions that also account for the effect of another critical firm characteristic for this study (i.e., internal debt finance), on certain firm outcome variables. These outcome variables are capital expenditure (investment), cash holdings, payout (dividend), and external debt. We call these dependent variables "firm outcomes".

In these regressions, we also use the measure for being financially constrained that we derive from the study of Farre-Mensa and Ljungqvist (2016). We continue to call this variable "small-private". In all the regression specifications, we interact the main explanatory variable of internal debt with this small-private dummy variable that determines the situation of being financially constrained. In these regressions, we also use the essential control variables of size, leverage, tangibility, profitability, and age. As we did in the previous section's regressions, we use firm, year, industry *x* year, and municipality *x* year fixed effects in all the regression specifications of **Table VI**. We lag all independent variables for one period with respect to the dependent variables in all regressions.

We also use the panel data methodology based on firm-year observations in this section's regressions. The regression specification for **Table VI** is then as follows:

$$\begin{aligned}\boldsymbol{Firm\ Outcome_{it}} = \boldsymbol{\alpha} &+ \boldsymbol{\beta_1 Internal\ Debt_{it-1}} \\ &+ \boldsymbol{\beta_2 Internal\ Debt_{it-1} \times Small\_Private_{it}} \\ &+ \boldsymbol{\beta_3 Small\_Private_{it}} \\ &+ \lambda' Controls_{it-1} + \gamma_i + \gamma_t + \gamma_{st} + \gamma_{mt} + \varepsilon_{it}\end{aligned}$$

where $Controls_{i,t-1}$ is the vector of the control variables of firm $i$ in year $t-1$, and $\gamma_i, \gamma_t, \gamma_{st}$, and $\gamma_{mt}$ are the firm, year, time-varying industry, and time-varying municipality fixed effects, respectively.

In this section's regressions, we have two main explanatory variables: internal debt finance and the status of being financially constrained. The second one is proxied by the dummy variable of small-private, showing that a firm is small and private when its value is equal to one. We observe that both internal debt finance and the status of being financially constrained explain the changes in almost all the firm's outcomes in the next period. In all the regression specifications in **Table VI,** from columns 1 to 4 (except in the first row of column 2), the estimated coefficients for these two explanatory variables are significant statistically, even after we control for some other variables and add all the fixed effects. For the interpretation of the estimated coefficients in the first row of **Table VI**, we need to understand qualitatively the impact of internal debt on firm outcomes. To do so, we consider the coefficient of the interaction term. The first regression depicted in the first column shows that the higher the internal debt, the higher the investment. In addition, once we consider the positive coefficient of 0.003 for internal debt with the coefficient of the interaction variable of internal debt *x* small-private, which is -

0.002, the combined effect is almost zero. This preliminary result implies that internal debt finance may not alleviate the financial constraints of small private firms and, consequently, may not help them invest more. In Section 6, we revisit the causality regarding this relationship using the instrumental variable approach.

Regarding the result of the second regression, once we interpret, there is no relation between cash holdings and internal debt, even for financially constrained firms. Thus, even though the results from the first two rows are not causal effects, they point in a different direction from what we expect according to the theory presented in Section 3 and the earlier results from Section 5. Concerning the coefficient of the dummy variable of small-private, the more financially constrained a firm is, the less cash it holds. On the other hand, we obtain a statistically insignificant coefficient (0.009) for the interaction term, meaning that the effect of internal debt on cash holdings does not become stronger or weaker when a firm is financially constrained.

In the third regression, we analyze the effect of internal debt on the payout. The estimated coefficient for internal debt is significant statistically at the 1 % level and negative (-0.012). Once the firms finance themselves internally inside the group, they distribute fewer dividends. As expected, a firm's status of being financially constrained decreases its payout, which finally leads to an increase in its retained profits. However, the interaction term's estimated coefficient is significant statistically at the 1 % level and positive (0.010), which implies that obtaining internal financing motivates financially constrained small and private firms to distribute slightly more than they would distribute otherwise. The interaction term's positive coefficient is nearly enough to balance the stand-alone negative effect of internal debt on the payout.

## Table VI – The effects of internal capital markets on firms' outcomes for financially constrained firms

**Table VI** shows panel regressions examining the effect of internal debt on investment, cash holdings, payout, and external debt. We adopt Farre-Mensa and Ljungqvist's (2016) small-private definition for selecting financially constrained firms. We control for size, leverage, tangibility, profitability, and age. **Table A1** presents a definition for each variable in the appendix. Firm, year, industry-year, and municipality-year fixed effects are included. We lag all control variables with one period. Standard errors are two-way clustered by firm and year. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. The *p*-values are reported in parenthesis.

| | **Dependent Variable** | | | |
|---|---|---|---|---|
| | **Investment** | **Cash Holdings** | **Payout** | **External Debt** |
| | **(1)** | **(2)** | **(3)** | **(4)** |
| **Internal Debt** | 0.003* | -0.005 | -0.012*** | -0.122*** |
| | (0.052) | (0.141) | (0.000) | (0.000) |
| **Small-Private** | -0.028*** | -0.007*** | -0.004*** | -0.022*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| **Internal Debt x Small-Private** | -0.002 | 0.009 | 0.010*** | 0.027*** |
| | (0.424) | (0.141) | (0.001) | (0.000) |
| **N** | 1,253,068 | 1,253,120 | 1,253,119 | 1,253,119 |
| **R-squared** | 0.392 | 0.743 | 0.453 | 0.790 |
| **Control Variables** | Yes | Yes | Yes | Yes |
| **Firm Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Year Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Industry x Year Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Municipality x Year Fixed-Effect** | Yes | Yes | Yes | Yes |

We can analyze the relation between internal finance and external debt finance in the fourth regression specification in **Table VI**. A negative relationship between these two different financing modes is implied by the statistically significant negative coefficient, -0.122. Firms that acquire internal financing borrow less from external sources. Being financially constrained, which means being a small private firm, limits the firm's access to external debt, as observed in

the statistically negative coefficient of -0.022. However, the interaction term's estimated coefficient (i.e., internal finance *x* small-private) is positive (0.027) and statistically significant at the 1 % level. From these findings, we conclude that internal finance is an alternative source of financing against external debt finance. Nevertheless, once financially constrained, small private firms have more internal financing, which improves their financial standing. Thus, their potential to borrow externally increases. That is the reason why the interaction term's coefficient is positive. However, this coefficient is not positive enough to change the negative relationship between internal finance and external debt finance.

In all these interpretations of the results from **Table VI**, however, we are not able to argue for a causal relationship between internal finance and the firm outcome variables. Thus, we conduct further analyses in the following sections to extract the mechanism more clearly and to approach a causal relationship explanation.

We also run **Table V** and **Table VI** regressions using an alternative definition of being financially constrained. We employ the Hadlock-Pierce Index provided by Hadlock and Pierce (2010). The Hadlock-Pierce Index (HP Index henceforth) considers age and size as the main firm characteristics in determining whether a firm is financially constrained[10]. The results from Table V and Table VI considering this alternative measure are shown, respectively, in **Appendix Table A3** and **Appendix Table A4**. We observe no economic difference in these results compared with those found in **Table V** and **Table VI**. Most of the estimated coefficients remain the same quantitatively and qualitatively between these alternative analyses.

[10] We compute the HP Index as $-0.737 \times Size + 0.043 \times Size^2 - 0.040 \times Age$, where $Size$ and $Age$ are calculated as detailed in Appendix Table I. Financially constrained firms are those belonging to the top tercile of the HP Index distribution in a given year, whereas financially unconstrained firms are those belonging to the bottom tercile of the HP Index distribution in a given year. As in the literature, we retain only observations from the top tercile and bottom tercile, and exclude firms in the second tercile. Moreover, following Hadlock and Pierce (2010), we cap $Size$ and $Age$ by their 95$^{th}$ percentile value.

### 5.3. The analysis of the relationship between the parent firms and affiliates

In this section, we investigate how financing decisions of parent firms influence their lending to their affiliates. We focus on two essential funding sources for parent firms, i.e., external debt finance and equity finance. We examine the effects of parent firms' external debt financing and equity financing on the corporate group's internal capital markets. In this analysis, the dependent variable is the affiliates' internal debt in all regressions in **Table VII**.

We also use the panel data methodology in this section. However, hereafter, we use ownership-year observations in the regressions. That is, for every year $t$, we observe a relation of affiliate firm $i$ with parent firm $j$. Then, the specification for **Table VII** is as follows:

$$\begin{aligned} \boldsymbol{Affiliate's\ Internal\ Debt_{ij,t}} = \boldsymbol{\alpha} &+ \boldsymbol{\beta_1 Parent's\ External\ Debt_{ij,t-1}} \\ &+ \boldsymbol{\beta_2 Parent's\ Equity_{ij,t-1}} \\ &+ \lambda_1' Affiliate's\ Controls_{ij,t-1} \\ &+ \lambda_2' Parent's\ Controls_{ij,t-1} \\ &+ \gamma_i + \gamma_j + \gamma_t + \gamma_{is,t} + \gamma_{js,t} + \gamma_{im,t} + \gamma_{jm,t} + \varepsilon_{ij,t} \end{aligned}$$

where $Affiliate's\ Controls_{ij,t-1}$ and $Parent's\ Controls_{ij,t-1}$ are vectors of the control variables for affiliate $i$ and parent $j$, in year $t-1$, respectively. Additionally, $\gamma_i, \gamma_j, \gamma_t, \gamma_{is,t}, \gamma_{js,t}, \gamma_{im,t}$, and $\gamma_{jm,t}$ are the affiliate, parent, year, time-varying affiliate's industry, time-varying parent's industry, time-varying affiliate's municipality, and time-varying parent's municipality fixed effects, respectively.

