INTERNAL CAPITAL MARKETS IN TIMES OF CRISIS: THE BENEFIT OF GROUP AFFILIATION

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1. Introduction[1]

This paper provides the first direct evidence of substitution towards internal capital markets in response to deterioration of the balance sheet condition of a firm's bank. This substitution allows group-affiliated firms to use internal capital market transfers to better survive the global financial and sovereign debt crises.

Earlier research demonstrates that internal capital markets become more important during periods of financial-market crisis (Matvos and Seru, 2014; Kuppuswamy and Villalonga, 2015; Almeida, Kim and Kim, 2015), and that diversifying mergers become more common during these periods (Matvos, Seru and Silva, 2018).

Our paper shows how firms use the internal capital market when

individual firm's banking relationships become impaired, its internal capital market becomes more important.

The Italian banking system began experiencing large credit losses starting at the beginning of the 2008 global financial crisis and increasing further with the onset and deepening of the euro area sovereign debt crisis in 2011. By December of 2015, aggregate bad loans had reached about €200 billion, or approximately 12% of loans outstanding to the non-bank private sector (Figure 1). Losses are higher when other troubled loans not yet written off are included. Unlike other recent banking problems, where losses were concentrated in mortgage related assets or sovereign debt, most of these losses – close to 80% – come from bad debts in lending to non-financial businesses.

As a result of these banking system-wide losses, the availability of credit overall in Italy has been constrained. A number of recent studies find that credit supply by distressed banks was reduced in Italy during both the 2007–2008 global financial crisis as well as the more recent euro area sovereign debt crisis (e.g., Albertazzi and Marchetti, 2010; Cingano, Manaresi and Sette, 2016; Bolton et al., 2016; Bofondi, Carpinelli and Sette, 2017; Balduzzi, Brancati and Schiantarelli, 2017). Losses at banks, combined with a weak legal system, have made the situation worse because Italian firms sometimes delay payments to banks weakened by past losses and facing large time and legal expenses associated with enforcing loan defaults in court (Schiantarelli, Stacchini and Strahan, 2016). In addition, bank distress from exposure to risky sovereign debt has reduced credit supply and helped propagate the euro crisis from distressed to non-distressed countries (e.g. Popov and van Horen, 2015; De Marco, 2019; Acharya et al., 2018). As we show, bank loan losses are strongly p r of ´ec[t ¤ r ê th M 8 urse ɾ ue duatte { s, and this Â ffec ʌ

market use, relative to the external markets. On one hand, Stein (1997) emphasizes that with external financial constraints, firms use internal capital transfers to move funds away from low-return projects and toward high-return ones. Consistent with our results, that paper suggests that internal capital markets are more valuable during times when external capital is especially expensive or hard to access. Others, however, focus on offsetting agency costs (e.g. divisional rent seeking) of internal capital markets in large, diversified conglomerates (e.g., Lang and Stulz, 1994; Scharfstein and Stein, 2000). Subsequent empirical studies raise doubts about whether a large and well-diversified internal capital market creates or destroys value (e.g., Whited, 2001; Schoar, 2002; Villalonga, 2004).[7] Whether or not the intra-group transfers are delaying the failure of otherwise bad firms in our setting is hard to fully assess. That said, we do report evidence that transfers are higher for firms with above-median sales, which suggests that the transfers are efficiency enhancing on average.

Our paper suggests when external capital markets are constrained, the internal capital market likely increases firm value, as its use increases and firms with access to large internal capital markets are more likely to survive the crisis.[8] This interpretation is

Our study also supports the general conclusions of earlier papers finding that investment rates are insulated from cash-flow shocks for firms with access to a wide internal capital market. Schiantarelli and Sembenelli (2000), also studying Italian business groups, find that investment is less sensitive to cash flow for firms in large business groups. Similarly, Shin and Stulz (1998) find lower investment-cash flo

Yet being a group member is likely to confer an advantage in accessing external finance (Schiantarelli and Sembenelli, 2000).[12]

