BANK OF GREECE
EUROSYSTEM

Working Paper

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DECEMBER 2017

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www.bankofgreece.gr

Printed in Athens, Greece
at the Bank of Greece Printing Works.

ISSN 1109-6691

GROUP AFFILIATION IN PERIODS OF CREDIT CONTRACTION AND BANK'S REACTION: EVIDENCE FROM THE GREEK CRISIS

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Abstract

Using a data set of bank loans to Greek firms during the period of the Greek sovereign crisis, we provide empirical evidence that firms affiliated with groups are less likely to default on their bank loan during a credit crunch, compared to stand-alone firms. We show that the lower default risk of affiliated firms is due to access to the internal capital market in the form of intra-group loans and to enhanced access to the restricted external financing. Furthermore, we provide empirical evidence that banks evaluate positively the group membership and that they collect private information about the delinquent affiliated firms from other firms that belong to the group. Finally, we find that banks are more likely to show forbearance against affiliated firms with non-performing loans, in order to delay additional loan charge-offs and to preserve their relationship with the rest of the group.

JEL-classification: G01, G21, G32, C23

Keywords: group affiliation, co-insurance, non-performing loans, forbearance

Acknowledgement: This study was conducted under the Bank of Greece's programme of cooperation with universities. We want to thank participants in a seminar at the Bank of Greece for valuable comments on an earlier version of the paper. The views expressed in this article are those of the authors and do not necessarily reflect those of the Bank of Greece or the Eurosystem. Any errors or omissions are the responsibility of the authors.

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1 Introduction

Business groups, as a set of legally independent firms that are bound together by a constellation of formal and informal ties, constitute a common way for exercising control over a large number of firms while containing risk exposure through limited liability. Irrespective of the type of organization between group members, the major characteristic of a group formation is the legal independence of affiliated firms. This enables them to access both the internal capital market provided by the group's network of firms, and the external financial markets, while the bankruptcy of a member firm does not automatically propagate financial problems to the whole group.

It is widely accepted that business group formation is the response to market inefficiencies and poor legal and regulatory institutions. For example, Desai et al. (2004) show that subsidiaries of multinational companies use more internal debt financing in countries where external financing is difficult or expensive, and Claessens et al. (2006) argue that group affiliation is especially beneficial to those subsidiaries that would have more difficulty in attracting external financing at competitive rates. In particular, groups function as efficient internal capital, labor and product markets and as an intermediary organizational form, capable of mobilizing valued resources (Khanna and Palepu 1997). The group's internal capital market may foster increased availability of financial resources and more optimal investment allocation thanks to reduced asymmetric information. It also enables group affiliated firms to share risks by smoothing out income flows and reallocating resources (Ferris et al. 2003; Khanna and Yafeh 2005, 2007) and therefore reduces default risk and the cost of debt financing as well as the likelihood of direct contagion to the group if one member faces bankruptcy (Bianco and Nicodano, 2006). Following this remark, some interesting research questions, which will be the subject of this study, arise. In particular, does group affiliation provide protection to firms during periods of financial market distress and credit rationing? Moreover, do banks explicitly acknowledge the risk-sharing attribute that affiliated firms enjoy?

Finally, how does the group-bank relationship affect the bank's treatment of affiliated firms that face financial difficulties?

Using a data set of bank loans to Greek firms for the period 2008-2015, we examine empirically the impact of group affiliation on a firm's ability to sustain the negative externalities of a banking crisis. The deep and protracted recession of the Greek economy following the outbreak of the sovereign debt crisis in early 2010 has led to a severe banking crisis, during which banks lost access to the interbank market, suffered significant deposit outflows and recorded large losses from their exposure to sovereign debt and the unprecedented increase in non-performing loans. With the Greek banks unable to provide new credit, both households and companies faced restrictions on external financing. In particular, bank credit to nonfinancial companies has been severely affected: outstanding bank loans to nonfinancial companies have declined by 35% over the period November 2009 to September 2017 whereas the outstanding stock of short-term loans with maturities up to one year fell by as much as 45%. The experience of the Greek economy over this extended period of credit contraction allows us to examine whether the use of internal capital markets helps firms to stay solvent in periods of severe restrictions on external financing. In particular, we provide empirical evidence that firms affiliated with groups are less likely to default on their loans, compared to stand-alone firms during a period of credit contraction. However, this risk-mitigation property is conditional on the group's financial strength. Furthermore, we provide evidence of the internal support offered to the financially weaker affiliated firms.