Panel A in **Table VII** examines the impact of a parent company's external debt financing on an affiliate firm's internal debt financing. In addition to the parent's external debt (i.e., the main explanatory variable), all the regressions include control variables that consist of the

affiliate and parent companies' main characteristics. These variables are leverage, size, tangibility, profitability, and age of the firm. Starting from the third regression, we add different fixed effects to the regression specification one by one. We first employ affiliate fixed effects in the 3rd specification. Then, we add parent fixed effects in the 4th specification and year fixed effects in the 5th specification. In the last two regression specifications in columns (6) and (7) of **Table VII**, we also use the affiliate's and parent's industry *x* year fixed effects and the affiliate's and parent's municipality *x* year fixed effects. Adding these four fixed effects ensure that the relationship is not driven by variations stemming from the time-varying industry or municipality fluctuations. All the empirical results in Panel A of **Table VII** suggest that the higher the parent's external debt, the lower the affiliate's internal debt.

## Table VII – The financing relationship between parent firms and their affiliates

**Table VII** reports the result of the regressions, where the dependent variable is the affiliate's internal debt. We organize the table according to the independent variable in the regressions as follows: external debt (Panel A), equity (Panel B), and both (Panel C). These independent variables refer to the respective parent company at the group level. We control for size, leverage, tangibility, profitability, and age. The variable definitions are shown in **Table A1** in the appendix. Firm, year, industry-year, and municipality-year fixed effects are included, both for the affiliate and the parent (when applicable). All control variables are lagged by one year. Standard errors are two-way clustered by ownership relation and year. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. The *p*-values are reported in parentheses.

| | Dependent Variable: Affiliate's Internal Debt | | | | | | |
|---|---|---|---|---|---|---|---|
| | (1) | (2) | (3) | (4) | (5) | (6) | (7) |
| | Panel A | | | | | | |
| **Parent's External Debt** | -0.058*** | -0.081*** | -0.020*** | -0.012** | -0.013** | -0.012** | -0.013** |
| | (0.000) | (0.000) | (0.000) | (0.023) | (0.021) | (0.039) | (0.040) |
| **N** | 143,352 | 143,278 | 133,628 | 131,992 | 131,992 | 117,594 | 117,217 |
| **R-squared** | 0.097 | 0.187 | 0.725 | 0.744 | 0.745 | 0.746 | 0.766 |
| | Panel B | | | | | | |
| **Parent's Equity** | 0.030*** | 0.059*** | 0.026*** | 0.027*** | 0.027*** | 0.029*** | 0.030*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| **N** | 143,368 | 143,294 | 133,645 | 132,010 | 132,010 | 117,610 | 117,233 |
| **R-squared** | 0.095 | 0.190 | 0.725 | 0.745 | 0.745 | 0.746 | 0.766 |
| | Panel C | | | | | | |
| **Parent's External Debt** | -0.048*** | -0.055*** | -0.010** | -0.002 | -0.002 | -0.002 | -0.002 |
| | (0.000) | (0.000) | (0.023) | (0.662) | (0.610) | (0.763) | (0.761) |
| **Parent's Equity** | 0.016*** | 0.048*** | 0.024*** | 0.027*** | 0.027*** | 0.029*** | 0.030*** |
| | (0.002) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| **N** | 143,352 | 143,278 | 133,628 | 131,992 | 131,992 | 117,594 | 117,217 |
| **R-squared** | 0.098 | 0.192 | 0.726 | 0.745 | 0.745 | 0.746 | 0.767 |
| | Specification for all panels | | | | | | |
| **Affiliate Control Variables** | Yes | Yes | Yes | Yes | Yes | Yes | Yes |
| **Parent Control Variables** | No | Yes | Yes | Yes | Yes | Yes | Yes |
| **Affiliate Fixed-Effect** | No | No | Yes | Yes | Yes | Yes | Yes |
| **Parent Fixed-Effect** | No | No | No | Yes | Yes | Yes | Yes |
| **Year Fixed-Effect** | No | No | No | No | Yes | Yes | Yes |
| **Industry-Year Fixed-Effect** | No | No | No | No | No | Yes | Yes |
| **Municipality-Year Fixed-Effect** | No | No | No | No | No | No | Yes |

In Panel B of **Table VII**, we examine the effect of the parent firms' equity financing on its affiliate's internal debt financing. The parent's equity is the primary explanatory variable in all

the regressions in this panel, and we use the same group of control variables. We also add the fixed effects, in the same manner, as in Panel A's regressions. Contrary to the negative relationship between the parent's external debt and its affiliate's internal debt, Panel B shows that the higher the parent's equity, the higher the affiliate's internal debt in the next year. The estimated coefficients for parent's equity are statistically significant at the 1 % level in all the regressions. We can argue that equity financing in the parent company leads to an increase in the affiliate's internal debt financing.

Furthermore, in Panel C of **Table VII**, we combine the empirical analyses in the earlier panels. We aim to analyze the effects of the parent's external debt financing and equity financing on the affiliate's internal debt financing using the same regression specification. In Panel C's regressions, we have two main explanatory variables (i.e., the parent's external debt and its equity). Regarding the control variables and fixed effects, we use the same strategy as we used earlier. Compared to Panel B, we obtain the same signs for the parent equity's estimated coefficients at statistically significant levels in all of Panel C's regressions. We reach the same result that an increase in the parent's equity leads to a rise in the affiliate's internal debt. On the other hand, regarding the effect of the parent's external debt, the results in Panel C suggest a different picture. The estimated coefficients lose their statistical significance starting from the 4$^{th}$ regression in Panel C. However, all the coefficients still imply a negative relationship between the parent's external debt and the affiliate's internal debt, as they do in Panel A.

As a robustness check, we rerun the specification in **Table VII** by decomposing the parent's total equity into (*i*) cumulative retained earnings and (*ii*) shareholders' capital. We find that the effect of the parent's retained earnings on the affiliate's internal debt is positive and statistically significant, as it is when we employ the parent firm's paid-in capital. Roughly half of

the effect comes from retained earnings, and the remaining part relies on paid-in capital. Therefore, new capital raised by the parent company is a relevant source of variation in the parent's total equity, which explains changes in the affiliate's internal debt. In other words, funds for intragroup loans borrowed by affiliates are substantially obtained through parent's equity issuance.

### 5.4. The analysis of internal capital markets during business cycles

This section develops our analysis of internal capital markets by investigating the corporate group firms' behavior during different business cycles. We examine if the patterns change in internal capital markets depending on whether there is an economic boom or an economic recession.

We improve the regression specification from the previous section by adding dummy variables that identify the business cycles. These variables are called the dummy for booms and the dummy for recessions. They define when a boom or a recession happens in the any given year. We categorize a year as a boom year whenever the GDP growth rate in Sweden in that year is higher than four percent. On the other hand, we define a year as a recession year whenever the country's GDP growth rate in that year is negative. For these categorizations, we refer to the Federal Reserve Bank of St. Louis' methodology for interpreting the Organization of Economic Development (OECD) Composite Leading Indicators[11]. In all the regressions in this section, the dependent variable is the affiliate's internal debt. We examine the effect of the parent's external debt and the parent's equity on the affiliate's internal debt together with the business cycle

[11] For further reference, see the Federal Reserve Bank of St. Louis (2020).

dummy variables to determine whether the relationship is more or less pronounced due to macroeconomic conditions.

**Table VIII** reports the results of the interactions between various business cycles and the parents' different financing modes while evaluating their effects on internal capital markets. First, we do not obtain any statistically significant impact of the parent's external debt on the affiliate's internal debt, which is consistent with the findings in **Table VII** in the previous section. On the other hand, in all the regressions, the higher the parent's equity financing, the higher is the affiliate's internal debt financing. The relationship is always statistically significant at the 1 % level.

We do not have any heterogeneous results regarding the effect of the interaction terms during economic booms and recessions. Neither the effect of the parent's equity nor the effect of the parent's external debt on the affiliate's internal debt becomes more pronounced, as observed in the regressions in columns 2 to 5 in **Table VIII**.

### 5.5. The analysis of internal capital markets depending on the affiliate's financial situation

This section develops our analysis in Section 5.3, where we evaluate the impacts of parent firms' financing type on the internal capital market. While investigating the individual effects of the parent's debt and equity financing on the affiliate's internal debt financing, we take into account the affiliate firms' financial conditions in this section. **Table IX** presents the regression analysis results. In this analysis, we add the affiliate's external debt and its equity as control variables to the regression specification that we used previously in Table VII's Panel C.