The typical Italian business group consists of a parent holding company that owns and controls affiliates (subsidiary operating companies). Figure 3 illustrates the structure of Gruppo PAM Spa, which operates as a subsidiary of Gecos Generale Di Commercio e Servizi Spa. PAM owns subsidiaries operating in a number of retail sectors, such as hardware, airport convenience stores, restaurants, and so on. In some of the more complicated structures, a business group will own operating companies in several industry segments (i.e., not just retail) and introduce sub-holding companies that lie between the ultimate parent holding company and the subsidiaries. In addition, affiliates themselves sometimes own other affiliated operating companies. Capital typically moves up and down the hierarchy, rather than horizontally. For example, consider a simple structure in which one parent holding companies owns two operating subsidiaries, one of which has excess cash flow relative to its investment demand and one of which has a deficit of cash flow relative to its investment needs. The cash-rich subsidiary would tend to lend its excess funds to the parent, who would, in turn, lend those funds to the cash-poor subsidiary to fill its financing needs. Parent companies also sometimes borrow from external sources such as banks and use those funds to support investment in the operating subsidiaries.

To illustrate the general patterns, consider the average behavior of firms in our main sample. We classify firms as ‘parent’ or ‘affiliate’, where parent refers to holding companies and sub-holding companies e m

between funds borrowed minus funds lent within the group, scaled by each firm's assets. On average, parent firms supply credit (the net flows are negative), whereas affiliate firms demand credit (the net flows are positive). Beyond the internal capital flows, business groups also use external capital to finance their investments. Panel B of Figure 4 reports average bank debt over time by parent and affiliated subsidiaries. Bank debt av

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statement of cash flows information from the Centrale dei Bilanci data set (also from Cerved). We match these with firm-level individual loan data from the Italian Credit Register and bank-level data from the Bank of Italy Supervisory Reports to construct a firm-specific measure of the quality the bank (or banks') portfolio from which each firm borrows.

We focus our analysis of intra-group capital transfers between firms affiliated with domestic business groups, as transfer to firms outside of Italy – relevant for Italian firms associated with foreign groups or holding companies – are not observable in our data. Although ours is the first study able to combine the comprehensive financial statement data to time-varying measure of ownership structure, we are restricted in our access to just three points in time: 2006, 2010 and 2014.[14] In other words, we can only merge the ownership connections to the year-by-year financial statements during these three points in time. In our regression analysis, which we describe in more detail below, we focus on annual panel data from 2004 to 2014. Hence, we need to assume that ownership connections remain constant over periods longer than a single year. To minimize classification error, we assign ownership as follows: we use the 2006 ownership data for all firms during the years 2004–2007; the 2010 ownership information we assign to the years 2008–2011; and the 2014 ownership data we assign to the years 2012–2014. Our strategy works well because business group affiliation in Italy is persistent over time.

After combining Cerved with the structural data from Gruppi Italiani, we apply several filters to remove data that may be unreliable. First, we drop observations with zero total assets or zero sales. Second, we include firms with financial statements reported in abbreviated form, under the condition that financial or trade aggregates in the balance sheet are recognized and fully disclosed. Third, we require the disclosure of the full statement of cash flow. And fourth, we drop financial companies.

According to national rules, firms are required to indicate their lending or borrowing positions within the group on their balance sheets (article 2424 of the Italian

available on the company), or when a firm's share capital is (i) equally distributed among different owners (such as in joint ventures) or (ii) subject to any shareholder agreements.

[14] Santioni and Supino (2018) take a first step in this direction using ownership data for 2006 and 2014. This paper contains a descriptive analysis of Italian groups and of the working of their internal capital markets when credit becomes tight.

performance. From the first quarter of 2009 on, loans are reported for firms borrowing at least €30,000 from the entire population of credit institutions, having been lowered from €75,000 before then. With these data, we can observe how much each firm borrowers from each bank. We focus on bad loans as a measure of bank health. As we show below, bank loan losses are strongly predictive of declines in credit growth in subsequent quarters, after controlling for credit demand. For each firm we construct the variable Bad Loans_{jt}, equal to the weighted average of that firm's banks' ratio of bad loans to total assets (from the Supervisory Reports), where the weights equal the fraction of credit received by the given firm from each of its banks in the prior quarter (from the Credit Register). As shown in Figure 5, Bad Loans_{jt} has substantial variation both over time, rising on average in the post-crisis years, and also displaying an increased dispersion across firms.