In addition, we show that lenders consider group affiliation positively and enhance the evaluation of affiliated firms, compared to unaffiliated firms. However, the enhanced evaluation of affiliated firms is subject to the strength of the relationship between the bank and the group. One possible explanation of this result is that banks can extract information about the future prospects of affiliated firms from their relationship with the group. Lastly, we find empirical evidence that banks are more likely to shun legal action against the defaulted firms that belong to a group, although

forbearance towards affiliated firms is conditional on the strength of the relationship between the bank and the group. There is a number of possible explanations for bank forbearance, which are not mutually exclusive. First, banks may want to delay additional loan charge-offs and loss provisions which would reduce the bank's earnings and its capital ratio. Second, banks may refrain from terminating a loan contract because they would like to avoid any negative spillovers on their business relationship with the entire group. Third, it is possible that banks can extract information about the defaulted affiliated firms from their relationship with the group.

One interesting aspect of the literature on business group is that the empirical evidence comes mostly from East-Asia or emerging markets and mainly focuses on the investment related to intragroup capital allocations. Therefore, there seems to be a knowledge gap regarding the operation of business groups in Europe and the operation of internal capital markets as a means of intragroup risk management. In addition, we have limited knowledge of how banks view group membership and if their relationship with the group interferes with their relationship with the firm. This study, taking advantage of the unique setting offered by the Greek economic crisis, aims to cover part of this gap by examining the interplay between solvency, group affiliation and the dynamics of the bank-firm and bank-group relationship in a European economy under conditions of severe credit contraction.

In addition, what makes our study interesting is that the Greek economy shares all the institutional inefficiencies that the literature has identified as key conditions for group affiliation to be an effective organizational form, i.e. a legal framework that offers weak protection to investors, underdeveloped capital markets and inadequate information sharing among creditors. Second, the credit contraction experienced by the domestic firms is unprecedented for a developed banking system. This setting offers a unique opportunity to reveal the role of internal capital markets when external capital markets are in effect shut down. Third, the credit contraction was the result of the losses incurred by Greek banks from their public debt holdings. Thus, the Greek public debt crisis offers an exogenous shock to the credit provided to the private sector and

this setting allows us to examine the role of internal markets using an econometric approach that aims at addressing endogeneity concerns.

Furthermore, examining how much lenders appraise group relationship helps to shed light on the viewpoint of an important economic agent, on a different organization of firms. When the probability of default is high for many corporations, thus creating high agency costs of borrowing, banks can derive valuable information about their borrowers through the network of affiliated firms. Moreover, regulatory treatment of group lending and concerns over the business with the group present strong incentives to lenders to show a higher degree of forbearance towards affiliated firms. Taken together, our findings show that banks are favourable to alternative organizational forms as long as these forms reduce market inefficiencies and capital requirements and have a positive impact on their business.

The remainder of the paper is structured as follows: In section 2, we provide a brief literature review and highlight further the contribution of the present study. In section 3, we develop the theoretical framework and the research hypotheses. Section 4 provides a short description of the Greek economic crisis and the institutional background. Section 5 describes the data and the methodology used in the empirical analysis. The empirical results are presented in sections 6 to 9. We conclude with a discussion of the findings and their implications in section 10.

2 Literature review

Group-affiliated firms play a dominant role in both developed and emerging economies, and the academic literature has attempted to shed light on the economic impact of such an organisational form.[1] The different strands in the literature that are more related to the current study focus on whether groups create or destroy value, or increase or decrease leverage and riskiness through access to internal markets.[2]

[1] For a review of the literature see Locorotondo et al., 2012 and Khanna and Yafeh, 2007.

[2] Another strand, less related to the current study, focuses on conflict of interest between controlling shareholders and minority shareholders and misallocation of capital resulting to suboptimal solutions. Agency theorists have seen

(a) Group membership and profitability

Khanna and Rivkin (2001) provide cross-country evidence (using data from 14 countries) concerning the performance of business group affiliates in emerging markets and find mixed results suggesting that the country-specific environment is important in explaining the relationship between group affiliation and firm profitability. Specifically, affiliates perform better than non-affiliates in six countries and worse than non-affiliates in three, with no difference in profitability levels in the remaining five countries. Chang and Hong (2000) show that the sharing of resources within Korean groups results into better firm performance, and Luo and Chung (2005), using data from Taiwanese business groups, document that family and prior social relationships enhance the performance of groups during a period of market transition.