Controlling for the affiliate's external debt and the affiliate's equity does not change the main results that we have obtained in the previous sections. The effect of the parent's external

debt financing on the affiliate's internal debt is still not significant statistically. However, an increase in the parent's equity leads to a statistically significant rise in the affiliate's internal debt at the 1 % statistical significance level in all regressions in Table IX. Once we interpret the estimated coefficients of the remaining independent variables, we observe that an affiliate firm uses the internal capital market less after raising its own equity or after borrowing more from outside the group. Both the affiliate's external debt and its equity have negative estimated coefficients, which are all statistically significant at the 1 % level. An increase in the affiliate's external debt or in its own equity leads to a decrease in its internal debt from other group firms. These results may corroborate the proposal that internal capital markets function as substitutes rather than complements to external capital markets.

## Table VIII – The working of internal capital markets during business cycles

**Table VIII** reports the heterogeneous results of the panel regressions run in **Table VII – Panel C**, where the dependent variable is the affiliate's internal debt. The independent variables are the parent's external debt and equity. We interact both independent variables with year dummies that capture booms (yearly GDP growth greater than 4%) and recessions (negative yearly GDP growth). We control for size, leverage, tangibility, profitability, and age. The variable definitions are shown in **Table A1** in the Appendix. Firm, year, industry-year, and municipality-year fixed effects are included, both for the affiliate and the parent (when applicable). All control variables are lagged by one year. Standard errors are two-way clustered by ownership relation and year. *, **, *** indicate significance at the 10%, 5% and 1% levels. The p-values are reported in parentheses.

| | **Affiliate's Internal Debt** | | | | |
|---|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
| **Parent's External Debt** | -0.002 | 0.001 | -0.002 | -0.002 | -0.002 |
| | (0.761) | (0.838) | (0.763) | (0.786) | (0.755) |
| **Parent's Equity** | 0.030*** | 0.030*** | 0.029*** | 0.030*** | 0.028*** |
| | (0.000) | (0.000) | (0.000) | (0.000) | (0.000) |
| **Parent's External Debt x Dummy for Booms** | | -0.007 | | | |
| | | (0.103) | | | |
| **Parent's Equity x Dummy for Booms** | | | 0.003 | | |
| | | | (0.252) | | |
| **Parent's External Debt x Dummy for Recessions** | | | | -0.001 | |
| | | | | (0.848) | |
| **Parent's Equity x Dummy for Recessions** | | | | | 0.003 |
| | | | | | (0.349) |
| | Specification for all panels | | | | |
| **N** | 22,142 | 22,142 | 22,142 | 22,142 | 22,142 |
| **R-squared** | 0.701 | 0.701 | 0.701 | 0.701 | 0.701 |
| **Control Variables** | Yes | Yes | Yes | Yes | Yes |
| **Affiliate Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Parent Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Year Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Affiliate Industry-Year Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Parent Industry-Year Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |

## Table IX – The effects of parent's financing mode on internal capital markets

**Table IX** extends the regression analysis that we perform in **Table VII – Panel C**, where the dependent variable is the affiliate's internal debt, and the independent variables are the parent's external debt and the parent's equity. Distinct from the regression specifications in **Table VII**, we add the affiliate's external debt and the affiliate's equity as independent variables in **Table IX**. We control for size, leverage, tangibility, profitability, and age. The variable definitions are shown in **Table A1** in the Appendix. Firm, year, industry-year, and municipality-year fixed effects are included, both for the affiliate and the parent (when applicable). All the control variables are lagged by one year. Standard errors are two-way clustered by ownership relation and year. *, **, *** indicate significance at the 10%, 5%, and 1% levels, respectively. The *p*-values are reported in parentheses.

| | **Dependent Variable: Affiliate's Internal Debt** | | | |
|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** |
| **Parent's External Debt** | -0.002 | -0.004 | -0.002 | 0.000 |
| | (0.763) | (0.479) | (0.759) | (1.000) |
| **Parent's Equity** | 0.029*** | 0.029*** | 0.030*** | 0.027*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| **Affiliate's External Debt** | | -0.083*** | | -0.129*** |
| | | (0.000) | | (0.000) |
| **Affiliate's Equity** | | | -0.187*** | -0.208*** |
| | | | (0.000) | (0.000) |
| | Specification for all panels | | | |
| **N** | 117,594 | 117,216 | 117,217 | 117,216 |
| **R-squared** | 0.746 | 0.761 | 0.767 | 0.769 |
| **Affiliate Control Variables** | Yes | Yes | Yes | Yes |
| **Parent Control Variables** | Yes | Yes | Yes | Yes |
| **Affiliate Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Parent Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Year Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Industry-Year Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Municipality-Year Fixed-Effect** | Yes | Yes | Yes | Yes |

We also explore the robustness of these results in this section by interacting the parent's external debt and its equity with the affiliate's equity and the affiliate's external debt. We try to diagnose the effects of parent's financing mode on the internal capital markets while considering the affiliate's financial standing. We want to understand whether the effect of parent's financing mode on internal capital markets is more pronounced depending on the capital structure of the affiliate. The results of the regressions with the interaction terms of the affiliate's equity and the affiliate's external debt are reported in **Tables A5 and A6** of the Appendix, respectively. **Table A5** shows that the interaction effect of the parent's external debt and the affiliate's equity is statistically positive at a 5 % level, as observed in the 3rd and 4th columns. Unlike the earlier table's results, in these two regressions, the individual effect of the parent's external debt on the affiliate's internal debt becomes statistically significant at the 10 % level. The estimated coefficients are negative. Once we evaluate them together with the respective coefficient estimates of the interaction terms as shown in **Table A5**, the net effect becomes positive, implying that the higher the parent's external debt together with the affiliate's increased equity, the higher the affiliate's internal debt. This observation suggests that the parent's external debt financing reflects more on the affiliate's internal debt as long as the affiliate increases its equity.

Regarding the interaction of the parent's financing modes with the affiliate's external debt, **Table A6** in the Appendix provides us with the immediate insight that an increase in the affiliate's external debt attenuates the affiliate company's need for the internal capital market. The individual effect of the affiliate's external debt on its internal debt is negative at a 1 % statistical significance level in all regressions of **Table A6**. The parent's equity finance has a positive and statistically significant effect on the affiliate's internal debt for all the regressions. In column 4 of **Table A6**, we control for both the interaction terms of affiliate external debt *x* parent

external debt and affiliate external debt *x* parent equity. The effects of both the affiliate's external debt and the parent firm's equity on the affiliate's internal debt remain the same. In addition, none of the estimated coefficients are statistically significant for the interaction term variables. Therefore, we conclude that our results are robust to this alternative specification.

## 6. Instrumental Variable Analysis (IV)

One can argue that a firm's affiliation with a corporate group might be an endogenous decision. On the one hand, one can interpret that profitable companies may use their excess cash flow to form corporate groups by either acquiring new companies or investing in other firms (Almeida and Wolfenzon, 2006). On the other hand, one can assert that weak firms may need the corporate group's support to survive (Gopalan et al., 2007). These arguments might lead to confounding factors in our regressions. These factors may have interfered with the mechanism that we are explaining regarding the relationship between an affiliate's use of internal capital markets (affiliate's internal debt) and its firm outcomes.

In this section, we refer to firm outcomes as the affiliate's usage of its capital. For instance, these capital usage variables might be investment, cash holdings, and payout. These are examples of the direct use of capital that the firm obtains internally. Additionally, there are examples of indirect capital usage, such as decreasing external debt. An increase in its internal debt may cause the affiliate to pay back its external debt. Thanks to the leverage effect, alternative funds from intragroup loans may help the affiliate firm borrow more from banks. Therefore, we treat the affiliate's external debt as a dependent variable in our analyses in this section.

We hypothesize that internal capital markets help financially constrained group firms to mitigate their financial limitations by funding them internally within the corporate groups. Using instrumental variable (IV) analysis, we attempt to distinguish our hypothesized economic channel from other possible confounding factors.

To better extract the causal effect of internal capital markets on an affiliate's capital usage, we need a variable that is closely related to the affiliate's internal debt, but which might not be vulnerable to endogeneity concerns. We use the parent firm's equity as an instrumental variable to explain the affiliate's internal debt, which might be considered an endogenous variable. The parent's equity is a reasonable choice for an instrument because it can only be correlated with the affiliate's capital usage through its effect on the affiliate's internal debt[12]. Furthermore, it might be more challenging to argue for an endogenous relationship between the affiliate's firm outcomes and its parent's equity, other than the relationship that we study[13]. The regression specifications for the instrumental variable approach are as follows:

[12] We insert a caveat here that the parent's equity might affect its affiliate's capital usage through cross-equity investment within the group. However, in this study, we only focus on the debt side of internal capital markets. Additionally, the effect of the parent's equity on the affiliate's capital usage through cross-equity investment would not counter the effect that we examine here through intragroup loans within a corporate group. At most, our findings show a lower bound effect of the internal capital market on firm outcomes.

[13] The affiliate's decision to raise internal debt is clearly endogenous, despite the fact our results are robust to several control variables and fixed effects. To address this concern, we adopt parent's equity as an instrument to evaluate the causal effect of affiliate's internal debt on capital usage. We claim that affiliate's internal debt is positively correlated with lagged parent's equity, as shown in Table VII, but parent's equity in $t-2$ is unlikely to affect directly current affiliate's capital usage (exclusion restriction). To reinforce our claim, we show in the appendix that our findings are qualitatively the same even if we restrict the sample of parent and affiliate firms to be in different industries, or if we split the sample in distinct types of ownership structure. Therefore, lagged time-varying parent's external capital does not seem to affect directly how affiliates use cash transfers from intragroup loans.