The Bad Loans_{jt} ratio captures variation in credit supply at the firm-time level because more distressed banks cut credit supply in general, and because firms can only switch lenders at substantial cost. This strategy builds on a long sequence of prior research demonstrating that banks cut credit supply in response to negative shocks to their balance sheets. This literature began with the seminal research of Peek and Rosengren (1997 and 2000), who demonstrate that lending by Japanese banks to borrowers in California was constrained due to large losses stemming from the collapse in Japanese real estate prices and the associated losses experienced by Japanese banks. A large academic literature on bank "capital crunches" followed, documenting that negative shocks from many different sources have large contractionary effects on the supply of lending. Such shocks can stem from exposure to losses in real e

absorb larger negative shocks without failing compared to smaller firms. Similarly, older firms may be less informationally opaque than younger firms, more able to access external finance, and, therefore, may have a higher probability of survival.[19] Given these controls, we then argue that any residual effect of group status on survival reflects advantages of the internal capital market. Since all firms in Italy experience a challenging economic downturn, this test should be quite powerful. As a preliminary exercise that avoids making parametric assumptions, we report below the raw survival rates by plotting the Kaplan-Meier estimate of the survival function and hazard rates over time by group status.

We then parameterize the survival model, as follows:

$$P_{i,t} = \beta_1 \text{Group} + \beta_2 \text{Bad Loans}_{i,t-1} + \beta_3 \text{Group x Bad Loans}_{i,t-1} + \quad (2)$$
$$+ \beta_4 \text{Sales Growth}_{i,t-1} + \beta_5 \text{Cash Flow}_{i,t-1}/\text{Assets}_{i,t-2} +$$
$$\beta_6 \text{Log asset ratio}_{i,t-1} + \beta_7 \text{Log age}_{i,t} + \text{Fixed Effects}$$

where i represents the firm and t the year. In Equation (2), the coefficients β_1 and β_3 capture the impact of Group on the probability failure, and β_2 and β_3 capture Bad Loans. To capture the effect of specific shocks faced by firms, we include lagged values of both Sales Growth and Cash Flow/Assets (Cash Flow for short). We interact Bad Loans with Group to test whether the importance of bank health declines for firms with access to an internal capital market. As additional controls, we also include firm age (in log form), as well as the log of the ratio of a given firm's asset relative to the sum of assets across all group-affiliated firms. This variable captures the relative size for group-affiliated firms. Because all unaffiliated firms have an asset ratio of 1.0 by definition, they have no impact on the estimation of β_7 (since Log (1.0) = 0). The fixed effects capture interactions of time with industry, region, firm size-bins (which may be specific to group versus non-group members).

Our sample includes only those firms that were present in the sample in 2006. Because later entrants are not considered, the model is a proper survival analysis. Given

[19] Firm age may also proxy for hard-to-observe variables such as managerial risk aversion, which likely affect failure rates. Note that our results linking failure rates to group status are not sensitive to whether or not we control for age.

the linear specification for $P_{i,t}$, we estimate the model by OLS applied to the pooled sample, with a dummy dependent variable equal to one in the year of failure and zero otherwise (Allison, 1982). We classify a firm as 'failed' when it disappears permanently from the sample. In some (few) cases, we miss the firm balance sheet for one year, or even more, but then the firm reappears in the sample. In these cases we delete the entire string of information for that firm. In the same spirit, we end our survival analysis in 2013 and classify as failed in that year only firms that do not have a balance sheet both in 2013 and 2014. In spite of these adjustments, some measurement error may remain in using exit as a proxy for failure.[20]

The results for the Kaplan-Meier estimate of the survival function are reported in Figure 6, while Table 4 reports the estimates of the discrete-time hazard estimate of Eq. 2. The simple results from the Kaplan-Meier analysis – which are no more than the raw survival and hazard rates themselves – suggest that the survival of a group-affiliated firm is greater than that of unaffiliated firms. For instance, the probability that a firm belonging to a group survives from 2006 until 2013 is about 56 percent, compared to about 50 percent for unaffiliated firms. These estimates, of course, do not control for firm level differences in growth opportunities or internal cash flow or for the industrial regional or size characteristics (time invariant or time varying). As a result one cannot attribute the differences in survival to a pure group effect, operating, for instance, through intra-group transfers.

To address fundamentals, Table 4A

by constructing pseudo-groups from unaffiliated firms, with one pseudo-group built to

statistically significant of both Other Sales Growth and Other Cash Flow in the placebo test. Note that the impact of Other Cash Flow and Other Sales Growth can only be estimated for groups that have sufficient diversification, since correlated shocks would not add explanatory power to the failure model.[21]

Table 4C introduces interactive effects between Bad Loans and firm fundamentals.

