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Diversification Advantages During the Global Financial Crisis*

Mats Levander†

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Abstract

In this paper, I investigate whether being part of a business group mitigated the effects of the global financial crisis for Swedish firms. The crisis is used as an exogenous shock to firms' external financing. The investments made by business group firms are compared to those made by standalone firms. I find that being part of a business group had a mitigating effect on the impact of the crisis on firm investments. Firms that were part of a business group reduced their investments by significantly less than standalone firms. These differences are driven by a diversification effect among business group firms due to the use of internal capital markets and easier access to external financing. I present evidence of increased internal capital market activity during the crisis. Finally, my results suggest that business group firms profitability increased relative to the profitability of standalone firms after the crisis.

Keywords: Financial crisis, firm investment, business group, internal capital markets, external financing constraints.

JEL codes: G01, G30, G32.

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1 Introduction

Conglomerates and business groups are unique, as they can decide how to redistribute resources among their affiliated firms. In addition, as an entity, a business group can generally borrow more than standalone firms, as cash flows in the business group are not perfectly correlated (see, e.g., Lewellen (1971), and Stein (2003)). Hence, lenders perceive business groups as safer due to their lower default risk, which results in higher debt capacity, especially if they are diversified (Berger and Ofek; 1995). This diversification effect enables the business group to borrow more and then decide how to allocate their resources across affiliated firms. Moreover, in comparison to standalone firms, a firm affiliated with a business group has the advantage of being able to use the internal capital market if it is more favourable than the external capital market. If this allocation of resources is handled efficiently, such that resources are allocated to the affiliates with the best investment opportunities, the group engages in "winner picking". If the allocation is inefficient, it is described as cross-subsidization of non-performing affiliates.

The diversified corporate structures of conglomerates and business groups were viewed positively during the rise of large conglomerates in the 1960s and 1970s. However, that perspective shifted dramatically when many of the conglomerates were broken up in the 1980s (see, e.g., Scharfstein (1998)). More recently, the empirical literature on conglomerates and business groups has mainly focused on the drawbacks of this form of corporate structure (see, e.g., Lamont (1997), Scharfstein and Stein (2000)) and the efficiency of their internal capital markets (see, e.g., Billett and Mauer (2003), Shin and Stulz (1998)).

Stein (1997) predicts that the benefits of being in a business group or conglomerate are likely to be most pronounced when credit constraints are binding and competition for internal funds occurs. Hence, under harsh economic conditions when credit constraints are likely to bind, firms in a business group should have diversification advantages relative to standalone firms due to the two non-exclusive effects: the use of internal capital markets and easier access to external financing.

In this study, I empirically test the prediction that being part of a business group can constitute an advantage when credit constraints are likely to bind. Specifically, I investigate whether being part of a business group during the global financial crisis had a mitigating effect on the investment policies of limited liability firms in Sweden.[1] The global financial crisis is used as an exogenous shock to firms' abilities to raise external financing.[2] The study of business groups has an advantage compared to the study of conglomerates, as the financial statements of each affiliated firm in a business group can be observed. Scharfstein (1998) and Shin and Park (1999) suggest that conglomerates in the US tend to arbitrarily allocate capital expenditures and assets across divisions. In contrast, Swedish business group firms are independent and have their own financial statements. Therefore, they should have less of this freedom. To evaluate the impact of the crisis, I use a difference-in-differences approach to contrast the investments of business group firms to those of standalone firms before and during the crisis. To control for unobserved time-invariant differences, I use firm fixed effects.

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[1] Limited liability firm in Swedish: *aktiebolag*.

[2] This is due to its origin in the US housing market, as stated in, e.g., Campello et al. (2010) and Campello et al. (2011b).

I find that business group affiliation had a mitigating effect on firm investments during the global financial crisis. Firms affiliated with a business group reduced their investments by 14% on average, while standalone firms reduced their investments by 33% on average.[3] The results suggest that business group affiliation dampened the impact of the crisis on firm investments, which might have been caused by diversification advantages relaxing credit constraints.

A potential concern is that the results could be driven by firm size, as business group firms are, on average, larger than standalone firms. However, I show that there is no statistically significant difference in the effect of the crisis between large business group firms and large standalone firms. To further investigate whether the crisis had a non-symmetrical impact across firms (e.g., for firms with different growth opportunities), I compare the investment behavior of exporting and non-exporting firms during the crisis. I show that exporting firms' investments were less affected by the crisis, although this could be explained by government subsidized guarantees made to exporting firms during the course of the crisis (see, e.g., Riksrevisionen (2009)) and exchange rate depreciation. In addition, a nearest-neighbor matching algorithm is used as a robustness test in which business group firms and standalone firms are matched on observables at the industry level prior to the crisis. I find that group firms either increased their investments by more or reduced their investments by less than matched standalone firms during the crisis, which further strengthens my findings.

After confirming the mitigating effect on investments for business group firms, I investigate the two *non-exclusive* explanations for this finding: access to external financing and internal capital markets. I first test the diversification advantages by investigating access to external financing. Changes in different measures of access to external financing during the crisis years for business group firms and standalone firms are examined for the sample of nearest-neighbor matched firms. I find statistically significant results indicating that business group firms had better access to external financing during the crisis. The results support the "more money" effect of business groups described by Stein (2003), which stems from uncorrelatedness of cash flows, which lenders perceive as safer.

To investigate the internal capital markets, I use a subsample of business groups for which I have information on all firms in the group.[4] In line with previous literature (Ang et al. (2015) and Lee et al. (2009)), I investigate the sensitivity of investments to the firm's own cash flow and to the cash flows of the affiliates in its business group. The sample is also split into diversified and non-diversified business groups by the number of industries in which the group operates.[5] I find that only the diversified business group firms became less sensitive to their own cash flows and more sensitive to their affiliates' cash flows during the crisis. This provides evidence of increased dependence on affiliates' cash flows during the crisis and, hence, the presence of internal capital markets.

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[3] On average for my sample, firms reduced their investments by 28% during the crisis. This effect is larger than the 6.4% decrease documented in Duchin et al. (2010) and highlights what could be expected ex-ante—smaller firms were more affected by the crisis. In unreported regressions, I follow the setting of Duchin et al. (2010) and investigate how cash reserves prior to the crisis and leverage affected firm investments during the crisis. These results also suggest that being part of a business group had a dampening effect on the impact of the crisis.

[4] Hence, I study business groups in which all of the firms are incorporated in Sweden.

However, the sensitivity of investments to affiliates' cash flows does not imply a causal relationship. It only suggests that they are related. To further test the internal capital markets, I investigate the impact of the relative performance of business group members on the firms' investments. I do so by investigating the effect of industry shocks on the affiliated firms' cash flows in relation to the industry cash flow of a specific firm in the group. I document a positive effect for the investments of a firm in the group if the other affiliates are performing better than that firm (i.e., if the affiliates outperform another firm in the group, they can support that firm's investments). These results add to the diversification story in which high-performing group members can reallocate capital to firms that need it for investments.

Finally, I investigate whether the diversification advantages of business groups led them to invest efficiently during the crisis. I compare changes in profitability by studying industry-adjusted cash flows during the crisis to cash flows in the after-crisis years of 2010 and 2011 for both group and standalone firms. My results suggests that business group firms became more profitable than matched standalone firms. The industry-adjusted cash flows are significantly higher for group firms than for standalone firms. In addition, the cash-flow gap widens over the years after the crisis. Hence, the results suggest that business group firms, given their financing advantage, invested efficiently, as they became more profitable than comparable standalone firms.

I contribute to the extant literature on the diversification advantages of business group affiliation by documenting that business group affiliation has a mitigating impact on firms' investments. This is consistent with the predictions of Stein (1997), the findings of Kuppuswamy and Villalonga (2015), and Ang et al. (2015) for the global financial crisis; the findings of Hoshi et al. (1991) and Almeida et al. (2015) for the Asian crisis; and Gopalan and Xie (2011) and Khanna and Palepu (2000).

The firms in my sample are mainly small and medium-sized, private, and bank dependent, while previous studies have mainly focused on large, publicly listed firms. In private firms, agency problems between shareholders and managers are likely to be less relevant if the firms are closely held by their owners. However, the financial crisis might have had a severe impact on private firms that were more opaque, younger, and more bank dependent (Gunnarsdottir and Lindh; 2011). Publicly listed firms should have found it easier to tackle the impact of the crisis, as they generally had more access to external financing owing to such factors as their investment ratings and established track records, which should have made them less bank dependent and potentially provided them with access to the bond market.[6] This is confirmed in my sample, where small firms experienced cuts in investments of 28% on average, while large firms only reduced investments by an average of 11%. Group affiliation has a significant mitigating effect on reductions in investments for small firms (-33% for standalone firms and -14% for group-affiliated firms), while there is no significantly different effect for large firms. The results are consistent with binding credit constraints and, as documented, the benefits of being in a business group are substantial, thereby adding to the literature on diversification benefits.

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[5] I use the coarsest Swedish industry classification (SNI2007), which has 17 industries excluding the financial and governmental sectors.

[6] The Swedish bond market is small in an international comparison and is dominated by large firms that also seek financing in foreign markets (see, e.g., Gunnarsdottir and Lindh (2011)).

Furthermore, I provide evidence of easier access to external financing using a sample of nearest-neighbor matched firms. These findings are consistent with the "more money" effect for business groups described by Stein (2003), the absence of perfectly correlated cash flows (Lewellen; 1971), and greater debt capacity (Berger and Ofek; 1995). My results differs from those of Almeida et al. (2015), who find no difference in access to external financing for Korean business groups (*chaebols*) during the Asian crisis and, therefore, attributes investment advantages to internal capital markets.