On the other hand, George and Kabir (2008) find that Indian business group member firms are less profitable than non-member firms and Chang and Choi (1988) show no significant difference between Korean business group affiliates and non-affiliates. For Japan, Lincoln et al. (1996), show that, on average, members of the six largest Keiretsu groups show lower profitability than non-member firms, a finding attributed to those firms that performed stronger in the past because of extensive risk-sharing within Japanese groups. Kim et al. (2004) find that less powerful Keiretsu members put more emphasis on increasing profitability, in contrast to more powerful members which focus on achieving growth. In Europe, Buysschaert et al. (2008), examining data from Belgian firms, find a lower operating profitability for business group members compared to non-member firms. Conversely, Hamelin (2011) shows that membership to small French business groups increases long-run firm profitability and reduces the sensitivity of profits to shocks. Carney et al. (2011) synthesized 141 studies covering 28 countries and find that affiliation diminishes performance in general, tracing reduced affiliation performance to specific strategic actions taken at the firm and

business groups as instruments used by wealthy families to appropriate private benefits through a variety of tactics including "pyramiding" (the control of many businesses with limited capital investments through a set of cascading parent-affiliate relationships (Claessens et al., 2000) and "tunneling" (a process whereby dominant shareholders transfer assets or profits from peripheral to core firms in which they hold greater equity ownership (Friedman et al., 2003).

group levels, indicating that affiliates' performance reflects complex processes and motivations.

(b) Group membership and access to capital

Another strand in the literature focuses on the alleviation of capital constraints through the role of internal capital markets and the facilitation of access to external capital markets and consequently on risk mitigation for group affiliates. Chang and Hong (2000) show that business groups in Korea use internal business transactions such as debt guarantees, equity investments, and internal trades for cross-subsidization purposes. Khanna and Yafeh (2005) using data from 12 countries examine the hypothesis that business groups facilitate mutual insurance among affiliated firms and find substantial evidence of risk sharing by Japanese, Korean, and Thai groups only and little evidence of it elsewhere. Using Indian business groups, Gopalan et al. (2007; 2014) find that intragroup loans are used to support member firms that are in financial difficulties in order to avoid the default and consequent negative spillovers to the rest of the group. Ferris et al. (2003) suggest that co-insurance increases debt capacity of group-affiliated firms. Byun et al. (2013), using a sample of corporate bonds issued in Korea between 2001 and 2007, find that firms affiliated with business groups, chaebols, enjoy a 77-basis point lower cost of public debt relative to independent firms, consistent with the co-insurance effect. They also find that the economic value of group affiliation is greater when group-affiliated firms have poor credit quality, opaque financial statements, and when the economy is in a downturn, consistent with the co-insurance theory. Dewaelheyns and Van Hulle (2006) show that Belgian business groups support their member firms in case of financial distress. However, the support for member firms with non-core activities is terminated if the group's financial situation deteriorates.

Recently, Almeida et al. (2015) provide new evidence on the efficiency of capital allocation of business groups' internal capital markets, by comparing the investment behavior and the performance of Korean business group (chaebol) firms with non-chaebol Korean firms in the aftermath of the 1997 Asian financial crisis. They show that

Korean business groups (chaebols) were able to support affiliated firms during the financial crisis through equity capital contributions. Chaebol firms with greater investment opportunities increased investment the most in the aftermath of the crisis, a pattern that is not observed in the control group. Finally, they find that chaebol firms performed better than control firms in the aftermath of the crisis as their profitability increased relative to control firms and they suffered a lower decline in market value than other similar firms during the crisis. Overall, their results suggest that Korean chaebols used their internal capital markets to mitigate the negative effects of the Asian crisis on corporate investment.

(c) Group membership and debt risk

The support of group affiliated firms has a profound effect on riskiness and bankruptcy cost. Gopalan et al. (2007; 2014) find a significantly higher probability of failure for stand-alone firms compared to affiliated firms with no prior bankruptcy, the difference arising primarily because of intragroup loan inflows. They also develop a simple model in which business group insiders lower the cost of external financing via a dividend channel. The notion is that insiders distribute dividends from the cash-rich firms they control – and then use their share of the payout to help finance investments in other affiliated firms. By participating in the equity financing of firms in their group, insiders are able to maintain their stake in affiliated firms and, thereby, preclude a costly diversion of resources. This lowers their cost of raising external capital.

Chakraborty (2013), using a sample of Indian firms, finds that group-affiliated firms have a lower level of leverage than stand-alone firms, attributing this to managers' preference for equity. In particular, high leverage increases the bankruptcy risk of the group and forces the firms to cut capital requirements and R&D investments in order to service debt payments, damaging their long-run efficiency and competitive position.

Beaver et al. (2016), using sovereign rating downgrades and industry shocks as sources of exogenous variation in credit risk, show that, compared to standalone entities, group subsidiaries are less sensitive to sudden increases in default risk. This

finding is consistent with business groups acting as “shock absorbers” in that they insure their subsidiaries against temporary liquidity shortfalls. Also, they find that, in line with theory, more diversified groups, groups with a bank in their corporate structure, groups with a large number of subsidiaries, and pyramidal groups are more effective at insulating their subsidiaries from credit-risk shocks.