To test this notion, we regress capital transfers between group affiliated firms on investment opportunities (proxied by Sales Growth) on Cash flow (to capture the potential

Both Cash Flow and Other Cash Flow affect capital transfers strongly: firms with high cash flow lend to the internal capital market and those with low cash flow borrow; in contrast, firms in groups with other high-cash firms are able to borrow more (i.e., the coefficient on Other Cash Flow is positive and statistically significant).[23] All four specifications suggest that group-affiliated firms make greater use of capital transfers when their banks are weak, particularly with regard to the effects of Cash Flow on transfers. Own Cash Flow interacts strongly with Bad Loans, implying much larger magnitudes during the crisis years, when Bad Loans are highest (recall Figure 4).[24]

Is the Internal Capital Market Efficient?

We have seen that group membership increases firm survival, and that groups move capital across firms during the crisis years when the banking system is under stress. Are these actions efficiency enhancing? Or, are groups propping up weak firms (perhaps for reasons related to agency problems)? Our results tend to point toward efficiency. For example, sales growth is a predictor of firm survival and also, in some cases, of intra-group capital transfers. In the model of column 1 of Table 5, the effect of sales growth is positive and significant at the mean value of

Sharing Bank Debt Capacity

Firms use internal transfers to share cash flow, and they do so most when their

are stronger. Moreover, we show

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Appendix

Bank level variables – Source: Supervisory Reports, Bank of Italy

(Bank level) Bad Loans exposures to insolvent counterparties (even if not legally ascertained or formally written off).

Total Assets: bank's total assets.

Bad Loans ratio: bad loans over total assets.

Capital Ratio: bank capital over total assets

Liquidity: asset liquidity ratio, defined as cash plus securities over assets

Funding: funding stability ratio, defined as deposits plus bonds sold to households over assets.

Loan quality and lending relationship – Source: Credit Register, Bank of Italy

(Firm-bank level) Bad Loans (as explanatory variable) end of year weighted average of the lending banks' ratio of bad loans to total assets (bad loans ratio), where the weights equal the fraction of credit received by a given firm i from each of its banks b.

$$\$ = @ \quad . K_{\ddot{U}\tilde{a}\hat{C}} = J O \acute{I} \frac{H K = \ddot{U} J Q_{\acute{a}\hat{C}}}{\tilde{A}\acute{a}_{\tilde{O}@5}} > = @ \quad H_{\tilde{O}\acute{a}\hat{C}} K = J O$$

Firm level variables – Source: Balance sheet register (Cerved)

Sales Growth: the annual percentage change in real sales; industry GDP deflator used to deflate nominal sales.

Cash Flow: net income minus extraordinary items plus depreciation and amortization divided by end of previous year total assets; firm, year-level.

Other Sales Growth: the annual percentage change in real sales of all other firms affiliated

Total Assets: firm's total assets.

Asset ratio: total assets of the firm/total assets of all firms affiliated with the same group.

Bank Debt: total amount of financial debt owed by a given firm towards all banks.

Table 1: Summary statistics

This table reports summary statistics for the universe of firms based in Italy. The description of variables and their data sources are provided in the Appendix.

	Group-affiliated firms					Unaffiliated firms				
	Mean	Std. Dev.	Percentiles			Mean	Std. Dev.	Percentiles		
			25th	50th	75th			25th	50th	75th
Panel A: 2004–2008										
Sales growth	0.117	0.569	–0.134	0.011	0.203	0.100	0.494	–0.144	0.013	0.214
Total assets	11,844	380,596	424	1,317	4,199	1,923	57,676	149	417	1,165
Cash flow/Assets	0.037	0.075	0.002	0.030	0.073	0.046	0.099	0.001	0.036	0.091
Total borrowing/Assets	0.339	0.317	0.022	0.275	0.558	0.294	0.305	0.000	0.207	0.499
Intra-group net fin. position/Assets	0.028	0.210	–0.056	0.001	0.081					
Intra-group net positions (total)/Assets	–0.019	0.239	–0.128	–0.019	0.070					
Other Sales growth	0.071	0.407	–0.111	0.018	0.171					
Other Cash flow/Assets	0.178	0.374	0.002	0.029	0.155					
Log(Asset ratio)	–1.656	1.626	–2.372	–1.158	–0.429					
Bad Loans/Assets	0.022	0.012	0.014	0.020	0.028	0.022	0.012	0.013	0.019	0.028
Log(Age)	2.269	0.973	1.609	2.398	3.045	2.070	0.970	1.386	2.079	2.833
Number of firms			160,519					362,665		

Table 2: Transition matrix for the universe of Italian firms

This table reports transition probabilities for the universe of firms based in Italy over two, non-overlapping periods: 2006 to 2010 and 2010 to 2014. The description of variables and their data sources are provided in the Appendix.