The finding that firms in diversified Swedish business groups became less sensitive to their own cash flows and more sensitive to affiliates' cash flows is consistent with Kuppuswamy and Villalonga (2015), Ang et al. (2015), and Lee et al. (2009).[7] This suggests internal capital market activity. In contrast to Ang et al. (2015), I document this relationship for all types of firms in diversified groups—not only for globally listed family business groups. As in Ang et al. (2015) I document a positive relationship between a firm's investments if it is outperformed by its affiliates and vice versa (i.e., if a firm outperforms its affiliates). This provides additional evidence of functioning internal capital markets. These finding supports the prediction of Stein (1997) that the benefits of a business group affiliation is most pronounced when credit constraints are binding and competition for internal funds occur.

My findings on the differential effect in after-crisis profitability suggest that business group firms used their advantages to invest efficiently. These findings support Stein's (1997) prediction that the benefits of business group affiliation are most pronounced when credit constraints are binding and competition for internal funds occurs. This result is similar to the findings of Almeida et al. (2015) for Korean *chaebols* during the Asian crisis and Santioni, Schiantarelli and Strahan's (2017) findings for Italian business groups during the global financial crisis. The findings also partially suggest that the internal capital markets efficiently allocated capital during the crisis, thereby highlighting the benefits of business group affiliation when access to external financing is limited or costly. This stands in contrast to some of the "dark" side effects of business groups and conglomerates documented during normal economic times (see, e.g. Scharfstein (1998); Scharfstein and Stein (2000); and Lamont (1997)).

This study is also related to classical work on how financial constraints and changes in the capital supply affect investments (e.g., Fazzari et al. (1988); Kaplan and Zingales (1997)) and provides additional evidence on how business groups can alleviate these effects. Last but not least, I add to the growing stream of literature on the impact of the global financial crisis on external financing and firm investments.

The paper proceeds as follows. Section 2 provides an overview of the global financial crisis in Sweden, while Section 3 describes the theoretical background. Section 4 presents the data and Section 5 offers an outline of the empirical strategy. Section 6 provides the empirical results, while my conclusions are presented in Section 7.

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[7] "Diversified" is defined as operating in more than 2 of the 17 industries covered by this study.

2 The Global Financial Crisis in Sweden

The financial crisis started in August 2007 when US consumers began to default on their subprime mortgages. This was just the tip of the iceberg and the subprime crisis quickly developed into a global financial crisis (Brunnermeier; 2009). In early 2008, Bear Stearns collapsed and was sold, while Lehman Brothers declared bankruptcy and Washington Mutual was seized in September 2008. These events resulted in an overall increase in uncertainty on the financial markets, which in turn made financial institutions unwilling to trade or lend to each other. A liquidity and credit crisis became a fact, and the ability of the financial markets to efficiently allocate capital deteriorated sharply.

Sweden was not affected by the initial subprime crisis, as Swedish financial institutions had little exposure to the markets that were affected (Sveriges Riksbank; 2007). However, with the fall of Lehman Brothers, Sweden became embroiled in the global crisis (Sveriges Riksbank; 2008a). The delayed effect is evident in Figure 1, which shows that investments did not begin to decline until the beginning of 2008. In the Swedish central bank's firm interviews (Sveriges Riksbank; 2008b) at the end of 2008, firms claimed that access to external financing (e.g., bank loans) was reduced and that promises of credit had been withdrawn by banks, resulting in cancelled projects.[8] In addition, firms revised their investment plans due to more costly and less available external financing for their liquidity needs. Moreover, firms cut investments in research and development projects. Larger firms reported that they could still manage their financing, although bond and certificate financing were more expensive and harder, leading some firms to avoid this type of financing. The firms found that the banks had a limited ability and willingness to increase credit and, thereby, credit risks. Similarly, aggregate data show that normal channels of external corporate financing, such as bank loans, actually stalled, as demonstrated in Figure 2. This type of reduction in lending during harsh economic times is also documented in work by Jiménez et al. (2012) and Ivashina and Scharfstein (2010).[9]

3 Diversification Advantages

Stein (1997) predicts that the benefits of being in a business group or conglomerate are likely to be most pronounced when credit constraints are binding and competition for internal funds occurs. Hence, during harsh economic times when credit constraints are likely to bind, firms in business groups should have diversification advantages when compared to standalone firms due to the two non-exclusive effects: the use of internal capital markets and easier access to external financing.

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[8] Around 60 firms were interviewed in the following industries: manufacturing, construction, retail, and other services. 15 of the 60 interviewed firms were among the largest in Sweden.

[9] Ivashina and Scharfstein (2010) examine how banks' lending responded to the crisis. They document a substantial decline in new lending across all types of loans. Banks co-syndicating credit lines with Lehman reduced their lending more than banks not cooperating with Lehman.

The easier access to external financing, or the "more money" effect proposed by Stein (2003), reflects the fact that business groups do not have not perfectly correlated cash flows (Lewellen; 1971). Therefore, lenders perceive business groups as safer, resulting in greater debt capacity.

The use of internal capital markets, or "smarter money" (Stein; 2003), gives business groups the possibility to redistribute resources among the affiliates. This can be advantageous when the internal market is more favorable than the external market.

These predictions can be analyzed under harsh economic situations, such as the global financial crisis. In this regard, I test the following hypothesis:

Hypothesis 1: Business group affiliation had a mitigating effect on the impact of the global financial crisis on firm investments.

If this hypothesis holds, it would be interesting to explore the mechanisms behind the effect. I therefore explore the two non-exclusive explanations proposed by Stein (2003): the "more money" effect and the "smarter money" effect, which are represented by easier access to external financing and the workings of internal capital markets respectively. In this regard, I present the following hypotheses:

Hypothesis 2: Business group firms had easier access to external financing during the global financial crisis.

Hypothesis 3: Business group firms became more dependent on internal capital markets during the global financial crisis.

4 Data

4.1 Databases

The data came from several databases. I used an unbalanced panel of yearly observations on all *aktiebolag* in Sweden from the Swedish Credit Bureau (Upplysningscentralen, UC). *Aktiebolag* are approximately the Swedish equivalent of corporations in the US or limited-liability businesses in the UK. Swedish firms are required to submit an annual financial statement to the Swedish Companies Registration Office (SCRO) that includes balance-sheet and income-statement data in accordance with the European Union standards. These financial statements represent the foundation of the panel data set used in this study. As cash-flow statements were not included in the data obtained from the Credit Bureau, I also used investment data from Statistics Sweden (SCB). The investment variables are gross and net investments in tangible assets (machinery, land, and building). Industry information for each firm is available through the SNI code classification, which is the Swedish equivalent of the NAICS/SIC codes. The PAR-Serrano database provides information on business group structure over time (e.g., ownership percentages, group tree structures with firm identifiers for Swedish firms, country of operation).[10] I also obtained information on which Swedish firms were publicly listed.

4.2 Definitions

4.2.1 Business Group

The definition of a business group (*koncern* in Swedish; see Aktiebolagslagen 1:11, L 2006:1371 1:4, s. B 1604 in *Sveriges Rikes Lag* (2014)) is as follows. Firm A is considered to be a parent firm and firm B is a subsidiary if firm A fulfills one of the following conditions:

1. Holds more than 50% of the votes for all stocks or shares in firm B.
2. Owns stocks in firm B and, due to an agreement with other owners, holds more than 50% of the votes for all stocks or shares.
3. Owns stocks or shares in firm B, and has the right to appoint or remove the majority of the members of its board of directors or the equivalent.
4. Owns stocks in firm B and has the sole right to exercise controlling influence over firm B due to an agreement or to articles in the partnership agreement.

Furthermore, firm C is considered to be a subsidiary if the subsidiary firm B, or the parent firm A and subsidiary B together fulfill one of conditions 1 to 4 above. A parent firm and its subsidiaries form a business group.

4.3 Sample Construction

Only firms with total assets and total sales of more than SEK 100,000, as indicated in the Credit Bureau data, were included. As in other countries, firms in Sweden have discretion in choosing the fiscal-year period for their financial statements, which implies that the fiscal and calendar years do not necessarily coincide.[11] Hence, financial-statement information was transformed into calendar-year-end observations.[12] I merged the financial-statement dataset with the investment information and removed observations for which data were missing. In addition, I added data from the Serrano-PAR database containing group information. Firms in the financial sector and firms that were state owned were excluded. All variables were then winsorized at the first and ninety-ninth percentile. This yields an unbalanced panel of more than 100,000 firm observations per year. The years 2005, 2006, and 2007 are defined as *before* the crisis, while 2008 and 2009 are defined as *during* the crisis. In some exercises, the years 2010 and 2011 are also included.

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[10] This database is similar to the Credit Bureau data but it has more information on business group structures.

[11] The fiscal years for corporations in Sweden are allowed to span from 6 to 18 months.

[12] For stock variables, the latest observation is used. For flow variables, the observations are scaled to yearly. For broken fiscal years, the flow variables are a convex combination of the length of the fiscal period.

5 Empirical Strategy

5.1 Firms' Investments

I start by using the global financial crisis as a natural experiment, and I examine how the crisis affected business group firms' and standalone firms' investments. The identifying assumption is that the global financial crisis was an exogenous shock to firms' external financing. This assumption is widely accepted (see, e.g., Campello et al. (2010); Campello et al. (2011b)) given the crisis's origin in the US housing market. The use of firm fixed effects alleviates the main identification concerns by controlling for unobserved, time-invariant firm heterogeneity. However, an endogeneity concern is that a shock of this magnitude could have an unequal impact across different types of firms, as different firms may have different growth opportunities (e.g., exporting firms in Sweden could have been more affected by the crisis). I control for this possibility by using data on Swedish exporting firms from Statistics Sweden and by employing a matching algorithm at the industry level.