**First Stage**

$$\boldsymbol{Affiliate's\ Internal\ Debt_{ij,t}} = \boldsymbol{\alpha} + \boldsymbol{\beta_1 Parent's\ Equity_{ij,t-1}} + \lambda_1' Affilliate's\ Controls_{ij,t-1} + \lambda_2' Parent's\ Controls_{ij,t-1} + \gamma_i + \gamma_j + \gamma_t + \gamma_{is,t} + \gamma_{js,t} + \gamma_{im,t} + \gamma_{jm,t} + \varepsilon_{ij,t}$$

**Second Stage**

$$\boldsymbol{Capital\ Usage_{ij,t}} = \boldsymbol{\psi} + \boldsymbol{\phi_1 Affiliate's\ \widehat{Internal\ Debt}_{ij,t-1}} + \mu_1' Affilliate's\ Controls_{ij,t-1} + \mu_2' Parent's\ Controls_{ij,t-1} + \gamma_i + \gamma_j + \gamma_t + \gamma_{is,t} + \gamma_{js,t} + \gamma_{im,t} + \gamma_{jm,t} + \nu_{ij,t}$$

where $Affilliate's\ Controls_{ij,t-1}$ and $Parent's\ Controls_{ij,t-1}$ are vectors of the control variables for affiliate $i$ and parent $j$, in year $t-1$, respectively. Additionally, $\gamma_i, \gamma_j, \gamma_t, \gamma_{is,t}, \gamma_{js,t}, \gamma_{im,t}$, and $\gamma_{jm,t}$ represent the affiliate, parent, year, time-varying affiliate's industry, time-varying parent's industry, time-varying affiliate's municipality, and time-varying parent's municipality fixed effects, respectively.

As shown in the above regressions' specifications, we regress the affiliate's internal debt on the parent's equity together with the control variables in the first stage regression, as was done in Section 5. All the control variables and fixed effects are the same as those employed in Section 5. We use affiliate firm, parent firm, and year fixed effects as well as the interaction fixed effects of the affiliate's industry-year, the parent's industry-year, the affiliate's municipality-year, and the parent's municipality-year in the first stage regression. In the second

stage regressions, we regress each capital usage variable of the affiliate firm (i.e., investment, external debt, cash holdings, and payout) on the estimated values for its internal debt that we obtain from the first stage regression. We also use the same set of control variables and fixed effects in these second-stage regressions that we employ in the first-stage regression.

**Table X** presents the regression results of the instrumental variable approach. In the first stage regression in column 1, the estimated coefficient of the parent's equity is positive (0.030) and statistically significant at the 1 % level. This result implies that the higher the parent's equity, the higher is the affiliate's internal debt. **Table X** shows the results of the second stage regressions for each capital usage variable, from column 2 to column 5. The second stage regression in the second column shows that an increase in the affiliate's internal debt due to the rise in its parent firm's equity leads to an increase in its investment. This result corroborates the main hypothesis that we state in Section 3. Additionally, the affiliate firm that obtains a higher internal debt from its parent chooses to decrease its external debt, as shown in column 3. We interpret this result to mean that the affiliate companies use the corporate group's internal capital to refinance their external debt, probably due to the expected decrease in their interest burden. As shown by the regression in column 4, the affiliate firms prefer to hold more cash, thus increasing their cash cushion, once they access internal group funds. All estimated coefficients that imply these respective effects from column 2 to column 4 are statistically significant at the 1 % level.

Moreover, column 5 in **Table X** concludes with the 1 percent statistically significant result that the affiliate firm pays less dividend even though they increase their funds through the internal capital markets. Based on this finding, one may comment that affiliates usually have to comply with strict corporate governance rules regarding internal loans in corporate groups. Moreover, as predicted by the pecking order theory (Majluf and Myers, 1984), the firm first tries

to retain profits. Thus, we expect a positive (negative) relation between the plowback (payout) ratio and internal debt finance. All the results from the analyses in **Table X** provide evidence of the general behavior of affiliate firms that supports the positive side of internal capital markets. These firms tend to keep the intra-group funds they obtain from their corporate groups within the firm. These findings support the function of intra-group loans to help financially constrained group firms.

In addition to **Table X**, we run the instrumental variable (IV) analysis for two subsamples: (i) corporate groups with a private parent firm and (ii) corporate groups with a public parent firm. Both subsamples are restricted to the case where the affiliate firms are small and private. As mentioned before, these firms are considered financially constrained firms by Farre-Mensa and Ljungqvist (2016). Therefore, we can evaluate the impact of internal capital markets on capital usage variables when affiliates are in weaker financial conditions, but have financially unconstrained parent firms that are listed publicly. This analysis complements our main specification because it considers the heterogeneity in parent characteristics. We report the findings in **Table A7** in the appendix.

## Table X – The effect of internal finance on capital usage: Instrumental variable analysis

**Table X** reports the instrumental variable (IV) approach's estimates predicting the following four dependent variables of an affiliate firm: investment, external debt, cash holdings, and payout. We instrument the affiliate's internal debt using the parent's equity. **Table X** shows both the first and second stages for the IV and the IV diagnostic. The IV diagnostic includes the first stage F-statistic, underidentification hypothesis p-value, weak identification F-statistic, and the Stock Yogo 10% critical value[14]. We control for size, leverage, tangibility, profitability, and the ages of both the parent and affiliate firms. The variable definitions are shown in **Table A1** in the Appendix. Firm, year, industry-year, and municipality-year fixed effects are included, both for the affiliate and the parent (when applicable). All control variables are lagged by one year. Standard errors are two-way clustered by ownership relation and year. They are robust to the first stage estimates. *, **, *** indicate significance at the 10%, 5% and 1%. The p-values are reported in parenthesis.

| | **First Stage** | **Second Stage** | | | |
|---|---|---|---|---|---|
| | Affiliate's Internal Debt | Investment | External Debt | Cash Holdings | Payout |
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
| **Parent's Equity** | 0.030*** | | | | |
| | (0.000) | | | | |
| **Affiliate's Internal Debt** | | 0.356*** | -0.623*** | 2.367*** | -0.719*** |
| ***Instrumented by Parent's Equity*** | | (0.000) | (0.000) | (0.000) | (0.000) |
| | IV Diagnostic | | | | |
| **First Stage F-Statistic** | 354.30 | | | | |
| **First Stage P-Value** | 0.000 | | | | |
| **Underidentification P-Value** | | 0.000 | 0.000 | 0.000 | 0.000 |
| **Weak Identification F-Statistic** | | 55.322 | 49.587 | 55.145 | 55.145 |
| **Stock Yogo 10% Critical Value** | | 16.38 | 16.38 | 16.38 | 16.38 |
| | Specification for all panels | | | | |
| **N** | 117,217 | 117,223 | 117,223 | 117,223 | 117,223 |
| **R-squared** | 0.767 | 0.355 | 0.777 | -0.068 | -0.143 |
| **Affiliate Control Variables** | Yes | Yes | Yes | Yes | Yes |
| **Parent Control Variables** | Yes | Yes | Yes | Yes | Yes |
| **Affiliate Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Parent Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Year Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Industry-Year Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Municipality-Year Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |

[14] Note also that we report $R^2$ for all the instrumental variable (IV) analysis' specifications. However, we emphasize that $R^2$ does not have any statistical interpretation in the IV setting.

In the case of corporate groups with a public parent firm, as shown in **Appendix Table A7 – Panel B**, we observe that the internal capital markets are ineffective in enabling parent firms to alleviate their affiliates' financial constraints. This result might imply that when the parent firm is a publicly owned company, its financially constrained affiliates do not need to rely on the internal capital markets at least as much as those affiliates which have privately owned parent firms. The former ones are likely to borrow from banks or financial markets directly through the reputation of their public parent firms in the market. For instance, these affiliates can obtain a loan from a bank with a letter of guarantee provided by the public parent firm with more pledgeable income. We may also infer that small and private firm definition for being a financially constrained firm does not capture this status fully when a publicly listed parent firm owns these firms. Thus, one should also consider the ownership structure when classifying a firm as either financially constrained or not.

On the other hand, as presented in **Appendix Table A7 – Panel A**, financially constrained affiliates in a corporate group with a private parent firm benefit from internal capital markets more than those affiliates in a corporate group with a public parent firm. We obtain statistically significant results for groups with a private parent firm in Panel A of **Table A7**, distinct from Panel B, where the corporate groups have a public firm as a parent. One can conclude that internal capital markets' functionality is more crucial for the corporate groups that are owned by private parent firms. This inference may be explained by the fact that the private parent firms have a higher level of information asymmetry than their public counterparts. Thus, affiliates of the former might have more obstacles in obtaining capital directly from external financial markets.

Furthermore, in **Appendix Table A7**, the estimated coefficients of the affiliate's internal debt that are instrumented by private parent's equity are higher than those obtained in **Table X** when we use all firms in the sample, both financially constrained and financially unconstrained affiliates. The effect of internal capital markets for financially constrained firms with a private parent is more material than it is for financially unconstrained firms. Financially constrained firms use the funds they obtain from the group to invest more and to increase their cash holdings. In addition, they do not misuse these funds and do not direct these funds to pay more dividends. In fact, financially constrained affiliates pay fewer dividends than financially unconstrained affiliates after accessing more internal group funds.