		Unaffiliated firms	Small and large domestic groups	Foreign groups	Exit (No balance sheet)
		2010			
2006	Unaffiliated firms	59.49%	8.05%	0.12%	32.34%
	Small and large domestic groups	13.02%	56.97%	0.37%	29.64%
	Foreign groups	8.03%	10.86%	50.99%	30.12%
	New firms	72.24%	27.33%	0.43%	0.00%
		2014			
2010	Unaffiliated firms	54.55%	5.61%	0.06%	39.77%
	Small and large domestic groups	9.42%	54.47%	0.22%	35.89%
	Foreign groups	6.19%	9.37%	55.34%	29.10%
	New firms	72.07%	27.49%	0.44%	0.00%

Table 3: Bank loan supply growth

This table reports regressions of the change in the log of bank loans at the firm-bank-quarter level, as a function of lender characteristics and fixed effects. Standard errors appear in parenthesis. ***, **, * indicate significance at the 99%, 95% and 90% level, respectively. Columns 1, 2, 4 and 5 include all of the data, while columns 3 and 6 drop observations below the 1st and above the 99th percentile of the distribution, based on the dependent variable.

Dependent Variable	ΔLog Loans$_{i,b,t}$					
	(1)	(2)	(3)	(4)	(5)	(6)
Bad Loans$_{b,t-1}$	–0.1069***	–0.2063***	–0.0767***	–0.0893***	–0.1954***	–0.0715***
	(0.0107)	(0.0118)	(0.0060)	(0.0154)	(0.0168)	(0.0085)
Liquidity$_{b,t-1}$	-	0.0312***	0.0152***	-	0.0395***	0.0162***
		(0.0043)	(0.0023)		(0.0061)	(0.0031)
Capital Ratio$_{b,t-1}$	-	0.2088***	0.0687***	-	0.2325***	0.0624***
		(0.0082)	(0.0039)		(0.0113)	(0.0054)
Funding$_{b,t-1}$	-	0.0039	0.0118***	-	-0.0028	0.0053**
		(0.0036)	(0.0018)		(0.0051)	(0.0025)
Log Assets$_{b,t-1}$	–0.0131***	–0.0154***	–0.0067***	–0.0163***	–0.0197***	–0.0098***
	(0.0005)	(0.0008)	(0.0004)	(0.0007)	(0.0011)	(0.0005)
Firm*Quarter FE	No	No	No	Yes	Yes	Yes
Bank FE	Yes	Yes	Yes	Yes	Yes	Yes
Firm Clustered St. Errors	Yes	Yes	Yes	Yes	Yes	Yes
Observations	39,978,328	39,978,328	39,178,762	30,341,104	30,341,104	29,567,021

Table 4A: Firm failure by group affiliation

This table reports a linear probability model for firms existing in 2006, from that year until 2013. Firms

Table 4C: Firm failure and access to group-level cash flow and sales growth and bank health

This table reports a linear probability model for firms existing in 2006, from that year until 2013. Firms

Table 5: Intra-group capital transfers and bank health

This table reports regressions of intra-group transfers as a function of sales growth, cash flow and bad loans at the firm-level and cash flow and sales growth for other firms affiliated with the same group. Increases in the dependent variable reflect increased borrowing from group-affiliated sources. Standard errors in parenthesis. ***, **, * indicate significance at the 99%, 95% and 90% level, respectively.