To estimate the impact of the global financial crisis on firms' investments, I use a difference-in-differences approach to contrast business group and standalone firms' investments before and during the crisis. The baseline regression is specified in the following way:

$$\begin{aligned} Invest_{it} &= \alpha + \beta_1 \cdot Crisis_t + \beta_2 \cdot Crisis_t \cdot Group_{it} + \beta_3 Group_{it} \\ &\quad + F_i + Controls_{it} + \epsilon_{it}, \end{aligned} \tag{1}$$

where $Invest_{it}$ is firm i's investment, measured as the ratio of net investments in fixed tangible assets to total assets in period t, and $Crisis_t$ is a dummy variable, which is equal to 1 during the crisis years 2008 and 2009. $Group_{it}$ is also a dummy variable which is equal to 1 if firm i is in a business group in period t. Hence, I allow firms to switch between being standalone and in a business group. F_i are firm fixed effects, which are introduced to control for time-invariant unobserved firm characteristics. $Controls_{it}$ includes sales growth and cash flow, and controls for investment opportunities. Standalone firms' and group firms' investments prior to the crisis are given by α and $\alpha + \beta_3$, respectively. The investments made by standalone firms and group firms during the crisis are given by $\alpha+\beta_1$ and $\alpha+\beta_1+\beta_2+\beta_3$, respectively. Therefore, the differences between crisis and the pre-crisis investments for standalone and group firms are β_1 and $\beta_2 + \beta_1$. Hence, the difference of the differences between business group and standalone firms is β_2. Hypothesis 1, which indicates that being part of a business group had an alleviating effect on investments, holds if β_2 is positive and statistically significant.

5.2 Test of Access to External Financing

The "more money" effect of easier access to external financing, which is the focus of Hypothesis 2, is tested by investigating average changes in different measures of external financing during the financial crisis, such as equity and debt growth. I investigate relative changes during the crisis years using:

$$(External finance_t - External finance_{t-1})/(External finance_{t-1}) \tag{2}$$

The results for business group firms are compared to those for standalone firms. A priori, I expect business group firms to have better access to external financing due to uncorrelatedness of cash flows, which should lead lenders to perceive them as safer.

5.3 Test of Internal Capital Markets

As a starting point for testing Hypothesis 3, which proposes that business group firms became more dependent on internal capital markets, I examine the sensitivity of business group firms' investments to their own cash flows and to the cash flows of other affiliates in the same group. To ensure that I am able to observe all members of the business group, I focus on a subsample consisting of Swedish business groups for which I observe almost all of the affiliates. The sample is constructed by comparing total assets in the consolidated financial statement for the whole group with the sum of total assets reported in the individual financial statements of the affiliates.[13] The share of total assets is then used for extraction and only business groups in which that share is within [0.85, 1.15] are extracted. For this subsample in which, in principle, all information is available for all affiliates in the business groups, the sensitivity of investments to own and affiliates' cash flow is estimated as follows:

$$\begin{aligned} Invest_{it} &= \alpha + \beta_1 \cdot CashFlow_{it} + \beta_2 \cdot CashFlow_{it} \cdot Crisis_t \\ &\quad + \beta_3 \cdot CashFlowGroup_{it} + \beta_4 \cdot CashFlowGroup_{it} \cdot Crisis_t \\ &\quad + \gamma \cdot Controls_i + F_i + \epsilon_{it}, \end{aligned} \tag{3}$$

where $Invest_{it}$ is net investment in fixed tangible assets divided by total assets of firm i at time t, $CashFlow_{it}$ is cash flow, which is defined as operating income before amortization and depreciation divided by the total assets of firm i at time t. $CashFlowGroup_{it}$ is the sum of all other cash flows of the affiliates in the group, scaled by their total assets at time t. $Crisis_t$ is a dummy variable that is equal to 1 in 2008 and 2009 and 0 from 2005 to 2007. F_i are firm fixed effects. $Controls_i$ is a vector of lagged control variables for firm i, consisting of the logarithm of total assets, the ratio of total debt to total assets, cash reserves (defined as the ratio of cash and short-term investments to total assets), and the ratio of property plant and equipment to total assets.

Pre-crisis sensitivities to the firm's own cash flow and the cash flow of other group affiliates are given by β_1 and β_3, respectively. During the crisis, the sensitivity to the firm's own cash flow is given by $\beta_1 + \beta_2$ and sensitivity to the affiliates cash flow is given by $\beta_3 + \beta_4$. The differences in sensitivity to the firm's own cash flow and to the cash flows of affiliates are therefore given by β_2 and β_4, respectively. If the internal capital markets reallocate resources during the crisis, I would expect business group firms to be less sensitive to their own cash flows and more sensitive to their affiliates' cash flows. In other words, I expect β_2 to have a negative sign and β_4 to have a positive sign.

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[13] Individual total assets have been adjusted for group-interfering items (e.g., claims on affiliates).

6 Empirical Results

6.1 Summary Statistics

Summary statistics for the sample are displayed in the top panel of Table 1. To provide some context, compared to a typical Compustat sample, Swedish firms invest more, and they have more cash reserves, more short-term debt (30% compared to 3.5%), about the same amount of long-term debt, and higher cash flows. By construction, they also have fewer total assets (mean of approximately USD 6.2 million).[14][15] Differences between business group firms and standalone firms are reported in the summary statistics displayed in the middle and bottom panels of Table 1, respectively. Standalone firms have higher investments and cash reserves (potentially because they engage in precautionary savings due to constraints in external financing) than group firms, as well as lower long-term debt, short-term debt, sales growth, and total assets. 15 standalone firms and 257 group firms were publicly listed in 2007.[16]

6.2 Test of Difference in Means

The evolution of the mean of the dependent variable—the ratio of net investments in fixed tangible assets to total assets—for standalone and group firms is displayed in Figure 3. Standalone firms experienced a steeper drop in investments than group firms during the crisis. In addition, group firms invested less on average, as suggested by the summary statistics. The tests for differences in means are shown in Table 2. Both types of firms experienced a significant decrease in investments during the crisis, and standalone firms reduced investments more than group firms.

6.3 Firms' Investments

I start by testing Hypothesis 1, which suggests that being part of a business group had a mitigating effect on the impact of the crisis, as in specification (1). The results are displayed in Table 3. The significant, negative coefficient in column 1 confirms that the crisis had a negative impact on firms' investments. On average, firms reduced their investments by 28% (-1.331/4.774 = -0.28). This is similar to aggregate statistics indicating that investments dropped by 20%, and it is in line with Almeida, Campello, Laranjeira and Weisbenner's (2009) finding that firms with debt that matured during the crisis reduced investments more, especially given that Swedish firms had more short-term debt, as shown in the summary statistics in Table 1. The effect is greater than the 6.4% decrease documented by Duchin et al. (2010) and may be driven by the fact that firms in this study were generally smaller. As such, they were more severely affected by the crisis.

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[14] Short-term debt is net of accounts payable to correspond to US data.

[15] Exchange rate as of December 31, 2007. USD 6.2 million corresponds to approximately EUR 4.2 million.

[16] Private firms invested more, which is in line with the findings of Asker et al. (2011). In addition, they had more cash reserves and leverage.

In column 2, the positive and statistically significant coefficient for β_2 confirms Hypothesis 1 —being part of a business group had a mitigating impact on the effect of the crisis. Standalone firms reduced their investments by 33% on average, which can be compared to 14% on average for group firms. These results are consistent with the findings of Campello et al. (2010), and Campello et al. (2011b) that credit-constrained firms around the world cut investments more than unconstrained firms. Similar findings have been presented for Europe (Campello et al.; 2011a) and Sweden (Holmberg; 2013). The results suggest that business group affiliation relaxes credit constraints.[17]

The negative coefficient on *Group* supports the evidence presented in Figure 3 that group firms tended to invest less in the pre-crisis period. In column 3, cash flow and sales growth are included to control for investment opportunities, but this does not alter the findings from column 2. The negative sign on cash flow could be puzzling, but it occurs only during the crisis period and is also found by Duchin et al. (2010). Results similar to those in Table 3 are also found in unreported regressions without firm fixed effects. In the estimation, I allow for firms to switch between being in a business group and standalone. In unreported regressions in which I remove firms that switch from or to a business group, I obtain virtually the same results. Therefore, the results are not driven by firms that switch from or to business groups. As I find evidence of a mitigating effect of being in a business group on investments during the crisis, I proceed by testing the validity of the results.

6.3.1 Controlling for Firm Size

A concern that could invalidate the baseline results is that a firm size effect might drive the results. If business group firms are systematically larger than standalone firms, such a size effect could confound my findings. In the middle and bottom summary-statistic panels in Table 1, group firms tend to be larger in terms of total assets. Ex ante, large firms may have easier access to external financing than small firms (e.g., owing to an established track record and potentially more pledgeable assets) and, thereby, easier access to funding for their investments. I control for size using two measures: total assets and the number of employees. I add an interaction term to regression (1) as follows:

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[17] In unreported regressions, I follow the setting in Duchin et al. (2010)), and investigate how cash reserves and leverage prior to the crisis affected firms' investments during the crisis. The results continue to support the finding that business group firms were better off than standalone firms during the crisis.

$$\begin{aligned}
Invest_{it} &= \alpha + \beta_1 \cdot Crisis_t + \beta_2 \cdot Crisis_t \cdot Group_{it} + \beta_3 Group_{it} \\
&\quad +\beta_4 \cdot Crisis_t \cdot Group_{it} \cdot Large_i \\
&\quad +\beta_5 \cdot Crisis_t \cdot Large_i + \beta_6 \cdot Group_{it} \cdot Large_i \\
&\quad +F_i + \epsilon_{it} \qquad (4)
\end{aligned}$$

The new interaction term, the dummy variable, $Large_i$, takes the value of 1 if firm i had more than EUR 43 million in total assets or if its total number of employees exceeded 249 in 2007.[18] If there is no difference between large business group and standalone firms during the crisis, β_4 will be insignificant. Column 4 of Table 3 reports the results when size is measured in terms of total assets. As expected, large firms' investments were less affected by the crisis than those of small firms on average—small firms reduced investments by 28%, while the corresponding figure for large firms was 11%.[19] In column 5, the results of regression (4) are displayed. As the coefficient $Crisis_t Group_{it} Large_i$ is insignificant, there is no difference during the crisis if a large firm is in a business group or a standalone firm. Among small firms, the average effect of the crisis is -14% for group firms and -33% for standalone firms. These results recovers the the findings of column 2 which is not surprising given the size distribution of firms in my sample. In unreported regressions, I find similar results when using the number of employees as the measure of size. This adds to the robustness of the findings regarding the size effect.