Santioni at al. (2017), using Italian data during the 2004-2014 period, show that affiliation with business groups helped firms survive the 2008-09 economic downturn. In particular, they show that firms in large business groups are approximately 11 percentage points more likely to survive from 2006 to 2013, compared with unaffiliated firms. Firms in small groups are also more likely to survive, although the difference is smaller. Finally, they show that the survival value of group affiliation becomes stronger during the crisis years and that firms substitute toward the internal capital market when the banking system becomes distressed. Their results are consistent with Kuppuswamy and Villalonga (2015) that found evidence of two channels through which the financial crisis increased the intrinsic value of corporate diversification: (1) better access to credit markets than single-segment firms had, as a result of the debt coinsurance provided by conglomerates; and (2) access to, and more efficient use of, internal capital markets. While these financing alternatives are always available to diversified firms, the evidence suggests that they became particularly valuable during the crisis. Finally, Matvos and Seru (2014), based on simulations from the 2008-2009 crisis period, suggest that diversified conglomerates are more likely to share resources across the internal capital market when external finance is costly. In particular, they show that improved resource allocation in internal capital markets has offset financial market stress during the recent financial crisis by between 16% and 30% relative to firms with no internal capital markets.

Despite the extensive research on the benefits and costs of group affiliation, there are research questions that remain unexplored. For example, the literature so far examines the debt insurance (co-insurance) effect and the use of internal markets during periods that external capital markets are available to the group. However, the

role of internal capital markets may be more important during periods when external capital markets dry up. Moreover, the majority of research is concentrated in East-Asian and emerging market economies, which leaves a gap on the role of group affiliation in European economies. Finally, current evidence about the behaviour of external capital providers, e.g. the banks, toward affiliated firms is limited to the Japanese structures of keiretsu, where the member banks evergreen loans to the weakest firms, especially when their reported capital ratio approaches their required capital ratio (Peek and Rosengreen 2005). However, this study provides evidence only for firms affiliated directly to the banks where the incentives to treat affiliated and unaffiliated borrowers differently are too obvious.

Our study aims to fill this gap in the literature and provide empirical answers to a number of research questions, which remain, in our view, unexplored. First, we explore if the commitment to provide co-insurance to affiliated firms is preserved when the group as a whole faces significant negative externalities such as credit rationing. Second, we study whether banks explicitly acknowledge the co-insurance effect that affiliated firms seem to enjoy. Third, we examine how the group-bank relationship affects the bank's decision to voluntarily disclose the private information about the firm's delinquency status and to take legal actions that would terminate the firm-bank relationship. In the next section, we present the theoretical framework and develop these research hypotheses in detail.

3 Hypothesis development

Throughout a financial crisis, external markets become too costly because of heightened information asymmetries between borrowers and lenders. Internal capital markets, on the other hand, are facilitated by the exchange of private information between the affiliated firms through the formal channels of cross-shareholdings and inter-firm transactions and the informal ones of social relations and personal friendship (Granovetter, 1994; Khanna and Rivkin, 2001).

These channels reduce information asymmetries, making internal debt contracts more accessible (Hoshi et al. 1990). Groups that have private information regarding their subsidiaries' investment opportunities are likely to fund distressed subsidiaries when external lenders are unable to do so. Furthermore, groups may support financially distressed subsidiaries as a result of explicit or implicit agreements, such as guarantees and comfort letters, or because they face significant direct and indirect costs in the event of subsidiary bankruptcy. In addition, groups may provide support to affiliated firms in financial distress if they are concerned about revealing negative information about the group, especially to external capital providers, a development that may impede the access of the other firms of the group to external capital, further damaging the group's investment prospects and its solvency as a whole. Therefore, our first hypothesis *(H1)* is that *groups have strong incentives to support distressed subsidiaries to avoid default contagion; hence we expect affiliated firms to have a lower default risk compared to their unaffiliated peers during a period of limited access to external financing*.

Previously, we argued that the default risk of affiliated firms is lower compared to their unaffiliated peers, due to the implicit or explicit support from the group, a phenomenon described as the co-insurance effect. The majority of the studies on the co-insurance effect finds that financial assistance transferred to weak affiliates takes the form of intra-group debt. Such a decision is rational especially during a period of high capital costs and the need to protect from contagion risks through the limited liability property of affiliated firms. Equivalently, if a co-insurance effect is present, then affiliated firms will receive a debt inflow, despite the unavailability of external capital. Hence, our second hypothesis *(H2)* is that *affiliated firms will exhibit a higher debt inflow compared to their unaffiliated peers during a period of credit contraction*. In addition to our second hypothesis, we expect that *financially weaker affiliated firms are more likely to be the recipients of the intra-group loans*.