Dependent Variable	Intra-Group Net Financial Position$_t$/Assets$_{t-1}$		Intra-Group Net Financial and Trade Position$_t$/Assets$_{t-1}$	
	(1)	(2)	(3)	(4)
Own Fundamentals:				
Sales Growth$_t$	0.0023**	0.0029	0.0000	0.0012
	(0.0009)	(0.0024)	(0.0017)	(0.0036)
Sales Growth$_t$*Bad Loans$_{t-1}$	–0.1206**	–0.1916*	–0.0898	–0.1791
	(0.0568)	(0.1085)	(0.0996)	(0.1716)
Cash Flow$_t$/Asset$_{t-1}$	–0.0869***	–0.1259***	–0.1608***	–0.2023***
	(0.0115)	(0.0219)	(0.0174)	(0.0314)
Cash Flow$_t$/Asset$_{t-1}$*Bad Loans$_{t-1}$	–2.6131***	–2.2147**	–3.2849***	–4.2202***
	(0.5096)	(0.8919)	(0.7418)	(1.2338)
Bad Loans$_{t-1}$	0.0237	0.0978	0.1153	0.0408
	(0.0527)	(0.0953)	(0.0772)	(0.1311)
Other Fundamentals:				
Other Sales Growth$_t$	–0.0000	0.0014	0.0008	0.0091
	(0.0009)	(0.0040)	(0.0016)	(0.0067)
Other Sales Growth$_t$*Bad Loans$_{t-1}$	–0.0007	–0.1275	0.0916	–0.4141
	(0.0590)	(0.1692)	(0.0993)	(0.2673)
Other Cash Flow$_t$ /Asset$_{t-1}$	0.0272***	0.0238***	0.0072	–0.0038
	(0.0052)	(0.0078)	(0.0076)	(0.0110)
Other Cash Flow$_t$ /Asset$_{t-1}$*Bad Loans$_{t-1}$	0.1168	–0.0661	–0.1403	0.1553
	(0.1855)	(0.2443)	(0.2464)	(0.3148)
Industry*Year FE	Yes	Yes	Yes	Yes
Province*Year FE	Yes	Yes	Yes	Yes
Group*Year FE	No	Yes	No	Yes
Firm FE	Yes	Yes	Yes	Yes
Group*Year & Firm Clustered St. Errors	Yes	Yes	Yes	Yes
Observations	127,450	70,524	75,280	43,042
R-squared	0.780	0.865	0.791	0.881

Table 6: Intra-group capital transfers and bank health with above-median sales indicator, by group size

This table reports regressions of intra-group transfers as a function of sales growth, cash flow and bad loans at the firm-level and cash flow and sales growth for other firms affiliated with the same group. A dummy for above median sales growth and its interactions with the cash flow variables are also introduced. Increases in the dependent variable reflect increased borrowing from group-affiliated sources. Standard errors in parenthesis. ***, **, * indicate

Table 7: Intra-group capital transfers and debt capacity

This table reports regressions of intra-group transfers as a fu

Figure 1: Italian GDP growth rate and aggregate bad loans ratio

This figure reports Italian GDP growth rate and the ratio of aggregate bad loans to total loans to the (non-bank) private sector for the Italian banking system from 2003 to 2015. The description of variables and their data sources are provided in the Appendix.

Figure 2: Gross intra-group financial debt and bank debt

This figure reports the growth in aggregate gross intra-group financial debt, bank debt for continuing firms. Values in 2004 normalized to 100. The description of variables and their data sources are provided in the Appendix.

Figure 4: Intra-group credit and debt flow by firm layer and direction

These figures report intra-group net financial position (i.e. gross debt minus gross credit over total asset) and bank debt ratio (over total asset) by parent and affiliated firms.

(a) Intra-group net financial position

(b) Bank debt

Figure 5: Bad loans

This figure reports the time-series and cross-sectional variation of the median and 5th and 95th percentile range for the firm-bank's bad loans-to-assets ratio, from 2004 to 2014. The

Figure 6: Kaplan-Meier survival estimates

This figure plots the Kaplan-Meier survival estimates for firms that exist in 2006 over the subsequent seven years (until 2013). The vertical axis equals the fraction of firms that remain in the sample in that year.

Figure 7: Marginal effect of cash flow

This figure plots the marginal effect of Cash Flow on intra-group net financial transfers (vertical axis) as a function of Bad Loans (horizontal axis), based on the model in column 2 of Table 5.

Figure 8: Marginal effect of bad loans

This figure plots the marginal effect of Bad Loans on intra-group net financial transfers (vertical axis) as a function of Cash Flow (horizontal axis), based on the model in column 2 of Table 5.