These results do not invalidate the previous findings, as group firms are still consistently better off than standalone firms when controlling for firm size. Therefore, firm size is not driving the results. In unreported regressions, I replicated the approach found in Duchin et al. (2010) and found similar results for the effect of cash reserves and leverage prior to the crisis on investments during the crisis. When contrasting group and standalone firms in these regressions, the estimation results again indicate that business group firms were less affected by the crisis. In the following, concerns that group and standalone firms may differ across dimensions other than size are addressed.

6.3.2 Robustness Test: Public versus Private firms

In contrast to previous studies in this field, the lion's share of firms in this study were not publicly listed. Therefore, it is interesting to investigate differences in the impact of the crisis for public and private firms. I do so by splitting the sample into these two categories and then running regression (1) for each sample. The average investment is 1.77% for public firms and 4.78% for private firms, which is consistent with Asker, Farre-Mensa and Ljungqvist's (2011) finding that private firms tend to invest more. The results are displayed in Table 4. In columns 1 and 2, public firms' investments were not severely affected by the crisis, although group firms increased investments by less than standalone firms during the crisis. This stands in contrast to earlier findings covering only publicly listed firms (Ang et al. (2015); and Kuppuswamy and Villalonga (2015)). The results for private firms in columns 3 and 4 almost recover the main findings in Table 3. In summary, the publicly listed firms are not driving the mitigating effect from business group affiliation.

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[18] These classifications are used by the European Commission (European Comission; 2015).

[19] Unreported regressions without firm fixed effects show that large firms invested more in the pre-crisis period.

6.3.3 Robustness Test: Exporting firms

Another potential concern is that a crisis can have a non-symmetrical impact across firms. Firms have different growth opportunities, and it is possible that exporting firms in Sweden were more affected by the crisis due to their exposure to the international markets. This is investigated by splitting the sample into exporting and non-exporting firms. The results are displayed in Table 5, where column 1 displays the previous results for the full sample. Only 12,000 of the 140,000 firms were exporters. A comparison of the impact of the crisis for exporting firms in column 2 and non-exporting firms in column 3 shows that both types of firms significantly reduced their investments. In terms of magnitude, exporting firms reduced their investments by 18% on average compared to an average reduction of 31% among non-exporting firms. Surprisingly, exporting firms reduced their investments less. One possible explanation may be that the Swedish government increased the outstanding guarantees to exporting firms from SEK 175 billion to SEK 350 billion in December 2008 through Exportkreditnämnden and AB Svensk Exportkredit a lending framework of SEK 100 billion (see, e.g., Riksrevisionen (2009)). Another explanation for this is that the exchange rate depreciated during the crisis years in favour of the exporting firms. There is also no statistically significant positive effect of being part of a business group for exporting firms during the crisis. The estimates in column 4 are again roughly similar to the main findings in Table 3.

6.3.4 Robustness Test: Nearest-neighbor Matching

To address the possibility that standalone and group firms may differ in terms of observable characteristics, I employ the nearest-neighbor matching algorithm developed by Abadie and Imbens (2006). The matching is done by industry. In each industry, the firms are matched on the means of sales growth, cash flow, the logarithm of total assets, and leverage in 2005 and 2006. The matching is done with replacement. Investments in the pre-crisis period (2005-2007) are then compared with investments in the crisis years (2008 and 2009). The matching algorithm is evaluated in Table 6 in which distributional properties prior to the crisis are compared and Kolmogorov-Smirnov tests for distributional equality are presented. The top panel presents the unmatched distributional properties and the bottom panel presents the matched properties. The algorithm decreases the distributional differences between the two groups. The Kolmogorov-Smirnov two-sample test of distributional equality is always rejected. This is not surprising when dealing with large samples, but the statistic is reported for clarity.

The average treatment effects from the matching procedure are shown in Table 7 and reveal that the business group firms either invested more or reduced their investments by less during the crisis than the corresponding standalone firms in the same industry. These results support the finding that being part of a business group had an alleviating effect during the crisis. In addition, it at least partially addresses the concern that some firms' growth opportunities were more negatively affected by the crisis (e.g., exporting firms), as firms are matched with similar firms at the industry level. As a robustness test, I also matched firms based on observable characteristics in 2007, which provided similar results.

As we have established that being part of a business group had an alleviating effect on the impact of the financial crisis, the next step is to try to explain why group firms reduced their investments by less or increased their investments by more than corresponding standalone firms. As mentioned above, there are two main non-exclusive explanations. The first is that group firms could use their internal capital markets to redistribute capital among firms in the business group. The second is that business groups had easier access to external financing due to their overall position and reputation, as well as their firms' uncorrelated cash flows, which could cause lenders to view firms in those group as safer than standalone firms. I attempt to find empirical support for the latter explanation by first studying access to external financing during the crisis for group and standalone firms.

6.4 The Ability of Group Firms to Raise External Capital

I explore whether, in the sample of nearest-neighbor matched firms, group firms were able to raise more capital in the external market than standalone firms. To do so, I examined relative changes in debt, equity, shareholder infusion, share capital, and debt owed to financial institutions.[20] I studied changes from 2007 to 2008 and from 2008 to 2009. The means of the changes are displayed in Table 8. There is a highly significant difference between standalone and group firms for all yearly changes in favor of better access to all types of external financing during the crisis for group firms with the exception of shareholder infusion in 2008-2007. All in-between firm type changes are statistically significant from zero except for standalone firms' equity growth from 2007 to 2008. These results are consistent with Hypothesis 2, which Stein (2003) describes as the "more money" effect resulting from debt coinsurance across affiliated firms and uncorrelated cash flows (Lewellen; 1971). This effect makes them less risky and increases debt capacity.[21] These findings differ from Almeida et al. (2015), who find no differences in access to external financing for Korean *chaebols* during the Asian crisis.

As we have established that business group firms had easier access to external financing during the crisis, I now explore the workings of the internal capital markets as the other non-mutually exclusive explanation.

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[20] Equity is adjusted for retained earnings and dividends.

[21] This is noted in Berger and Ofek (1995), and in Boutin et al. (2013), who show that the deep pockets of French business groups provide liquidity to affiliated firms that face difficulties in obtaining external financing. This phenomenon prevents the entry of competitors into the group-affiliated firms' markets.

6.5 Internal Capital Markets

In Swedish financial-statement data, claims on and debt owed to business group affiliates are listed as separate items in the individual firm's financial statements (these debts and claims cancel each other out in the group's consolidated financial statement). A drawback of these intra-group loans is that they can be subject to internal pricing. To avoid this possibility, I resort to other measures of internal capital market activity. Therefore, in the following sections, I investigate whether business group firms utilized their internal capital markets during the crisis when external financing was scarce and costly.

6.5.1 Internal Capital Markets in All-Swedish Business Groups

To further explore the workings of internal capital markets in business groups, I focus on a subsample of the business group firms for which I have data on nearly the entire business group, following the methodology described previously in 5.3. I then follow Ang et al. (2015) by contrasting how investments are related to business group firms' cash flow and to the cash flow of the other firms in the group before and during the crisis, as specified in regression (3).

The results are displayed in Table 9. Notably, for this subsample, the average net investment actually increased during the crisis. As I am interested in the diversification effect, I split the sample according to the level of diversification in the business groups. Groups that operated in more than two industries are classified as diversified, while groups that operated in only one or two industries are classified as non-diversified.[22] The first four columns of Table 9 display the results for the diversified business groups, while the last four columns present the results for the non-diversified groups. In the diversified groups, firms' investments are only sensitive to their own cash flow during the pre-crisis period, as shown in columns 1 and 2. For the crisis period (columns 3 and 4), I find significant results indicating that the investment sensitivities to the firm's own cash flow and the cash flows of its affiliates' changed drastically. As suggested in Hypothesis 3, firms became significantly less dependent on their own cash flows and significantly more dependent on the cash flows of other firms in their group. For non-diversified business groups, the only significant results indicate that investments depended only on the firm's own cash flow, not on affiliates' cash flows, and no significant differences during the crisis as seen in columns 5 to 8. Not surprisingly, the diversification effect through the internal capital markets is present for only the most diversified business groups.

These results suggest a relation between the investments of one firm in the group and the cash flow of the other firms in the group and, hence, the presence of internal capital market activity. Such activity would allow a firm in the group to continue to invest when external financing is disrupted or costly. Given the earlier results, this shows the importance of internal capital markets for alleviating financial constraints. It is also consistent with the prediction of Stein (1997) and the findings of Ang et al.

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[22] I use the coarsest industry classification in to the Swedish industry classification (SNI2007) system, which yields 19 industries.

(2015) and Shin and Park (1999) that document the sensitivity of investments to affiliates' cash flows. The results are also in line with Almeida, Kim and Kim's (2015) findings that internal capital markets facilitated investments during the Asian crisis for Korean *chaebols*. However, the investments of one firm in the group and the cash flow from other affiliates are likely to be endogenous. To investigate this further, I focus on exogenous shocks to the cash flows of business group firms.