If evidence of the co-insurance effect yields a lower risk profile for affiliated firms, then banks are likely to recognize the implicit support and give an enhanced credit

evaluation to affiliated firms, especially during a period of credit contraction. In addition, banks base their evaluations not only on hard, verifiable information but also on soft private information gathered throughout their relationship with the borrower (Petersen and Rajan 1994). Hence, it is likely that banks can extract private information about the future prospects of affiliated firms from their relationship with the other firms of the group. Equivalently, the bank's credit evaluations of affiliated firms will not be based on the firm's hard information only, but it will take into account soft information acquired from the network of affiliated firms as well as the future prospects of the bank-group relationship. Hence, our third hypothesis *(H3)* is that *lenders assign a higher credit score (lower risk) to affiliated firms compared to their unaffiliated peers during periods of credit contraction and their decision is conditional of the strength of their relationship with the group*.

The single risk approach of the regulatory provisions is likely to influence the bank's business approach toward the financially distressed affiliated firms, especially during periods of financial turmoil. Banks will want to delay additional loan charge-offs and loss provisions for the entire group, which would negatively influence their, already impaired, bank's earnings and capital ratio. The stronger the bank's relationship with the group, the bigger is the impact and hence the stronger the incentive to avoid the occurrence of these costs. It is equally likely that banks may refrain from terminating a loan contract through legal action because they would like to avoid any negative spillovers on their business relationship with the entire group. Finally, it is possible that banks can extract information about the defaulted firm's future prospects and investment opportunities from their relationship with the firm's affiliates. Taken together, our fourth hypothesis *(H4)* is that *lenders are more likely to avoid taking any legal action against a defaulted affiliated firm compared to an unaffiliated firm during a period of high information asymmetry and limited financial resources and their forbearance is conditional on the strength of their relationship with the group*.

In the following paragraphs, we take the above research hypotheses to the data. But before that, we present some more information about the institutional background

that characterizes the operations of groups of firms in Greece. In addition, we present more information about the Greek sovereign debt crisis that support our decision to use it as an exogenous shock to the credit supply to Greek businesses.

4 Institutional background and the Greek crisis

Following the global financial crisis of 2008, the Greek economy entered a deep and protracted recession during which real GDP declined by 26% and the unemployment rate peaked at 27% in 2014, up from less than 8% in 2008. The Greek crisis started as a sovereign debt crisis in the autumn of 2009 as the then newly elected government announced that the budget deficit was expected to exceed 11% of GDP against an initial target of 3% of GDP.

This announcement triggered a series of downgrades of the sovereign by rating agencies and a significant increase in bond yields as bond investors perceived Greek sovereign debt as unsustainable. The sovereign crisis soon turned into a banking crisis, however, because of the concurrence of several factors. First, following the downgrades of the Greek sovereign by rating agencies, Greek banks faced severe liquidity constraints as they were gradually excluded from the interbank market and lost nearly half of their customers' deposits. Second, the sharp decline in GDP and the significant increase in unemployment impacted negatively on the income of households and businesses and therefore the ability of borrowers to service their debt obligations. As a result, non-performing loans (NPLs) increased from 5% in 2008 to more than 35% in 2015, with corporate NPLs, the focus of the current study, increasing from 4.2% in 2008 to 34.3% in 2015.[3] Such a huge surge in NPLs, in conjunction with the losses from the restructuring of Greek public debt in 2012, has put significant pressure on the banking sector, which was forced to raise additional capital in three consecutive years (2013-2015) and to proceed with a heavy deleveraging of its balance sheet.

[3] From 2014 onwards, Bank of Greece monitors the asset quality of banks also through the definition of non-performing exposures that include loans 90 days past-due plus loans that are deemed unlikely to be repaid. Under this more strict definition, the percentage of non-performing exposures over total exposures amounted to 44% at the end of 2015.

Under these conditions, the provision of credit contracted significantly and resulted in negative net credit flows. In particular, during the years 2008-2010, the aggregated net credit flows to non-financial firms was €29 billion, corresponding to annual rates of credit growth of 21.4% in 2008, 5% in 2009 and 0.8% in 2010, respectively. In contrast, during the years 2011-2015, the aggregated net credit flows to non-financial firms was -€15.16 billion, corresponding to annual rates of credit contraction of -1.8% in 2011,-3.3% in 2012, -5% in 2013, -3.3% in 2014 and -1.2% in 2015. Based on the above, we define the years 2008-2010 as the period of credit expansion and the years 2011-2015 as the period of credit contraction.

Regarding the institutional environment, Greek law provides for a variety of legal forms for carrying out business. Despite the prominent economic role of business groups in Greece, there is no particular law that regulates their operation since individual firms that may be part of a group maintain their independence. The law provisions relevant to business groups are related to the preparation of consolidated financial accounts. In addition, there is no dominant type of a business group formation (e.g. pyramid or cross-holding forms) and the vast majority of business groups do not have any affiliation to banks along the lines of the Japanese Keiretsu.