Figure 9: Cash flow coefficients by year

This figure reports the coefficient on firm Cash Flow in regressions of intra-group net financial transfers like those of Table 5, allowing the marginal effect to vary in each year in the sample.

APPENDIX

Appendix Table 1: Firm failure by group affiliation, logit

This table reports average marginal effects from a logit model for firms existing in 2006, from that year until 2013. Firms that exit the sample during this period are modelled as failures, while those that survive are right-censored. Sample includes both group-affiliated and unaffiliated firms. Firms that enter the sample after 2006 are excluded. Standard errors in parenthesis. ***, **, * indicate significance at the 99%, 95% and 90% level, respectively.

Dependent Variable	Firm failure		
	(1)	(2)	(3)
Group	–0.0174***	–0.0277***	-
	(0.0004)	(0.0007)	
No Group x Bad Loans $_{t-1}$	-	0.2009***	0.2270***
		(0.0268)	(0.028)
Group*Bad Loans $_{t-1}$	-	0.1815***	0.1294***
		(0.0291)	(0.0344)
Cash Flow$_{t-1}$/Asset$_{t-2}$	-	–0.5765***	–0.5745***
		(0.004)	(0.004)
Sales Growth			

Appendix Table 2: Intra-group capital transfers and bank health for firms that never switch ownership

This table reports regressions of intra-group transfers as in Table 5 (columns 1 & 2), but drops any firm that switches its ownership type (say, from group-affiliated to unaffiliated). Increases in the dependent variable reflect increased borrowing from group-affiliated sources. Standard errors in parenthesis. ***, **, * indicate significance at the 99%, 95% and 90% level, respectively.

Dependent Variable	Intra-Group Net Financial Position$_t$/Assets$_{t-1}$	
	(1)	(2)
Own Fundamentals:		
Sales Growth$_t$	0.0031***	0.0040
	(0.0010)	(0.0027)
Sales Growth$_t$*Bad Loans$_{t-1}$	–0.0964	–0.1616
	(0.0643)	(0.1247)
Cash Flow$_t$/Asset$_{t-1}$	–0.1183***	–0.1744***
	(0.0126)	(0.0241)
Cash Flow$_t$/Asset$_{t-1}$*Bad Loans$_{t-1}$	–2.3835***	–2.2419**
	(0.5732)	(0.9758)
Bad Loans$_{t-1}$	0.0271	0.1394
	(0.0581)	(0.1041)
Other Fundamentals:		
Other Sales Growth$_t$	0.0002	0.0042
	(0.0010)	(0.0048)
Other Sales Growth$_t$*Bad Loans$_{t-1}$	–0.0099	0.0145
	(0.0657)	(0.1942)
Other Cash Flow$_t$ /Asset$_{t-1}$	0.0280***	0.0268***
	(0.0056)	(0.0085)
Other Cash Flow$_t$ /Asset$_{t-1}$*Bad Loans$_{t-1}$	0.2044	0.3002
	(0.2110)	(0.2709)
Industry*Year FE	Yes	Yes
Province*Year FE	Yes	Yes
Group*Year FE	No	Yes
Firm FE	Yes	Yes
Group*Year & Firm Clustered St. Errors	Yes	Yes
Observations	113,734	61,524
R-squared	0.768	0.859

Appendix Table 3: Intra-group capital transfers and bank health using different index of bank health

This table reports regressions of intra-group transfers as in Table 5 (columns 1 & 2), using a broader index of bank health containing bad loans, liquidity, the capital ratio, funding stability and bank size, each weighted by the coefficients of column 2 in Table 3. Increases in the dependent variable reflect increased borrowing from group-affiliated sources. Standard errors in parenthesis. ***, **, * indicate significance at the 99%, 95% and 90% level, respectively.