6.5.2 Exogenous Shocks to Business Group Firms Cash Flows

The previous results suggest a relation between the investments of a firm in the business group and the cash flows of the other firms in the group. To see how earnings shocks that impact affiliated firms affect the investments of other firms in the business group, I adopt the methodology of Ang et al. (2015). The problem in regressing the investments of one firm on the cash flow of the other firms in the group is that it does not imply a causal relationship but only that they are related, as the cash flows of the other firms are endogenous to the focal firm's investments. To alleviate endogeneity concerns, I replace the cash flows of other business group firms with a measure of their industry's cash flows. This analysis involves investigating relative changes in the medians of variables from the pre-crisis period of 2005 to 2007 to the crisis years of 2008 and 2009. I estimate the following regression:

$$\begin{aligned} \Delta Invest_{it} &= \alpha + \beta_1 \Delta CashFlow_{it} + \beta_2 \Delta SalesGrowth \quad (5) \\ &\quad + \beta_3 \Delta Performance_t + \gamma \cdot Controls + \epsilon_{it}, \quad (6) \end{aligned}$$

where $\Delta Invest_{it}$ is the relative change in investments from the median of the pre-crisis period to the two crisis years. $\Delta CashFlow_{it}$ and $\Delta SalesGrowth$ are constructed in the same fashion but for firm i's cash flow and sales growth, respectively. $\Delta Performance_t$ is the difference of the performance of the industries that firm i's affiliates operate in and the industry of firm i. Performance is measured as the relative change in the industry median cash flows from the pre-crisis years to the two crisis year. To mitigate endogeneity concerns, only the cash flows of standalone firms are used for the industries. If the business group affiliates operate in more than two industries, their performance is weighted by the total assets of the affiliates in that industry. If the affiliates outperform firm i, I expect to see a positive effect on firm i's investments, as the affiliates can support firm i. If instead firm i outperform the others, I expect to see a negative effect on firm i's investments, as firm i can now support the other firms. Hence β_3 is expected to have a positive sign.

For this exercise only, all-Swedish business groups that operate in *at least two industries* are included. The results are reported in Table 10. For both years, all specifications except column 4 produced a statistically significant coefficient for the performance measure. The findings are consistent with internal capital activity. The interpretation is that the investments of one firm in a business group are responsive to the cash flows of its affiliated firms. As the shock is exogenous, the group affiliation is the driver of the capital flows. As I only study business groups that operate in at least two different industries, the results are consistent with the diversification story-being part of a business group mitigated the impact of the financial crisis through internal capital markets. In other words, when external funding is disrupted, business group firms can partly rely on their internal capital markets. As a test of robustness, I used aggregate industry net sales as a measure of firm performance.[23] The results were similar, as reported in Table 11.

These findings support the "smarter money" effect described in Stein (2003), which states that internal capital markets may do a better job than external financing in allocating capital to investment projects. This is true if the internal capital markets channel funds to the best investment projects, which could not have obtained financing if the firm was a standalone firm, and is known as "winner-picking". Stein (1997) argues that the positive aspects of an internal capital market outweigh its negative sides when its participants have binding credit constraints and, hence, have to compete for internal resources. The global financial crisis was a clear case of such circumstances.

6.6 Efficient Allocation of Capital

Given that the business group firms invested more than the corresponding standalone firms during the crisis, did their internal capital markets and access to external financing allocate capital efficiently? If they were, in fact, overinvesting, then they should have been less profitable than standalone firms after the crisis. Alternatively, if the groups' internal capital markets and access to external financing provided financial slack, thereby mitigating underinvestment, I would expect the profitability of group firms to increase relative to that of standalone firms. I analyze this issue by exploring changes in industry demeaned cash flows one, two, and three years after the crisis. Cash flow is measured as the ratio of operating income before depreciation to total assets. Industry demeaning is done by subtracting the industry's mean cash flow from each firm's cash flow. I conducted this exercise using the sample of nearest-neighbor matched firms. The results are displayed in Table 12. The top panel reports the tests of median changes from year 2009, the middle panel covers the changes from 2010 to 2011, and the lower panel shows the yearly changes from 2008. All median changes are statistically significantly different from zero and I can always reject the null hypothesis that the medians are the same at the 1% level. The panels indicate that the profitability of firms affiliated with business groups decreased by less than the profitability of comparable standalone firms. When evaluating the one-, two-, and three-year changes, it is also evident that the profitability gap widened over time. The one-year changes from 2008 to 2011 display a similar widening of the profitability gap for the first two years and then a change of similar magnitude for 2011.

The results suggest that the business group firms efficiently allocated capital during the crisis through their internal capital markets and their better access to external financing, as the industry-adjusted cash flows of group firms are significantly higher than those of standalone firms. My findings are consistent with Almeida, Kim and

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[23] Industry net sales data obtained from Statistics Sweden, SCB.

Kim's (2015) results for Korea during the Asian crisis.

7 Conclusion

I document a mitigating effect of business group affiliation on the impact of the financial crisis on firm investments. business group firms reduced their investments by an average of 14% in contrast to 33% for standalone firms.[24] These findings highlight the greater impact of the crisis on many of the small and medium-sized firms used in these study, while also documenting the alleviating effect of business group affiliation. A potential concern is that the results could be driven by firm size, as business group firms tend to be large, but I show that this is not the case. The findings are robust to the use of a nearest-neighbor matching algorithm in which business group firms and standalone firms are matched on observables prior to the crisis by industry. business group firms either reduced their investments by less than standalone firms or increased their investments by more than standalone firms during the crisis.

After establishing the mitigating effect for business group affiliated firms, I turn to the explanations for this finding. There are two non-exclusive explanations: easier access to external financing and the functioning of internal capital markets. I show that business group firms had easier access to external financing during the crisis, which reflects the "more money" effect suggested by Stein (2003). Furthermore, I investigate the functioning of the internal capital markets for a subsample of all-Swedish business group firms for which I have a full overview of the respective business groups. I demonstrate that diversified business group firms became less dependent on their own cash flows and more dependent on the cash flows of their affiliates during the crisis. These results suggest internal capital market activity. For less diversified firms, I find no evidence of internal capital market activity. The increased dependence on the cash flows of other affiliates supports Stein's (2003) "smarter money" effect.

I further investigate the internal capital market activity in terms of how differences in cash flows between one firm in the group and its affiliates affect investment for diversified business groups. I find a positive effect for the investments of one firm in the group during the crisis if it was outperformed by its affiliates in terms of cash flows or sales. If, instead, that firm outperformed the rest of the affiliates, I find a negative impact on the investments of that firm during the crisis. These findings also suggest functioning internal capital markets.

In addition, I investigate whether business group firms used their diversification advantages to invest efficiently. I do so by contrasting business group and standalone firms' after-crisis profitability. The results suggest that business group firms became significantly more profitable than standalone firms after the crisis. The profitability gap widened over the after crisis years, suggesting that the business group firms invested efficiently.

In summary, my findings confirm Stein's (1997) prediction that the benefits of business group affiliation will be largest when credit constraints are binding and there is competition for internal resources. I also add to the extant literature by studying mainly small and medium-sized private firms, while typical studies in this field focus on large public listed firms.

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[24] Investments declined by an average of 28% across all firms during the crisis.

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9 Figures

Figure 1: Investment in Sweden (left y-axis) and the US (right y-axis). Gross Fixed Capital Formation MSEK, 2012 Prices, US Total Private Non-residential Fixed Investment, 2009 Billions USD. Sources: Statistics Sweden and BEA.

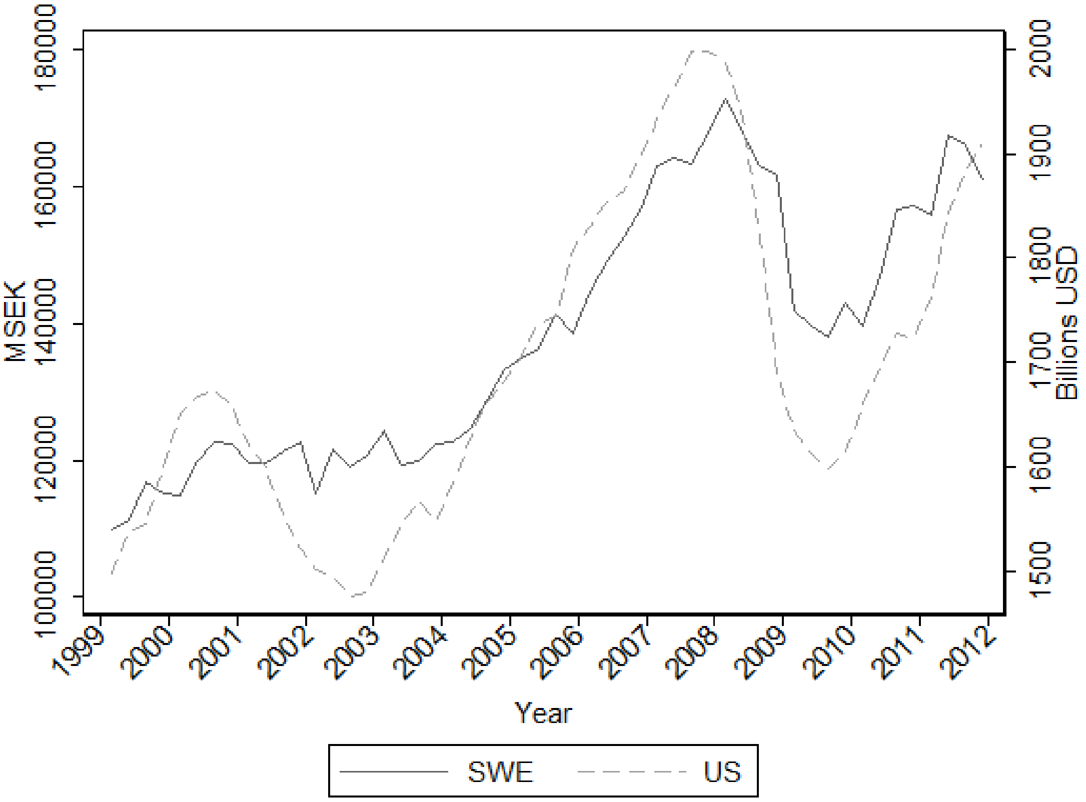


Figure 2: Monetary Financial Institutions lending to non-financial Swedish firms in MSEK. Divided by interest fixation period. Source: Financial markets statistics, Statistics Sweden.