Regarding the effect of internal capital markets on an affiliate's external debt, unlike the respective result in **Table X**, the coefficient of an affiliate's internal debt instrumented by its private parent's equity for its external debt is not statistically significant in **Appendix Table A7**. In **Table X**, we include all affiliates in the sample. In contrast, in **Appendix Table A7**, we include only financially constrained firms that do not prefer to use internal funds to decrease their external debt; because they have more financial constraints, they need more capital to invest. Thus, they may not direct these additional funds to reduce their external debt, unlike their financially unconstrained counterparts, which are more likely to decrease their interest burden from external debt, as seen in **Table X**.

## 7. Further Empirical Analyses

We further analyze whether an affiliate firm uses additional internal funds from its corporate group to reward its managers or employees. One dark side of internal capital markets is that

some managers in the politically more potent divisions might use internal group funds inefficiently by increasing their own and their employees' compensations or executive perks. We search for empirical evidence that lends support to this managerial agency problem. We continue to utilize the instrumental variable approach in which we regress a group of corporate governance variables on the affiliate's internal debt that is instrumented by the parent's equity. The corporate governance variables used in each regression specification in **Table XI** are executive remuneration, executive bonus, employee paycheck, and employee bonus. We use the same set of control variables and fixed effects as those used in the regressions in Section 6.

**Table XI – Panel A** reports the results of the IV analysis with corporate governance variables. We obtain statistically significant effects of internal capital markets on managers' remuneration and employees' salaries. However, we observe no impact from internal capital markets on bonuses to managers or employees. Therefore, we interpret this to mean that the affiliates' managers spend, at least partially, those additional funds that they borrow from their group to improve their own and their employees' salaries. Interestingly, this increase is not accompanied by an expansion in performance-based compensation. This finding implies that either (i) the manager is not performing better than he does in the absence of internal capital markets, or (ii) stricter rules regarding appraisal of bonuses apply to firms obtaining intragroup loans.

Furthermore, we extend our analysis in Section 6 by examining the real effects of internal capital markets. We investigate the impact of an affiliate's internal debt on the affiliate's fixed assets, intangible assets, employment, and productivity. We again use the IV approach by utilizing the parent's equity as an instrument for an affiliate's internal debt. **Table XI – Panel B** presents the regression results for each affiliate's firm outcomes in the respective columns from 2

to 5. We observe statistically significant effects of internal capital markets on the affiliate's fixed and intangible assets, as shown in columns 2 and 3. Furthermore, we estimate coefficients in the 2nd stage regressions where the dependent variable is the affiliate's log of the number of employees and the affiliate's log of productivity in columns 4 and 5, respectively. Both coefficients are statistically significant at the 1 % level.

## Table XI – Corporate governance and real effects of internal capital markets

**Table XI** provides the instrumental variable (IV) analysis estimates. We instrument the affiliate's internal debt using the parent's equity. The table shows both the first and second stages of the IV analysis. We organize the table according to the following two groups of firm outcomes: corporate governance variables (Panel A) and real effects variables (Panel B). We control for size, leverage, tangibility, profitability, and age. The variable definitions are shown in **Table A1** in the appendix. Firm, year, industry-year, and municipality-year fixed effects are included, both for the affiliate and the parent (when applicable). All the control variables are lagged by one year. Standard errors are two-way clustered by ownership relation and year and are robust to the first stage estimates. *, **, *** indicate significance at the 10%, 5% and 1% levels. The p-values are reported in parenthesis.

| | **First Stage** | **Second Stage** | | | |
|---|---|---|---|---|---|
| | **Panel A: Corporate Governance** | | | | |
| | Affiliate's Internal Debt | Executive Remuneration | Executive Bonus | Employees Paycheck | Employees Bonus |
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
| **Parent's Equity** | 0.030*** | | | | |
| | (0.000) | | | | |
| **Affiliate's Internal Debt** | | 0.366*** | -0.002 | 0.668** | -0.000 |
| ***Instrumented by Parent's Equity*** | | (0.004) | (0.531) | (0.028) | (0.650) |
| **N** | 117,217 | 107,921 | 114,099 | 114,002 | 114,098 |
| **R-squared** | 0.767 | 0.745 | 0.511 | 0.858 | 0.593 |
| | **Panel B: Real Effects** | | | | |
| | Affiliate's Internal Debt | Fixed Assets | Intangible Assets | Log of Employees | Log of Productivity |
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
| **Parent's Equity** | 0.030*** | | | | |
| | (0.000) | | | | |
| **Affiliate's Internal Debt** | | 0.514*** | 0.096*** | 2.818*** | -1.516*** |
| ***Instrumented by Parent's Equity*** | | (0.000) | (0.007) | (0.000) | (0.002) |
| **N** | 117,217 | 117,223 | 117,223 | 112873 | 112,497 |
| **R-squared** | 0.767 | 0.805 | 0.759 | 0.914 | 0.894 |
| | Specification for all panels | | | | |
| **Affiliate Control Variables** | Yes | Yes | Yes | Yes | Yes |
| **Parent Control Variables** | Yes | Yes | Yes | Yes | Yes |
| **Affiliate Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Parent Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Year Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Industry-Year Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Municipality-Year Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |

**Panel B in Table XI** also presents us with another important finding. The higher the affiliate's internal debt, the higher both the affiliate's tangible and intangible assets are. However, the estimated coefficient (0.514) for the regression of tangible assets is remarkably higher than the one (0.096) for the regression of intangible assets. This finding conforms to the empirical work of Belenzon et al. (2013), which states that the importance of internal capital markets is more vital for corporate groups in capital-intensive industries. Regarding the effect of internal capital markets on the affiliate's employment and productivity, we find that the affiliate firm prefers to use funds from intragroup loans to increase the number of employees, but this might lower the firm's productivity. Even though the internal capital markets may alleviate financial constraints, our evidence from the last column of **Table XI – Panel B** implies that firms invest in projects with relatively lower internal rates of return or negative economies of scale.

We also run several robustness checks to reduce the probability that our results are due to other plausible economic channels. We run regressions to observe heterogeneity effects that might stem (i) from the classification of multi-industry conglomerates against same-industry conglomerates and (ii) from various ownership structures in a corporate group. Tables reporting the additional analyses searching for heterogeneous effects are shown in the appendix (see **Appendix Tables A8 and A9**).

First, **Appendix Table A8** reports some prominent evidence that internal capital markets matter more in multi-industry business groups than in same-industry conglomerates. Once we compare Panel A with Panel B, the effects of internal capital markets on investment, external debt, cash holdings, and payout are more potent for the affiliate firms that belong to the multi-industry business groups. In both panels in **Table A8**, all the affiliate's internal debt coefficients

are statistically significant at the 1 % level and have the same sign. However, Panel B's estimated coefficients are economically much smaller than those of Panel A. Therefore, same-industry corporate groups have some characteristics that do not allow these group firms to benefit from the potential benefits of internal capital markets. These corporate groups are less diversified and more susceptible to industry shocks. The parent company of a same-industry business group might suffer from a lack of liquidity, while its affiliate firm needs internal financing. Thus, we interpret our results from **Table A8** as evidence in favor of horizontal conglomerates, and they are consistent with Kuppuswamy and Villalonga's (2016) study. They find that diversified conglomerates in the U.S. became more valuable than otherwise-similar, single-segment firms during the 2008 financial crisis.

Second, in **Appendix Table A9**, we perform the IV analysis of the effects of internal capital markets on an affiliate firm's different outcomes in various types of corporate groups according to distinct ownership structures. Various ownership structures here mean that some affiliate firms have more than one parent firm due to their ownership, whereas some affiliates firms have only one parent firm. Another example is that some corporate groups are small in terms of the number of firms, and one parent firm owns only one affiliate firm. In **Table A9**, we focus on some of these sub-samples in our regression analyses.

In Panel A of **Table A9**, we run the regressions in a sub-sample of corporate groups in which the affiliate firms have only one parent company. In contrast, in Panel B, we exclude small corporate groups where a parent firm has only one affiliate firm. In **Table A9**, we observe, in general, no difference in our qualitative results for different ownership structures. Specifically, in **Table A9**, we obtain similar findings as those in Section 6, even after excluding affiliates with more than one parent company or after excluding parent companies that have only one affiliate

firm from the analysis sample. In both corporate group structures analyzed in Panel A and Panel B, affiliates employ intra-group loans to increase their investments, decrease their external debt, and keep more cash in their balance sheets. They prefer not to increase their dividend payments. All the estimated coefficients are statistically significant at the 1 % level. Therefore, we infer that the main results from Section 6 are robust to any different ownership structures in the corporate groups.

## 8. Conclusions

We study the workings of internal capital markets within corporate groups by investigating whether internal capital markets allow financially constrained group firms to alleviate their financial limitations. Using a large and comprehensive panel dataset of all private and public firms from Sweden over a period of 15 years, this paper shows that parent companies of corporate groups raise funds from external capital markets and transfer these funds to financially constrained firms through intragroup loans.