Finally, from a supervisory point of view, risk measurement and the calculation of the relevant capital requirements use the concept of 'single risk'. Equivalently, despite the limited liability property, banks group two or more business clients that, unless it is shown otherwise, constitute a single risk. For the purposes of applying this requirement, institutions must assume that two or more clients constitute a single risk when there is a control relationship between them, unless they are able to demonstrate that despite the existing control relationship these clients, by way of exception, do not constitute a single risk.

5 Data and sample

We perform the empirical analysis using a unique proprietary database of business loans, based on data submitted by commercial banks to the Bank of Greece. The loan

database contains annual data over the period 2008 to 2015 on outstanding corporate loans exceeding 1 million euro for companies domiciled in Greece.[4] For the purposes of the analysis, we exclude off-balance sheet items, such as letters of guarantee and loan exposures that are reported by non-banking financial institutions (e.g. leasing, factoring) or subsidiaries.

The information includes the loan amount and if any, the amount that is 90 days past due. Following the regulatory guidelines, a bank defines a loan as non-performing if its payment is delinquent for more than 90 days. To mitigate the possibility of incorrect submission or potential overestimation of delinquent payments, if the non-performing exposure of the bank to a company is relatively small in comparison to the total exposure of the borrower (i.e. less than 3%), we do not denote the exposure as non-performing. In addition, the database includes the value of associated collateral pledged, primarily tangible assets (e.g. real estate) although financial collateral is also included.[5] Furthermore, the dataset includes the credit score assigned by the bank to the borrower with the lower score of 1 representing the lowest credit risk and the highest score of 7 representing the highest credit risk. Finally, we calculate two more variables: the number of different banks with which the firm has some cooperation during the year and the strength of the firm-bank relationship which is measured as the ratio of the firm's loans contracted with the specific bank to the total loans of the firm. If a firm has loans issued only by a single bank, then the ratio equals to one, indicating a strong relationship with this particular bank. Similarly, we replicate these calculations at a group-level. Thus, we calculate the number of different banks with which the group has some cooperation during the year as well as the strength of the group-bank relationship, measured as the ratio of the group's loans contracted with the specific bank to total loans of the group.

[4] Banks report total exposures per business customer provided that they exceed 1 million euros. There are also cases where the exposure is less than 1 million euros. These include the exposures of connected borrowers, as defined in the relevant Bank of Greece's Governor Acts, irrespective of the size of exposure, when at least one of these borrowers has an exposure higher than 1 million euros.

[5] The valuation of collaterals is in accordance with Bank of Greece Governor's Acts 2588 and 2589/2007.

The loan database is supplemented with financial business information retrieved from ICAP's database, a Greek business information provider. It includes the information about the group membership of a firm based on the definition about group-related firms described earlier. The financial database includes accounts and ratios from the published annual financial statements of the companies. Finally, we retrieve legal actions data (e.g. issued orders of payments, liquidation auction announcements, filings for bankruptcy among others) from the Default Financial Obligation System of Tiresias SA, an inter-banking company that specializes in the collection and supply of credit profile data.

After merging the different databases, our loan sample comprises 68,656 loan-year observations that correspond to 7,553 unique firms contracted with 36 different banks. Group affiliated firms account for 22,676 loan-year observations that correspond to 1,476 unique firms with loans from 31 different banks, while unaffiliated firms account for 45,980 loan-year observations that correspond to 6,077 unique firms with loans from 36 different banks. In terms of coverage, our sample accounts for about 60% of total outstanding corporate loans in the Greek economy.

Next, we split the data into two periods. We use the credit contraction period covering 2011-2015 to test directly the hypotheses as well as to run a quasi-experiment analysis as the after credit shock. Similarly, we use the credit expansion period covering 2008-2010 to run the quasi-experiment analysis as the pre credit shock that helps us to estimate the outcome variables that we would have observed in the absence of a credit contraction. In the quasi-experiment analysis, we look at the difference between the pre-shock and post-shock estimated differences. This removes biases in second period comparisons between the affiliated and unaffiliated firms that could be the result of permanent differences between those two firm types.