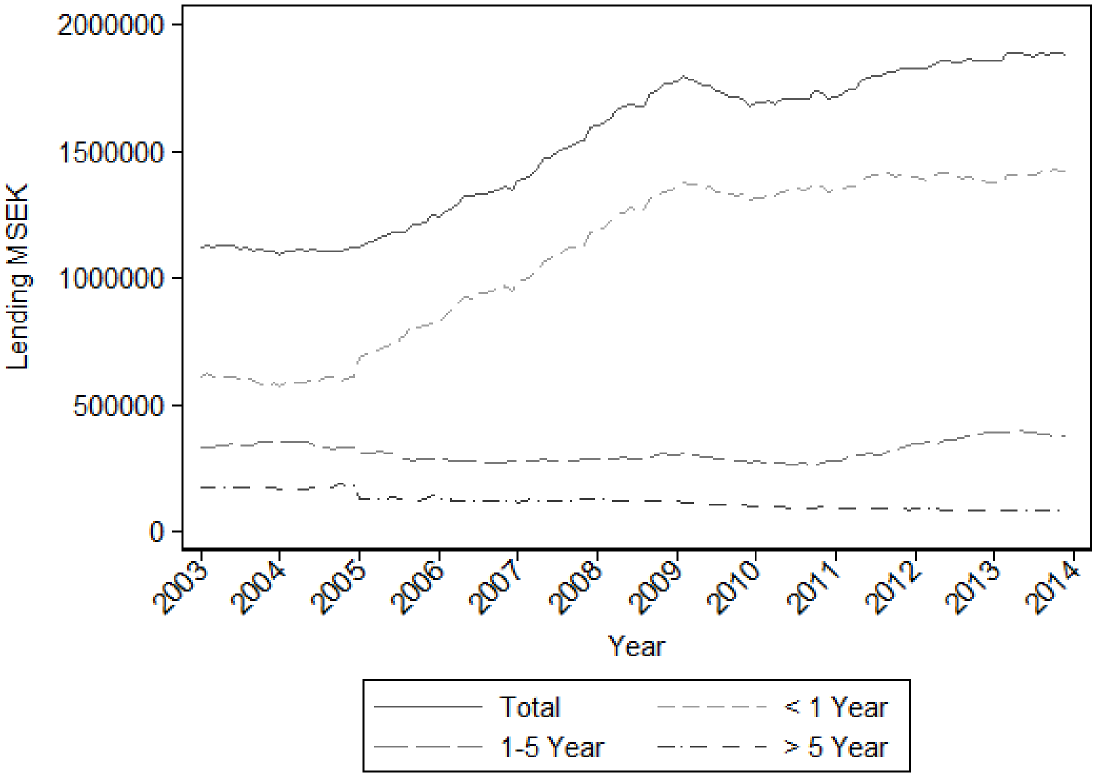
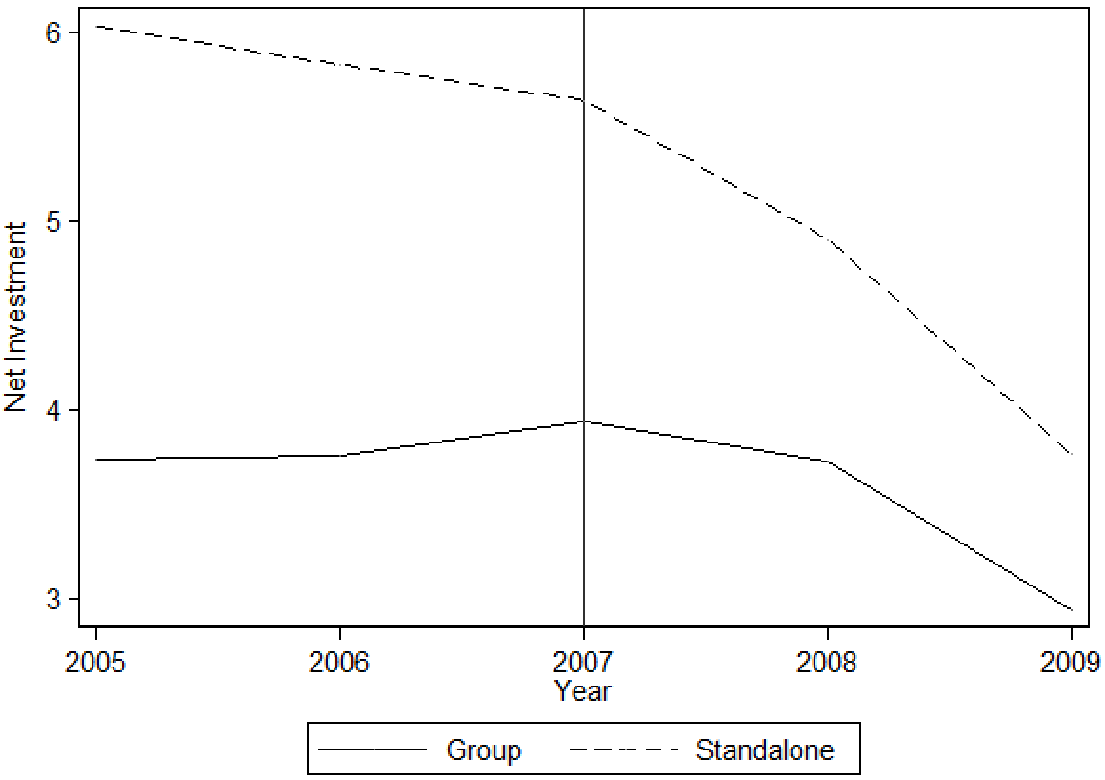


Figure 3: Average net investment to total assets over time for standalone firms and business group firms. Averages are end of year.



10 Tables

Table 1: Summary Statistics 2005-2009. All variables except total assets are in percent of total assets. Investment is net investment in fixed tangible assets (land, machinery and buildings), it includes asset sales but not acquisitions. Cash reserves and debt variables are measured in 2007. Short term debt is debt maturing within 1 year and is net of accounts payable to correspond to US data. Sales growth is the relative change in sales from last year to this year. Cash flow is operating income before amortization and depreciation divided by total assets.

Variable	**Mean**	**Min**	**Max**	**Std Dev.**	**P10**	**P50**	**P90**	**Obs**
Full sample								
Net investment, %	4.77	-36.36	72.29	12.08	0.00	0.67	16.62	688,644
Cash reserves, %	27.46	0.00	138.38	30.35	0.30	16.85	70.91	688,644
Short-term debt, %	29.82	1.39	92.84	20.02	7.29	25.92	58.11	688,644
Long-term debt, %	16.89	0.00	92.50	23.96	0.00	2.86	55.36	688,644
Sales growth, %	7.60	-74.81	279.39	41.73	-28.36	2.85	40.43	688,644
Cash flow, %	12.73	-69.21	77.60	17.83	-3.85	11.83	32.63	688,644
Total assets MSEK	39.89	0.10	259,030	1,148.24	0.48	2.52	22.58	688,644
Group Firms								
Net investment, %	3.62	-36.36	72.29	10.19	0.00	0.70	11.87	202,015
Cash reserves, %	19.47	0.00	138.38	25.71	0.05	8.80	54.58	202,015
Short-term debt, %	32.08	1.39	92.84	22.76	5.88	27.53	66.29	202,015
Long-term debt, %	18.05	0.00	92.50	25.81	0.00	2.59	62.17	202,015
Sales growth, %	9.41	-74.81	279.39	44.91	-28.74	3.41	43.93	202,015
Cash flow, %	11.72	-69.21	77.60	18.56	-4.61	10.25	32.57	202,015
Total assets MSEK	125.75	0.10	259,030	2,117.26	1.44	8.77	92.04	202,015
Standalone Firms								
Net investment, %	5.26	-36.36	72.29	12.76	0.00	0.65	18.72	486,629
Cash reserves, %	30.78	0.00	138.38	31.48	0.61	20.93	75.61	486,629
Short-term debt, %	28.89	1.39	92.84	18.68	7.87	25.40	54.62	486,629
Long-term debt, %	16.41	0.00	92.50	23.13	0.00	2.96	52.83	486,629
Sales growth, %	6.85	-74.81	279.39	40.32	-28.20	2.59	39.02	486,629
Cash flow, %	13.16	-69.21	77.60	17.50	-3.53	12.48	32.65	486,629
Total assets MSEK	4.25	0.10	6,330	22.54	0.40	1.67	8.79	486,629

Table 2: Tests of differences in mean investment for standalone and business group firms. Investment is net investment in tangible assets to total assets. Before are the years 2005-2007, After is 2008-2009. Standard errors reported in parenthesis. ***, **, or * indicates the statistical significance at the 1%, 5% and 10% level, respectively.