The paper's main results underscore that financially strong parent firms use internal capital markets to direct capital to financially constrained affiliate firms with high growth opportunities and, thereby, to support investment in these firms. We thus complement and extend previous research on the role of internal capital markets (e.g., Desait et al. 2004, Gopalan et al. 2007, Belenzon et al. 2013, Almeida et al. 2015, and Santioni et al. 2020). The paper differentiates itself from previous studies by analyzing the functioning of internal capital markets within a developed country's legal and financial environment. It extends our knowledge about internal capital markets by not only investigating the publicly listed companies' corporate groups, but also the corporate groups that consist of only private firms.

Distinct from the literature, this study also provides evidence that parent firms use the capital that they generate by issuing more equity rather than borrowing externally in their groups' internal capital markets. Parent firms do not tend to increase their external debt by borrowing from financial markets and then lending to their financially constrained group firms. We show that financially constrained affiliates use internal funds from the parent firms in several different ways through the instrumental variable analysis. Once they obtain intragroup loans, these affiliate firms increase their investments, pay back their external debt, or hold these funds as additional liquidity. In turn, they do not pay extra dividends, which confirms the existence of strict corporate governance rules in many corporate groups. Indeed, we observed a reduction in payouts, which corroborates the idea that financially constrained affiliates need and demand liquidity from the other group firms. Based on the economic channels shown in the literature and discussed in this paper, we document that corporate groups use intragroup loans intentionally, such as making more investments or paying back external debt. Therefore, these outcomes may not be considered directly as spillovers from internal capital markets.

By focusing on different sub-samples, this study also points out that financially constrained firms with a private parent firm benefit from internal capital markets more than financially constrained firms with a publicly listed parent firm. Furthermore, we also obtain results that indicate that the affiliate firm's management may use this extra liquidity from intragroup loans for its benefit. In analyzing the effects of internal capital markets on corporate governance, we find that once the affiliates receive more intragroup loans, they raise the salaries of their managers and employees.

The paper's main findings highlight the importance of internal funds combined with an active internal capital market for financially constrained firms in alleviating their financial

limitations. However, we also underline some potential adverse effects of internal capital markets (i.e., managers direct some of these internal funds to their compensation schemes). This study supports a perspective that advocates for the existence of a tradeoff in internal capital markets, where companies should balance the advantages of internal capital markets with the disadvantages. Furthermore, the analyses of the internal capital markets' effects on real firm outcomes indicate that internal capital markets promote investment and employment, but lead to a reduction in productivity, at least in the short run.

## References


Almeida, H., Kim, C. S., & Kim, H. B. (2015). Internal capital markets in business groups: Evidence from the Asian financial crisis. *The Journal of Finance*, *70*(6), 2539-2586.

Almeida, H. V., & Wolfenzon, D. (2006). A theory of pyramidal ownership and family business groups. *The Journal of Finance*, *61*(6), 2637-2680.

Belenzon, S., Berkovitz, T., & Rios, L. A. (2013). Capital markets and firm organization: How financial development shapes European corporate groups. *Management Science*, *59*(6), 1326-1343.

Bertrand, M., Mehta, P., & Mullainathan, S. (2002). Ferreting out tunneling: An application to Indian business groups. *The Quarterly Journal of Economics*, *117*(1), 121-148.

Buchuk, D., Larrain, B., Muñoz, F., & Urzúa, F. (2014). The internal capital markets of business groups: Evidence from intra-group loans. *Journal of Financial Economics*, *112*(2), 190-212.

Desai, M.A., Foley, C. F., and Hines Jr, J.R., 2004. A multinational perspective on capital structure choice and internal capital markets. The Journal of Finance, 59(6), 2451-2487

Farre-Mensa, J., & Ljungqvist, A. (2016). Do measures of financial constraints measure financial constraints? *The Review of Financial Studies*, *29*(2), 271-308.

Fazzari, S., Hubbard, R., Petersen, B., Blinder, A., & Poterba, J. (1988). Financing constraints and corporate investment. *Brookings Papers on Economic Activity, 1988*(1), 141-206. doi:10.2307/2534426

Federal Reserve Bank of St. Louis (2020), OECD-based Recession Indicators for Sweden from the Peak through the Period preceding the Trough [SWERECP], *retrieved from FRED, Federal Reserve Bank of St. Louis*; https://fred.stlouisfed.org/series/SWERECP, September 3, 2020.

Gertner, R. H., Scharfstein, D. S., & Stein, J. C. (1994). Internal versus external capital markets. *The Quarterly Journal of Economics*, *109*(4), 1211-1230.

Gopalan, R., Nanda, V., & Seru, A. (2007). Affiliated firms and financial support: Evidence from Indian business groups. *Journal of Financial Economics*, 86(3), 759-795.

Hadlock, C. J., & Pierce, J. R. (2010). New Evidence on Measuring Financial Constraints: Moving Beyond the KZ Index. *The Review of Financial Studies*, *23*(5).

Holmstrom, B., & Tirole, J. (1997). Financial intermediation, loanable funds, and the real sector. *The Quarterly Journal of Economics*, *112*(3), 663-691.

Jensen, M. C., & Meckling, W. H. (1976). Theory of the firm: Managerial behavior, agency costs, and ownership structure. *Journal of Financial Economics*, *3*(4), 305-360.

Johnson, S., La Porta, R., Lopez-de-Silanes, F., & Shleifer, A. (2000). Tunneling. *American Economic Review*, *90*(2), 22-27.

Kraus, A., & Litzenberger, R. H. (1973). A state-preference model of optimal financial leverage. *The Journal of Finance*, *28*(4), 911-922.

Kuppuswamy, V., & Villalonga, B. (2016). Does diversification create value in the presence of external financing constraints? Evidence from the 2007–2009 financial crisis. *Management Science*, *62*(4), 905-923.

Lamont, O. (1997). Cash flow and investment: Evidence from internal capital markets. *The Journal of Finance*, *52*(1), 83-109.

Larrain, B., Sertsios, G., & Urzúa I, F. (2018). The effects of losing a business group affiliation. *The Review of Financial Studies*, *32*(8), 3036-3074.

Lemmon, M. L., Roberts, M. R., & Zender, J. F. (2008). Back to the beginning: persistence and the cross-section of corporate capital structure. *The Journal of Finance*, *63*(4), 1575-1608.

Masulis, R. W., Pham, P. K., & Zein, J. (2020). Family Business Group Expansion Through IPOs: The Role of Internal Capital Markets in Financing Growth While Preserving Control. *Management Science*.

Majluf, N. S., Myers, S. C. (1984). Corporate Financing and Investment Decisions When Firms Have Information That Investors Do Not Have, *Journal of Financial Economics*, *13*(2), 187-221.

Modigliani, F., & Miller, M. H. (1958). The cost of capital, corporation finance, and the theory of investment. *The American Economic Review*, *48*(3), 261-297.

Myers, S. C. (1984). The Capital Structure Puzzle. *The Journal of Finance*, *39*(3), 574-592.

Rajan, R., Servaes, H., & Zingales, L. (2000). The cost of diversity: The diversification discount and inefficient investment. *The Journal of Finance*, *55*(1), 35-80.

Santioni, R., Schiantarelli, F., & Strahan, P. E. (2020). Internal Capital Markets in Times of Crisis: The Benefit of Group Affiliation. *Review of Finance*, *24*(4), 773-811.

Scharfstein, D. S., & Stein, J. C. (2000). The dark side of internal capital markets: Divisional rent-seeking and inefficient investment. *The Journal of Finance*, *55*(6), 2537-2564.

Stein, J. C. (1997). Internal capital markets and the competition for corporate resources. *The Journal of Finance*, *52*(1), 111-133.

Tirole, J. (2010). *The Theory of Corporate Finance*. Princeton University Press.

# Appendix

## Appendix Table A1 – Variable definitions

This table presents the definition for each variable in our empirical analysis. The first column gives the variable's name, and the second column describes the variable. PPE stands for Property, Plant, and Equipment, which is the sum of machinery, equipment, building, and land.

| Variable | Description |
|---|---|
| Cash Holdings | Cash, bank balances, and short-term investments over total assets |
| Investment | Change in PPE plus depreciation over total assets |
| Size | Total assets in 2010 Swedish Krona, deflated using Swedish CPI index |
| Leverage | Total liabilities over total assets |
| Tangibility | PPE over total assets |
| Profitability | Net income over equity (return on equity, ROE) |
| Age | Number of years since firm's foundation year |
| External Debt | Bonds and bank liabilities over total assets |
| Internal Debt | Short-term plus long-term group liabilities over total assets |
| Payout | Dividends over total assets |
| Intangible Assets | Intangible assets over total assets |
| Executive Remuneration | Board and CEO salary excluding bonuses over total assets |
| Executive Bonus | Board and CEO bonuses over total assets |
| Employees Paycheck | Employee salary excluding performance compensation over total assets |
| Employees Bonus | Performance compensation for employees over total assets |
| Number of Employees | Number of employees |
| Productivity | Net sales over number of employees |

## Appendix Table A2 – Stand-alone x corporate groups: Comparison of the main firm characteristics

**Appendix Table A2** separately reports the mean, median, and number of observations by stand-alone and corporate group firms. All variables (except size, age, number of employees, and productivity) are reported in terms of the percentage of total assets. **Table A1** in the Appendix provides the definition of each variable. This table also reports the differences in the means and medians for each variable. *, **, *** indicate significance at the 10%, 5% and 1% levels, using heteroscedasticity-consistent standard errors. All variables are winsorized at the 1% and 99% levels each year and by firm status (private or public).