Table 1 contains the summary statistics of the firm-bank level and group-bank level variables for affiliated and unaffiliated firms separately for the two periods. The percentage of non-performing loans during the credit expansion period is 2.9% for

unaffiliated and 2.1% for affiliated firms. Further, we observe that affiliated firms have, on average, larger loan amounts (€8.624m vs €3.102m) and lower collateral coverage (0.762 vs 1.096). The percentage of non-performing loans during the credit contraction period is 15.5% for unaffiliated and 12.7% for affiliated firms. Similarly, we observe that affiliated firms have, on average, a higher loan amount per bank (€9.986m vs €3.341m) and lower collateral coverage (1.105 vs 1.470) compared to their unaffiliated peers. When we compare the affiliated (and the unaffiliated) firms before and after the crisis, we see an increase in the average loan exposure per bank and an increase in the collateral coverage. We attribute the observed increase in the average loan exposure per bank to the significant drop in the number of banks during the credit contraction. In particular, due to mergers and acquisitions as well as the resolution of several smaller banks, the average number of banks cooperating with an affiliated (unaffiliated) firm dropped from 4.797 to 3.888 (from 3.075 to 2.424). Thus, although firms' total loan exposure has dropped significantly due to the credit contraction (the numerator of the ratio), the simultaneous decrease in the number of banks (the denominator of the ratio) yields a higher average loan exposure per bank.

[Insert Table 1 About Here]

In addition to the loan data, we employ accounting data to capture the financial condition of firms. Specifically, to detect signs of financial distress that would imply an imminent likelihood of default, we use the z-score measure that converts key financial ratios into a single score. In particular, we use the Altman (1968) z-score modified for non-listed and non-US companies (Altman 2000) that evaluates the firm's working capital (WC), retained earnings (RE), the earnings before interest and taxes (EBIT) expressed as percentage of the firm's total assets (TA) and the book value of equity (BE) over total liabilities (TL):

$$z = 3.25 + 6.56 \times \frac{WC}{TA} + 3.26 \times \frac{RE}{TA} + 6.72 \times \frac{EBIT}{TA} + 1.05 \times \frac{BVE}{TL}.$$

The higher the firm's z-score, the lower the probability of default, while firms with scores below the threshold of 1.1 are considered as financially distressed.

Furthermore, we measure the size of the company using the logarithm of its reported total assets and the firm's age, measured from the year of establishment. Note that, along with the firm's financials, we have access to group level financial performance through the consolidated financial statements. Hence, we calculate a group-wide z-score using the consolidated accounts reported by the group. Table 2 contains the summary statistics of the firm and group variables split into the two periods separated for unaffiliated and affiliated firms. Affiliated firms are on average larger in size, but less profitable than their unaffiliated counterparties while we observe no difference in leverage. In addition, during credit expansion, affiliated firms have a lower z-score compared to their unaffiliated peers (3.923 vs 4.427). In contrast, after the credit contraction, affiliated firms have a higher z-score compared to unaffiliated firms (1.476 vs 1.109). Equivalently, albeit we observe a significant deterioration in the financial performance of both types of firms due to the crisis, the average financial strength of affiliated firms is higher than the financial distress zone while the average financial strength of unaffiliated firms is at the financial distress zone. This observation is a preliminary signal of the ability of affiliated firms to withstand the shutdown of the external capital markets by drawing on their internal resources.

[Insert Table 2 About Here]

The firms in the data sample come from different sectors excluding financial services. We classify firms into industries at a level equivalent to the four-digit standard industrial classification (SIC). Then we use the Bank of Greece classification groups which in our sample entails 13 broad sectors. Table 3 presents the distribution of the firm's in these sectors. Manufacturing and commerce are the biggest sectors followed by construction.

[Insert Table 3 About Here]

6 Group affiliation and non-performing loans

In this section, we provide empirical evidence that firms affiliated with groups are less likely to default on their loan during a period of credit contraction, compared to unaffiliated firms. We examine the hypothesis empirically using the firm-bank level sample i.e. a firm with loans from multiple banks will have more than one observation per year. Beyond group affiliation, we use several observable firm-bank level and firm level factors that interact with the firm's likelihood to default on its loan obligations as explanatory variables. For example, the firm's relationship with a bank is a key determinant of the default risk, especially for firms with loans from multiple banks. In particularly, a strong relationship reduces the probability of default. Furthermore, the literature has established the ex-ante effect of collateral as private information regarding the borrower's quality (Bester 1985) as well as the ex-post effect of collateral on moral hazard problems in incomplete contracting (Boot, Thakor and Udell 1991). Thus, we add in the model the percentage of the loan exposure covered by a collateral. Moreover, we control for the firm's financial conditions using the z-score as well as its size and age. By adding the firm's z-score and size to the model we identify the effect of affiliation after controlling for the heterogeneity between affiliated and unaffiliated firms on size and financial condition. In addition to the observed firm-bank and firm controls, we account for any unobserved firm-bank characteristics using the firm-bank random effects. We choose the random effects instead of fixed effects due to identification issues. In particular, group membership is a time invariant firm characteristic and if we employ firm fixed effects, they would subsume the group membership effect. Moreover, we include time and industry fixed effects that capture the unobserved annual trends including changes in the macro-economic environment or in the industry.