	Before	After	Δ(After-Before)
Standalone Firms	5.835***	4.345***	-1.490***
	(0.025)	(0.026)	(0.018)
Group Firms	3.815***	3.331***	-0.483***
	(0.031)	(0.032)	(0.046)

Table 3: Regression results explaining firm level investment over the period 2005 to 2009. Dependent variable is investment and is defined as net investment in fixed tangible assets divided by total assets. Sales growth is the relative change in sales from last year to this year. Cash flow is operating income before amortization and depreciation divided by total assets. Group is a dummy variable if the firm was part of a business group at that point in time. Crisis is a dummy variable if the year is 2008 or 2009. Large is a dummy variable if total assets > 43 MEUR in 2007. ***, **, or * indicates the statistical significance at the 1%, 5% and 10% level, respectively. Standard errors are robust and clustered at the firm level.

Variables	(1)	(2)	(3)	(4)	(5)
Crisis	-1.331***	-1.582***	-1.531***	-1.339***	-1.582***
	(0.027)	(0.034)	(0.043)	(0.028)	(0.034)
Crisis*Group		0.909***	0.789***		0.904***
		(0.056)	(0.064)		(0.057)
Group		-1.159***	-1.175***		-1.159***
		(0.108)	(0.108)		(0.109)
Cash Flow			-0.029***		
			(0.0017)		
Sales Growth			0.330***		
			(0.063)		
Crisis*Cash Flow			-0.013***		
			(0.002)		
Crisis*Sales Growth			2.197***		
			(0.124)		
Crisis*Group*Cash Flow			0.011***		
			(0.003)		
Crisis*Group*Sales Growth			-0.902***		
			(0.165)		
Crisis*Large				0.794***	-1.053
				(0.181)	(2.122)
Group*Large					1.102
					(1.627)
Crisis*Large*Group					1.210
					(2.130)
Observations	688,644	688,644	688,644	688,644	688,644
R-squared	0.004	0.005	0.007	0.004	0.005
Number of firm	140,818	140,818	140,818	140,818	140,818
Firm FE	YES	YES	YES	YES	YES

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 4: Regression results explaining firm level investment over the period 2005 to 2009. Dependent variable is investment and is defined as net investment in fixed tangible assets divided by total assets. Sales growth is the relative change in sales from last year to this year. Cash flow is operating income before amortization and depreciation divided by total assets. Group is a dummy variable if the firm was part of a business group at that point in time. Crisis is a dummy variable if the year is 2008 or 2009. The results for public firms are reported in columns 1 and 2, and private firms in columns 3 and 4. ***, **, or * indicates the statistical significance at the 1%, 5% and 10% level, respectively. Standard errors are robust and clustered at the firm level.

Variables	(1) Public	(2) Public	(3) Private	(4) Private
Crisis	1.131	2.968**	-1.583***	-1.532***
	(1.716)	(1.473)	(0.034)	(0.043)
Crisis*Group	-0.708	-2.644*	0.902***	0.779***
	(1.759)	(1.563)	(0.056)	(0.065)
Group	2.300	2.589	-1.162***	-1.178***
	(1.975)	(1.936)	(0.109)	(0.108)
Cash Flow		0.039		-0.029***
		(0.026)		(0.002)
Sales Growth		0.000		0.332***
		(0.230)		(0.063)
Crisis*Cash Flow		-0.046		-0.013***
		(0.064)		(0.002)
Crisis*Sales Growth		-4.266**		2.200***
		(2.017)		(0.125)
Crisis*Group*Cash Flow		-0.027		0.012***
		(0.063)		(0.003)
Crisis*Group*Sales Growth		4.027**		-0.887***
		(2.000)		(0.166)
Observations	1,294	1,294	687,350	687,350
R-squared	0.011	0.043	0.005	0.007
Number of firm	301	301	140,611	140,611
Firm FE	YES	YES	YES	YES

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 5: Regression results explaining firm level investment over the period 2005 to 2009. Dependent variable is investment and is defined as net investment in fixed tangible assets divided by total assets. Sales growth is the relative change in sales from last year to this year. Cash flow is operating income before amortization and depreciation divided by total assets. Group is a dummy variable if the firm was part of a business group at that point in time. Crisis is a dummy variable if the year is 2008 or 2009. The baseline result is reported in column 1, the results for exporting firms in column 2, and results for non-exporting firms in column 3. ***, **, or * indicates the statistical significance at the 1%, 5% and 10% level, respectively. Standard errors are robust and clustered at the firm level.

VARIABLES	(1) All	(2) Export	(3) Non-Export
Crisis	-1.331***	-0.590**	-1.493***
	(0.027)	(0.232)	(0.046)
Crisis*Group		0.357	0.492***
		(0.258)	(0.079)
Group		-1.281***	-0.795***
		(0.317)	(0.127)
Cash Flow		-0.024**	-0.023***
		(0.011)	(0.002)
Group*Cash Flow		0.002	-0.025***
		(0.013)	(0.004)
Crisis*Cash Flow		-0.008	-0.017***
		(0.014)	(0.003)
Crisis*Group*Cash Flow		0.008	0.028***
		(0.015)	(0.004)
Sales Growth		0.165	0.335***
		(0.306)	(0.080)
Group*Sales Growth		0.204	0.001
		(0.359)	(0.139)
Crisis*Sales Growth		1.670***	2.191***
		(0.628)	(0.135)
Crisis*Group*Sales Growth		-0.100	-0.842***
		(0.684)	(0.221)
Observations	688,644	44,028	644,616
R-squared	0.004	0.005	0.008
Number of firm	140,818	12,093	134,476
Firm FE	YES	YES	YES

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 6: This table reports the distributional differences between business group firms and standalone firms before and after the nearest neighbor matching algorithm. Means of total assets, sales growth, cash flow, total debt and cash reserves in 2005 and 2006 are matched. All variables except total assets are divided by total assets. Total assets is the logarithm of total assets. Each firm is paired with its nearest neighbour in terms of the euclidean distance in the covariate space. Kolmogorov-Smirnov is the two-sample test of distributional equality of the two groups of firms. ***, **, or * indicates the statistical significance at the 1%, 5% and 10% level, respectively.

		25th	Median	75th	Kolmogorov-Smirnov
Difference between Group and Standalone Firms					
Investment	Group	0.108	1.276	4.549	0.114***
	Standalone	0.309	2.236	8.007	
Total Assets	Group	14.991	15.956	17.075	0.457***
	Standalone	13.538	14.324	15.167	
Sales Growth	Group	-0.012	0.071	0.198	0.052***
	Standalone	-0.034	0.054	0.177	
Cash Flow	Group	1.719	9.435	27.677	0.176***
	Standalone	5.659	20.097	44.406	
Cash Reserves	Group	4.351	10.950	20.071	0.070***
	Standalone	5.966	12.777	21.068	
Total Debt	Group	43.892	82.223	124.358	0.068***
	Standalone	47.125	77.353	112.160	
Difference between Matched Group and Standalone Firms					
Investment	Group	0.108	1.276	4.549	0.110***
	Control	0.417	2.171	7.453	
Total Assets	Group	14.991	15.956	17.075	0.043***
	Control	14.904	15.837	16.877	
Sales Growth	Group	-0.012	0.071	0.198	0.025***
	Control	-0.004	0.074	0.190	
Cash Flow	Group	1.719	9.435	27.677	0.042***
	Control	2.231	9.339	26.957	
Cash Reserves	Group	4.351	10.950	20.071	0.033***
	Control	5.099	11.162	19.603	
Total Debt	Group	43.892	82.223	124.358	0.018***
	Control	43.338	80.822	121.396	

Table 7: Nearest neighbour matching to estimate the average treatment effect of being part of a business group during the crisis, firms in a group is treated, matched standalone firms are the control group. Matching with replacement is done per industry on means of sales growth, cash flow, logarithm of total assets and leverage in 2005 and 2006. Standard errors are reported next to the estimates in parenthesis. ***, **, or * indicates the statistical significance at the 1%, 5% and 10% level, respectively.

Industry	Δ Group	s.e.	Δ Standalone	s.e.	ATE	s.e.	Obs
Agriculture	1.100***	(0.186)	0.439**	(0.211)	0.661**	(0.274)	21,934
Minerals	-0.237	(0.722)	-1.126	(0.839)	0.889	(1.055)	1,159
Manufacturing	-0.326***	(0.070)	-1.193***	(0.079)	0.867***	(0.103)	78,618
Electricity, Gas, Heating, Coooling	-2.196***	(0.673)	-2.966***	(0.796)	0.770	(1.021)	1,743
Water,Sewer, Waste	-0.310	(0.679)	-3.214***	(0.773)	2.904***	(0.973)	1,766
Construction	0.160**	(0.070)	-1.196***	(0.089)	1.357***	(0.109)	82,842
Retail	-0.389***	(0.042)	-0.856***	(0.048)	0.467***	(0.064)	150,189
Transport	1.061***	(0.171)	-2.263***	(0.193)	3.324***	(0.247)	40,842
Hotel Restaurant	-0.091	(0.183)	-1.871***	(0.213)	1.780***	(0.276)	21,198
IT	0.000	(0.088)	-1.151***	(0.105)	1.151***	(0.135)	31,488
Real Estate	-0.367***	(0.115)	-1.342***	(0.123)	0.976***	(0.164)	53,552
Law,Economics, Science, Tech	-0.749***	(0.048)	-1.214***	(0.059)	0.465***	(0.076)	99,637
Rental Services	-0.473***	(0.169)	-1.737***	(0.181)	1.264***	(0.241)	22,186
Education	-1.216***	(0.234)	-1.810***	(0.270)	0.594*	(0.349)	8,759
Health Care and Social	-0.595***	(0.135)	-2.466***	(0.171)	1.871***	(0.216)	19,662
Culture, Recreation, Entertainment	0.225	(0.254)	-1.814***	(0.281)	2.039***	(0.371)	10,601
Other Services	-1.637***	(0.175)	-1.550***	(0.243)	-0.087	(0.294)	8,656

Table 8: Test of differences in means of one year relative changes of different measures of access to external finance for the sample of nearest neighbor matched firms. Equity growth = (Equity(t)-Equity(t-1)-(Retained Earnings(t-1)-Dividend(t-1)))/Equity(t-1). Financial debt is short and long-term debt to financial institutions. Standard errors reported in parenthesis. ***, **, or * indicates the statistical significance at the 1%, 5% and 10% level, respectively.