| Variable | Mean | Median | N | Mean | Median | N | Difference in Means | Difference in Medians |
|---|---|---|---|---|---|---|---|---|
| | Stand-alone | | | Corporate | | | | |
| Cash Holdings | 27.6 | 20.1 | 1,053,001 | 17.3 | 6.9 | 648,146 | 10.3*** | 13.2*** |
| Investment | 5.0 | 1.7 | 807,850 | 2.9 | 0.7 | 512,875 | 2.1*** | 1.0*** |
| Size | 4,605 | 1,931 | 1,053,379 | 28,231 | 5,738 | 648,248 | -23,626*** | -3,807*** |
| Leverage | 64.1 | 67.1 | 1,053,000 | 63.0 | 69.5 | 648,146 | 1.1*** | -2.4*** |
| Tangibility | 22.6 | 11.0 | 1,052,969 | 15.7 | 3.6 | 648,115 | 6.9*** | 7.4*** |
| Profitability | 9.7 | 12.3 | 1,053,153 | 6.1 | 10.4 | 648,192 | 3.6*** | 1.9*** |
| Age | 15 | 12 | 1,053,153 | 17 | 13 | 648,025 | -2*** | -1*** |
| External Debt | 12.3 | 0.0 | 1,052,895 | 10.7 | 0.0 | 648,099 | 1.6*** | - |
| Internal Debt | 0.4 | 0.0 | 1,052,900 | 11.5 | 0.1 | 648,101 | -11.1*** | -0.1*** |
| Payout | 19.5 | 0.0 | 1,008,790 | 22.5 | 0.0 | 569,858 | -3.0*** | - |
| Intangible Assets | 0.8 | 0.0 | 1,053,000 | 1.0 | 0.0 | 648,145 | -0.2*** | - |
| Executive Remuneration | 23.1 | 13.8 | 989,703 | 6.8 | 1.1 | 592,339 | 16.3*** | 12.7*** |
| Executive Bonus | 0.0 | 0.0 | 1,025,145 | 0.0 | 0.0 | 618,407 | - | - |
| Employees Paycheck | 33.9 | 21.8 | 1,019,810 | 29.4 | 15.5 | 615,210 | 4.5*** | 6.3*** |
| Employees Bonus | 0.0 | 0.0 | 1,025,143 | 0.0 | 0.0 | 618,402 | - | - |
| Number of Employees | 6 | 3 | 996,150 | 22 | 5 | 597,581 | -16*** | -2*** |
| Productivity | 1,262 | 901 | 996,147 | 2,073 | 1,282 | 485,647 | -811*** | -382*** |

## Appendix Table A3 – Investment x cash holdings sensitivity regressions using HP index

**Appendix Table A3** shows the panel regressions following Fazzari, Hubbard, and Petersen's (1998) specification and uses Hadlock and Pierce's (2010) definition of financially constrained firms. We control for size, leverage, tangibility, profitability, and age. The control variables' definitions are presented in **Table A1** in the appendix. All regressions include firm, year, industry-year, and municipality-year fixed effects. All control variables are lagged by one period with respect to the dependent variable. Standard errors are two-way clustered by firm and year. *, **, *** indicate significance at the 10%, 5% and 1% levels. The p-values are reported in parenthesis.

| | **Dependent Variable: Investment** | | | |
|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** |
| **Lagged Cash Holdings** | 0.006*** | -0.002 | 0.008*** | -0.000 |
| | (0.000) | (0.101) | (0.000) | (0.956) |
| **HP Index** | - | -0.018*** | - | -0.015*** |
| | | (0.000) | | (0.000) |
| **Lagged Cash Holdings x HP Index** | - | 0.019*** | - | 0.017*** |
| | | (0.000) | | (0.000) |
| **Corporate** | - | - | -0.005*** | -0.001 |
| | | | (0.000) | (0.183) |
| **Lagged Cash Holdings x Corporate** | - | - | -0.007*** | -0.007*** |
| | | | (0.000) | (0.004) |
| **HP Index x Corporate** | - | - | - | -0.011*** |
| | | | | (0.000) |
| **Lagged Cash Holdings x HP Index x Corporate** | - | - | - | 0.002 |
| | | | | (0.541) |
| **Control Variables** | Yes | Yes | Yes | Yes |
| **Firm Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Year Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Industry x Year Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Municipality x Year Fixed-Effect** | Yes | Yes | Yes | Yes |
| **R-squared** | 0.388 | 0.439 | 0.388 | 0.440 |
| **N** | 1,253,193 | 736,061 | 1,253,193 | 736,061 |

## Appendix Table A4 –The effects of internal capital markets on firms' outcomes for financially constrained firms: HP index as an alternative measure

**Appendix Table A4** depicts panel regressions examining the effect of internal debt on investment, cash holdings, payout, and external debt. We adopt Hadlock and Pierce's (2010) definition (HP Index) for selecting financially constrained firms. We control for size, leverage, tangibility, profitability, and age. **Table A1** presents a definition for each variable in the appendix. Firm, year, industry-year, and municipality-year fixed effects are included. We lag all control variables with one period. Standard errors are two-way clustered by firm and year. *, **, *** indicate significance at the 10%, 5% and 1% levels. The p-values are reported in parenthesis.

| | **Dependent Variable** | | | |
|---|---|---|---|---|
| | **Investment** | **Cash Holdings** | **Payout** | **External Debt** |
| | **(1)** | **(2)** | **(3)** | **(4)** |
| **Internal Debt** | 0.000 | -0.005 | -0.017*** | -0.100*** |
| | (0.986) | (0.360) | (0.000) | (0.000) |
| **HP Index** | -0.014*** | -0.004 | -0.006*** | -0.006*** |
| | (0.000) | (0.176) | (0.000) | (0.006) |
| **Internal Debt x HP Index** | 0.002 | 0.004 | 0.022*** | 0.020*** |
| | (0.586) | (0.593) | (0.000) | (0.003) |
| **N** | 735,981 | 736,001 | 736,000 | 736,000 |
| **R-squared** | 0.439 | 0.774 | 0.510 | 0.814 |
| **Control Variables** | Yes | Yes | Yes | Yes |
| **Firm Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Year Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Industry x Year Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Municipality x Year Fixed-Effect** | Yes | Yes | Yes | Yes |

## Appendix Table A5 – The heterogeneous effects of an internal capital market: Interacting with an affiliate's equity

**Appendix Table A5** reports the heterogeneous results of the panel regressions that are similar to the regressions in **Table VII – Panel C**. The dependent variable is again the affiliate's internal debt, and the independent variables are the parent's external debt and the parent's equity. In **Appendix Table A5**, distinct from **Table VII**, we interact the independent variables from **Table VII – Panel C** with the affiliate's equity. We control for size, leverage, tangibility, profitability, and age. The variable definitions are shown in **Table A1** in the Appendix. Firm, year, industry-year, and municipality-year fixed effects are included, both for the affiliate and the parent (when applicable). All the control variables are lagged by one year. Standard errors are two-way clustered by ownership relation and year. *, **, *** indicate significance at the 10%, 5% and 1% levels. The p-values are reported in parentheses.

| | **Affiliate's Internal Debt** | | | |
|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** |
| **Parent's External Debt** | -0.002 | -0.013* | -0.002 | -0.014* |
| | (0.755) | (0.093) | (0.773) | (0.082) |
| **Parent's Equity** | 0.029*** | 0.030*** | 0.031*** | 0.028*** |
| | (0.000) | (0.000) | (0.001) | (0.002) |
| **Affiliate's Equity** | -0.511*** | -0.509*** | -0.505*** | -0.513*** |
| | (0.031) | (0.031) | (0.031) | (0.028) |
| **Affiliate's Equity x Parent's External Debt** | | | 0.047** | 0.050** |
| | | | (0.028) | (0.015) |
| **Affiliate's Equity x Parent's Equity** | | -0.007 | | 0.005 |
| | | (0.671) | | (0.736) |
| | Specification for all panels | | | |
| **N** | 117,217 | 117,217 | 117,217 | 117,217 |
| **R-squared** | 0.767 | 0.767 | 0.767 | 0.767 |
| **Affiliate Control Variables** | Yes | Yes | Yes | Yes |
| **Parent Control Variables** | Yes | Yes | Yes | Yes |
| **Affiliate Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Parent Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Year Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Industry-Year Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Municipality-Year Fixed-Effect** | Yes | Yes | Yes | Yes |

## Appendix Table A6 – The heterogeneous effects of internal capital markets: Interacting with an affiliate's external debt

**Appendix Table A6** reports the heterogeneous results of the panel regressions comparable to the ones used in Table VII – Panel C, where the dependent variable is the affiliate's internal debt. The independent variables are the parent's external debt and the parent's equity. This table interacts the independent variables from **Table VII – Panel C** with the affiliate's external debt. We control for size, leverage, tangibility, profitability, and age. The variable definitions are shown in **Table A1** in the appendix. Firm, year, industry-year, and municipality-year fixed effects are included, both for the affiliate and the parent (when applicable). All control variables are lagged by one year. Standard errors are two-way clustered by ownership relation and year. *, **, *** indicate significance at the 10%, 5% and 1% levels. The p-values are reported in parentheses.