Dependent Variable	Intra-Group Net Financial Position$_t$/Assets$_{t-1}$	
	(1)	(2)
Own Fundamentals:		
Sales Growth$_t$	0.0035***	0.0049**
	(0.0009)	(0.0024)
Sales Growth$_t$*Bank Health$_{t-1}$	0.0305	0.0321
	(0.0278)	(0.0525)
Cash Flow$_t$/Asset$_{t-1}$	–0.0984***	–0.1381***
	(0.0112)	(0.0207)
Cash Flow$_t$/Asset$_{t-1}$*Bank Health$_{t-1}$	0.5862*	1.2348**
	(0.3116)	(0.5070)
Bank Health$_{t-1}$	0.0367	0.0643
	(0.0307)	(0.0515)
Other Fundamentals:		
Other Sales Growth$_t$	0.0001	0.0030
	(0.0009)	(0.0040)
Other Sales Growth$_t$*Bank Health$_{t-1}$	–0.0301	0.0634
	(0.0323)	(0.0844)
Other Cash Flow$_t$ /Asset$_{t-1}$? Ò t	0.0205***	0.0160**
	(0.0050)	(0.0073)
Other Cash Flow$_t$		

Appendix Table 4: Firm failure, with Main Bank Share

This table reports a linear probability model for firms existing in 2006, from that year until 2013. Column 1 reproduces the result from Table 4A (col. 3), and column 2 adds Main Bank Share and its interaction with Group. Firms that exit the sample during this period are modelled as failures, while those that survive are right-censored. Sample includes both group-affiliated and unaffiliated firms. Firms that enter the sample after 2006 are excluded. Standard errors in parenthesis. ***, **, * indicate significance at the 99%, 95% and 90% level, respectively.

	Original Model	Model with Bank Share
	(1)	(2)
Main Bank Share$_{t-1}$		−0.0226***
		(0.0019)
Group*Main Bank Share$_{t-1}$		0.0004
		(0.0023)
Bad Loans $_{t-1}$	0.2304***	0.2665***
	(0.0289)	(0.0290)
Group*Bad Loans $_{t-1}$	−0.1081**	−0.1034**
	(0.0481)	(0.0482)
Cash Flow$_{t-1}$/Asset$_{t-2}$	−0.6768***	−0.6803***
	(0.0051)	(0.0052)
Sales Growth$_{t-1}$	−0.0392***	−0.0394***
	(0.0008)	(0.0008)
Log (asset ratio)$_{t-1}$	−0.0174***	−0.0162***
	(0.0005)	(0.0005)
Log age	−0.0229***	−0.0206***
	(0.0003)	(0.0003)
Group*Industry*Year FE	Yes	Yes
Group*Region*Year FE	Yes	Yes
Group*Firm size*Year FE	Yes	Yes
Number of Banks FE	No	Yes
Firm Clustered St. Errors	Yes	Yes
Observations	900,487	785,196

Appendix Table 5: Intra-group capital transfers and bank health, with Main Bank Share

This table reports regressions of intra-group transfers as a function of sales growth, cash flow and bad loans at the firm-level and cash flow and sales growth for other firms affiliated with the same group. Increases in the dependent variable reflect increased borrowing from group-affiliated sources. Columns (1) and (2) reproduce the results of Column (1) and (2) of Table 5, while columns (3) and (4) add Main Bank Share and its interactions with the other regressors. Standard errors in parenthesis. ***, **, * indicate significance at the 99%, 95% and 90% level, respectively.

	Original Models (no Bank Relationship)		Models with Bank Relationship	
	(1)	(2)	(3)	(4)
Own Fundamentals:				
Sales Growth$_t$	0.0023**	0.0029	0.0018**	0.0017
	(0.0009)	(0.0024)	(0.0009)	(0.0024)
Sales Growth$_t$*Bad Loans$_{t-1}$	−0.1206**	−0.1916*	–0.1141**	–0.1812*
	(0.0568)	(0.1085)	(0.0567)	(0.1085)
Cash Flow$_t$/Asset$_{t-1}$	−0.0869***	−0.1259***	–0.0843***	–0.1108***
	(0.0115)	(0.0219)	(0.0113)	(0.0215)
Cash Flow$_t$/Asset$_{t-1}$*Bad Loans$_{t-1}$	−2.6131***	−2.2147**	–2.6572***	–2.2855**
	(0.5096)	(0.8919)	(0.5099)	(0.8889)
Bad Loans$_{t-1}$	0.0237	0.0978	0.0447	0.1382

Bank Relationships:		
Main-Bank Share$_{t-1}$	0.0161***	0.0129**
	(0.0034)	(0.0062)
Sales Growth*Main-Bank Share$_{t-1}$	0.0046	0.0113*
	(0.0035)	(0.0064)
Cash Flow*Main-Bank Share$_{t-1}$	–0.1287***	–0.2701***
	(0.0351)	(0.0618)
Bad Loans*Main-Bank Share$_{t}$		