	ΔDebt	Δ Equity	ΔShareholder Infusion	ΔShare Capital	Δ Fin. Debt
2008-2007					
Standalone	0.017***	-0.430***	-0.210***	0.005***	0.212***
	(0.002)	(0.024)	(0.061)	(0.001)	(0.037)
Group	0.058***	-0.333*	-0.382***	0.023***	0.538***
	(0.007)	(0.055)	(0.102)	(0.003)	(0.102)
Group-Standalone	0.041***	0.097	-0.172***	0.019***	0.325***
	(0.005)	(2.269)	(0.112)	(0.003)	(0.90)
2009-2008					
Standalone	0.007***	-0.357***	-0.104***	0.006***	0.158***
	(0.002)	(0.036)	(0.021)	(0.001)	(0.022)
Group	0.024***	-0.195**	0.140***	0.032***	0.463***
	(0.006)	(0.081)	(0.287)	(0.007)	(0.096)
Group-Standalone	0.017***	0.162*	0.245***	0.027***	0.304***
	(0.005)	(0.091)	(0.216)	(0.005)	(0.077)

Table 9: Test of internal capital markets for all-Swedish business groups were all affiliates are observed. Dependent variable is net investment in fixed tangible assets divided by total assets. Sales growth is the relative change in sales from last year to this year. Cash flow is operating income before amortization and depreciation divided by total assets. Group cash flow is the sum of all other affiliated firms cash flows scaled by their total assets in that period. Crisis is a dummy variable, which is one for 2008 and 2009. Controls is a vector of lagged variables: property, plant and equipment to total assets, log(total assets), cash and short term investments to total assets and total debt to total assets. The sample is split into diversified (columns 1-4) and non-diversified (columns 5-8) if the business group operates in more than 2 industries. ***, **, or * indicates the statistical significance at the 1%, 5% and 10% level, respectively. Standard errors are robust and clustered at the firm level.

VARIABLES	(1) Div.	(2) Div.	(3) Div.	(4) Div.	(5) Non-Div.	(6) Non-Div.	(7) Non-Div.	(8) Non-Div.
Cash flow	1.160***	1.216***	1.170***	1.227***	0.541***	0.541***	0.548***	0.549***
	(0.122)	(0.057)	(0.116)	(0.048)	(0.025)	(0.024)	(0.015)	(0.014)
Crisis*Cash flow			-0.785***	-0.857***			-0.187	-0.187
			(0.106)	(0.089)			(0.245)	(0.245)
Group Cash flow	0.180	0.510	-0.165	0.104	-0.019	-0.029	0.110	0.115
	(0.265)	(0.342)	(0.255)	(0.261)	(0.108)	(0.115)	(0.132)	(0.133)
Crisis*Group Cash flow			0.452**	0.529**			-0.070	-0.100
			(0.184)	(0.212)			(0.145)	(0.146)
Crisis			0.037	0.029*			0.013	0.013
			(0.025)	(0.015)			(0.022)	(0.022)
Sales Growth	-0.019	-0.022**	-0.017	-0.019*	-0.007*	-0.008**	-0.006*	-0.007**
	(0.015)	(0.010)	(0.015)	(0.010)	(0.004)	(0.004)	(0.004)	(0.003)
Observations	12,209	12,198	12,209	12,198	19,588	19,570	19,588	19,570
R-squared	0.822	0.904	0.828	0.912	0.842	0.843	0.846	0.848
Number of firm	5,599	5,595	5,599	5,595	7,537	7,534	7,537	7,534
Firm FE	YES	YES	YES	YES	YES	YES	YES	YES
Controls	NO	YES	NO	YES	NO	YES	NO	YES

Robust standard errors in parentheses

*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 10: Regression results for subsample of all-Swedish business groups that operates in at least two different industries. All variables are percentage changes, calculated as the change in the median of the years 2005-2007 to a crisis year: 2008 or 2009. The dependent variable is the percentage change in net investment in fixed tangible assets. Sales growth is the relative change in sales from last year to this year. Cash flow is operating income before amortization and depreciation divided by total assets. Cash is cash and short-term investments divided by total assets. Performance is the difference in asset-weighted cash flows for firms in the same business group but in other industries than firm i less the industry cash flows for the industry firm i operates in. PPE is property, plant and equipment. Leverage is total debt divided by total assets. Size is the lag of the logarithm of total assets. ***, **, or * indicates the statistical significance at the 1%, 5% and 10% level, respectively. Standard errors are robust and clustered at the firm level.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Variables	08	08	08	08	09	09	09	09
$\Delta CashFlow$		0.000	-0.003	-0.007		0.005	0.009	-0.004
		(0.008)	(0.008)	(0.013)		(0.008)	(0.008)	(0.012)
$\Delta SalesGrowth$		0.004	0.004	0.008**		0.001	0.001	0.001
		(0.003)	(0.003)	(0.004)		(0.002)	(0.002)	(0.003)
$\Delta Performance$	0.510**	0.530**	0.584**	0.488	0.474***	0.426**	0.416**	0.890***
	(0.238)	(0.250)	(0.260)	(0.375)	(0.163)	(0.174)	(0.180)	(0.211)
$\Delta Cash$			0.000	0.001			-0.001	-0.002**
			(0.002)	(0.002)			(0.001)	(0.001)
ΔPPE				0.106**				0.066**
				(0.049)				(0.031)
$\Delta Leverage$			0.203***	0.375***			0.058	0.023
			(0.074)	(0.115)			(0.053)	(0.071)
$\Delta Size$			0.329	-0.850			0.192	-0.001
			(0.384)	(0.567)			(0.342)	(0.461)
Observations	2,031	1,866	1,746	919	1,875	1,703	1,580	866
R-squared	0.002	0.004	0.008	0.026	0.004	0.004	0.005	0.031

Robust standard errors in parentheses
*** $p<0.01$, ** $p<0.05$, * $p<0.1$

Table 11: Regression results for subsample of all-Swedish business groups that operates in at least two different industries. All variables are percentage changes, calculated as the change in the median of the years 2005-2007 to a crisis year: 2008 or 2009. The dependent variable is the percentage change in net investment in fixed tangible assets. Sales growth is the relative change in sales from last year to this year. Cash flow is operating income before amortization and depreciation divided by total assets. Cash is cash and short-term investments divided by total assets. SCBNetSales is the difference in asset-weighted net sales for firms in the same business group but in other industries than firm i less the industry net sales for the industry firm i operates in. Net sales are from Statistics Sweden at the industry level. PPE is property, plant and equipment. Leverage is total debt divided by total assets. Size is the lag of the logarithm of total assets. ***, **, or * indicates the statistical significance at the 1%, 5% and 10% level, respectively. Standard errors are robust and clustered at the firm level.

Variables	(1) 08	(2) 08	(3) 08	(4) 08	(5) 09	(6) 09	(7) 09	(8) 09
$\Delta CashFlow$		0.001	-0.003	-0.006		0.00508	0.009	-0.004
		(0.008)	(0.008)	(0.013)		(0.008)	(0.008)	(0.012)
$\Delta SalesGrowth$		0.004	0.004	0.008*		0.001	0.001	0.001
		(0.003)	(0.003)	(0.004)		(0.002)	(0.002)	(0.003)
$\Delta SCBNetSales$	0.865***	0.869***	0.814***	0.727*	0.401***	0.342**	0.302**	0.754***
	(0.278)	(0.290)	(0.299)	(0.395)	(0.134)	(0.143)	(0.148)	(0.176)
$\Delta Cash$			0.000	0.001			-0.001	-0.001*
			(0.002)	(0.002)			(0.001)	(0.001)
ΔPPE				0.108**				0.067**
				(0.049)				(0.031)
$\Delta Leverage$			0.191**	0.360***			0.054	0.013
			(0.074)	(0.115)			(0.053)	(0.071)
$\Delta Size$			0.306	-0.882			0.201	0.038
			(0.385)	(0.566)			(0.342)	(0.461)
Observations	2,030	1,865	1,745	919	1,875	1,703	1,580	866
R-squared	0.005	0.006	0.010	0.027	0.005	0.004	0.005	0.032

Robust standard errors in parentheses
*** p<0.01, ** p<0.05, * p<0.1

Table 12: Test of differences in medians of after crisis changes in firm profitability for the sample of nearest neighbor matched firms. Profitability is defined as relative change in industry-adjusted cash flows from a crisis year to the post-crisis years 2010 and 2011. Industry-adjustment is done by subtracting the industry mean cash flow. Cash flow is operating income before depreciation divided by total assets. Standard errors and Pearsons continuity corrected χ^2 for the null hypothesis that the medians are from the same population are reported in parenthesis for the medians and their difference, respectively. ***, **, or * indicates statistical significance at the 1%, 5% and 10% level, respectively.

Median Changes in Profitability			
Years	Standalone	Group	Δ(Group-Standalone)
2010-2009	-0.316***	-0.180***	0.137***
	(0.004)	(0.005)	(394)
2011-2009	-0.510***	-0.320***	0.190***
	(0.005)	(0.007)	(489)
2011-2010	-0.291***	-0.154***	0.137***
	(0.004)	(0.005)	(466)
2009-2008	-0.345***	-0.233***	0.113***
	(0.004)	(0.005)	(306)
2010-2008	-0.523***	-0.369***	0.154***
	(0.005)	(0.007)	(338)
2011-2008	-0.558***	-0.393***	0.165***
	(0.005)	(0.007)	(364)

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