| | **Affiliate's Internal Debt** | | | |
|---|---|---|---|---|
| | **(1)** | **(2)** | **(3)** | **(4)** |
| **Parent's External Debt** | 0.000 | 0.002 | -0.000 | 0.002 |
| | (0.997) | (0.882) | (0.998) | (0.787) |
| **Parent's Equity** | 0.027*** | 0.027*** | 0.027*** | 0.027*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| **Affiliate's External Debt** | -0.129*** | -0.127*** | -0.128*** | -0.124*** |
| | (0.000) | (0.000) | (0.000) | (0.000) |
| **Affiliate's External Debt x Parent's External Debt** | | | -0.010 | -0.013 |
| | | | (0.583) | (0.553) |
| **Affiliate's External Debt x Parent's Equity** | | -0.002 | | -0.006 |
| | | (0.931) | | (0.777) |
| | Specification for all panels | | | |
| **N** | 117,216 | 117,216 | 117,216 | 117,216 |
| **R-squared** | 0.769 | 0.769 | 0.769 | 0.769 |
| **Affiliate Control Variables** | Yes | Yes | Yes | Yes |
| **Parent Control Variables** | Yes | Yes | Yes | Yes |
| **Affiliate Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Parent Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Year Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Industry-Year Fixed-Effect** | Yes | Yes | Yes | Yes |
| **Municipality-Year Fixed-Effect** | Yes | Yes | Yes | Yes |

## Appendix Table A7 – The effect of internal capital market on capital usage: Groups with private parent firms vs. groups with public parent firms

**Appendix Table A7** reports the results of the instrumental variable (IV) analyses that examine the effect of internal capital markets on the following four dependent variables: investment, external debt, cash holdings, and payout. We instrument the affiliate's internal debt using the parent's equity. **Table A7** shows both the first and second stages of the IV analysis for two different sub-samples. According to the parent firm's status, we determine the sub-samples and organize the table: corporate groups with private parent firms (Panel A) and corporate groups with public parent firms (Panel B). In both sub-samples, we only include financially constrained affiliates. We control for both parent and affiliate firms' size, leverage, tangibility, profitability, and age. Firm, year, industry-year, and municipality-year fixed effects are included, both for the parent and the affiliate firms (when applicable). All control variables are lagged by one year. Standard errors are two-way clustered by ownership relation and year and are robust to the first stage estimates. Symbols *, **, *** indicate significance at the 10%, 5% and 1% levels. The p-values are reported in parentheses.

| | **First Stage** | **Second Stage** | | | |
|---|---|---|---|---|---|
| | Affiliate's Internal Debt | Investment | External Debt | Cash Holdings | Payout |
| | **Panel A: Private Parent and Small-Private Affiliate** | | | | |
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
| **Parent's Equity** | 0.035*** | | | | |
| | (0.000) | | | | |
| **Affiliate's Internal Debt** | | 0.596* | -0.334 | 2.440** | -1.242** |
| ***Instrumented by Parent's Equity*** | | (0.078) | (0.241) | (0.026) | (0.023) |
| **N** | 28.933 | 28.935 | 28.937 | 28.937 | 28.937 |
| **R-squared** | 0,800 | 0,265 | 0,820 | 0,235 | -1,069 |
| | **Panel B: Public Parent and Small-Private Affiliate** | | | | |
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
| **Parent's Equity** | -0.946 | | | | |
| | (0.267) | | | | |
| **Affiliate's Internal Debt** | | 0.470 | 0,229 | 0,328 | -0.085 |
| ***Instrumented by Parent's Equity*** | | (0.420) | (0.383) | (0.750) | (0.473) |
| **N** | 132 | 132 | 132 | 132 | 132 |
| **R-squared** | 0,914 | 0,832 | 0,851 | 0,896 | 0,865 |
| | Specification for all panels | | | | |
| **Affiliate Control Variables** | Yes | Yes | Yes | Yes | Yes |
| **Parent Control Variables** | Yes | Yes | Yes | Yes | Yes |
| **Affiliate Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Parent Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Year Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Industry-Year Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Municipality-Year Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |

## Appendix Table A8 – The effect of the internal capital market on capital usage: The case of multi-industry x same-industry conglomerates

**Appendix Table A8** reports the result of the instrumental variable (IV) estimates that predict the following four dependent variables: investment, external debt, cash holdings, and payout. We instrument the affiliate's internal debt using the parent's equity. **Table A8** in the Appendix shows both the first and second stages of the IV. According to the conglomerate diversification status, we organize the table as follows: multi-industry group (Panel A) and the same-industry group (Panel B). We control for size, leverage, tangibility, profitability, and age. The variable definitions are shown in **Table A1** in the Appendix. Firm, year, industry-year, and municipality-year fixed effects are included, both for the affiliate and the parent (when applicable). All control variables are lagged by one year. Standard errors are two-way clustered by ownership relation and year and are robust to the first stage estimates. *, **, *** indicate significance at the 10%, 5% and 1% levels. The p-values are reported in parentheses.

| | **First Stage** | **Second Stage** | | | |
|---|---|---|---|---|---|
| | Affiliate's Internal Debt | Investment | External Debt | Cash Holdings | Payout |
| | **Panel A: Multi-Industry Conglomerates** | | | | |
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
| **Parent's Equity** | 0.030*** | | | | |
| | (0.000) | | | | |
| **Affiliate's Internal Debt** | | 0.404*** | -0.635*** | 2.531*** | -0.828*** |
| ***Instrumented by Parent's Equity*** | | (0.005) | (0.000) | (0.000) | (0.000) |
| **N** | 78.710 | 78.712 | 78.718 | 78.718 | 78.718 |
| **R-squared** | 0,773 | 0,343 | 0,784 | -0.212 | -0.369 |
| | **Panel B: Same-Industry Conglomerates** | | | | |
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
| **Parent's Equity** | 0.032*** | | | | |
| | (0.000) | | | | |
| **Affiliate's Internal Debt** | | 0.302*** | -0.315* | 1.915*** | -0.495*** |
| ***Instrumented by Parent's Equity*** | | (0.008) | (0.050) | (0.000) | (0.000) |
| **N** | 36.343 | 36.347 | 36.351 | 36.351 | 36.351 |
| **R-squared** | 0,780 | 0,463 | 0,866 | 0,384 | 0,347 |
| | Specification for all panels | | | | |
| **Affiliate Control Variables** | Yes | Yes | Yes | Yes | Yes |
| **Parent Control Variables** | Yes | Yes | Yes | Yes | Yes |
| **Affiliate Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Parent Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Year Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Industry-Year Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Municipality-Year Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |

## Appendix Table A9 – The effect of the internal capital market on capital usage: Robustness to distinct ownership structures

**Appendix Table A9** reports the instrumental variable (IV) approach's estimates that predict the following four dependent variables: investment, external debt, cash holdings, and payout. We instrument the affiliate's internal debt using its parent's equity. **Table A9** in the appendix presents both the first and second stages of the IV analysis. We organize the table according to two distinct ownership structures as follows: one excluding affiliates with more than one parent company (Panel A) and one excluding parent companies with only one affiliate (Panel B). We control for size, leverage, tangibility, profitability, and age. The variable definitions are shown in **Table A1** in the appendix. Firm, year, industry-year, and municipality-year fixed effects are included, both for the affiliate and the parent (when applicable). We lag all control variables one year. Standard errors are two-way clustered by ownership relation and year and are robust to the first stage estimates. *, **, *** indicate significance at the 10%, 5% and 1% levels. The p-values are reported in parentheses.

| | **First Stage** | **Second Stage** | | | |
|---|---|---|---|---|---|
| | Affiliate's Internal Debt | Investment | External Debt | Cash Holdings | Payout |
| | **Panel A: Excluding affiliates with more than one parent company** | | | | |
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
| **Parent's Equity** | 0.031*** | | | | |
| | (0.000) | | | | |
| **Affiliate's Internal Debt** | | 0.340*** | -0.625*** | 2.314*** | -0.722*** |
| ***Instrumented by Parent's Equity*** | | (0.000) | (0.000) | (0.000) | (0.000) |
| **N** | 114,569 | 114,575 | 114,585 | 114,585 | 114,585 |
| **R-squared** | 0.760 | 0.366 | 0.774 | -0.042 | -0.170 |
| | **Panel B: Excluding parent companies with only one affiliate** | | | | |
| | **(1)** | **(2)** | **(3)** | **(4)** | **(5)** |
| **Parent's Equity** | 0.027*** | | | | |
| | (0.000) | | | | |
| **Affiliate's Internal Debt** | | 0.450*** | -0.517*** | 2.183*** | -0.866*** |
| ***Instrumented by Parent's Equity*** | | (0.000) | (0.000) | (0.000) | (0.000) |
| **N** | 65,778 | 65,784 | 65,788 | 65,788 | 65,788 |
| **R-squared** | 0.777 | 0.386 | 0.841 | 0.360 | -0.046 |
| | Specification for all panels | | | | |
| **Affiliate Control Variables** | Yes | Yes | Yes | Yes | Yes |
| **Parent Control Variables** | Yes | Yes | Yes | Yes | Yes |
| **Affiliate Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Parent Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Year Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Industry-Year Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |
| **Municipality-Year Fixed-Effect** | Yes | Yes | Yes | Yes | Yes |