Using the above firm-bank factors (*FBControls*), firm factors (*Controls*) and additional effects, we estimate the panel data probit regression model:

$$P(D_{ibt} = 1) = \Phi(\beta_0 + \beta_1 Group_i + \gamma FBControls_{ibt} + \gamma FControls_{it} + Time\ Effects_t + Industry\ Effects_i + FirmBank\ Effects_{ib} + \varepsilon_{ibt})$$

where D_{ibt} is the indicator of non-performing loans that takes the value of one if firm *i* has stopped making payments on its loans from bank *b* at time *t*, $Group_i$ is the indicator that takes the value of one if firm *i* belongs to a group and zero if it is a stand-alone firm and Φ(.) is the normal cumulative probability function. We acknowledge that annual observations of the firm-bank pair are correlated; hence the error term ε_{ibt} is clustered at the firm-bank level.

The effect of group affiliation, in Table 4 column (1), is statistically significant at the 1% level, which supports our hypothesis that loans to group affiliated firms are less likely to default compared to loans of unaffiliated firms, ceteris paribus. In particular, the marginal effect calculated at the mean indicates that the probability of default of affiliated firms is on average 4.52 percentage points lower compared to stand-alone firms over the period examined. Theoretically, we attribute the affiliated firm's lower rate of non-performing loans to the co-insurance effect i.e. group affiliated firms are likely to tap to internal capital markets in order to avoid insolvency. If the "co-insurance" hypothesis is true, we would expect that the affiliation effect holds only for firms belonging to financially sound groups. In contrast, we expect no co-insurance effect for firms belonging to financially distressed groups. We therefore examine whether the effect of group affiliation on a firm's likelihood to default on its loans is related to the group's financial position.

We use the group's z-score and split our sample into firms affiliated to groups in financial distress (i.e. their z-score is below the threshold of 1.1) and firms affiliated to non-financially distressed groups while we maintain the unaffiliated firms sample unchanged. The estimation results in Table 4 column (2) suggest that affiliation to a financially distressed group has a significantly positive effect on the default risk compared to unaffiliated firms. Based on the marginal effect calculated at the mean, the probability of loan default for group affiliated firms that belong to a financially weak

group is on average 4.02 percentage points higher than the probability of default of unaffiliated firms. In contrast, the results in Table 4 column (3) show that the effect of affiliation to a financially sound group on loan default is strongly negative and statistically significant. In particular, the marginal effect calculated at the mean indicates a reduction of 5.58 percentage points in the default risk of firms affiliated to financially sound groups compared to the default risk of the unaffiliated firms.

The default risk hypothesis assumes that group-affiliated firms were capable of weathering the credit contraction better than the stand-alone firms because of the support received by the other group members. One could object, however, that group-affiliated firms have performed better not because they received support by the group but because they are in principle better than non-affiliated ones, i.e. groups select better firms as their members. In order to remove any potential biases in the second period, a comparison between the affiliated and unaffiliated firms that could be the result of permanent differences between those two firm types, we look at the time difference between the periods of credit expansion and contraction. Hence, we examine if the difference in default risk of group-affiliated and non-affiliated firms has changed after the onset of the crisis by estimating the panel data probit regression model:

$$P(D_{ibt} = 1) = \Phi\,(\beta_0 + \beta_1 Group_i + \beta_2 Shock + \beta_3 Group_i \times Shock + \gamma FBControls_{ibt} + \gamma FControls_{it} + Time\ Effects_t + Industry\ Effects_{it} + FirmBank\ Effects_{ib} + \varepsilon_{ibt})$$

where the dummy variable *Shock* takes the value of zero for years 2008-2010 and the value of one for years 2011-2015. If group-affiliated firms were superior to stand alone firms in principle (i.e. groups are formed by better quality firms), then the interaction effect β_3 of the credit shock with the group, i.e. the time difference of the differences between affiliated and unaffiliated firms will not be statistically significant because the superior performance existed beforehand.

The estimation results in Table 4 column (4) support the co-insurance hypothesis. Specifically, we find evidence at the 1% significance level that the difference in default

risk between group-affiliated and stand-alone firms is significant after the credit shock that resulted in a credit contraction. However, in Table 4 column (5), we observe no difference in default risk between firms belonging to financially *distressed* groups and unaffiliated firms during the credit contraction period. In contrast, in Table 4 column (6), we observe a strong difference in default risk between the firms affiliated to financially *sound* groups and unaffiliated firms after the credit shock. This difference is statistically significant at the 1% level.

Overall, during the period of credit contraction, firms belonging to a group are less likely to default compared to unaffiliated firms in support of the co-insurance hypothesis. In particular, group-affiliated firms are likely to receive financial assistance by the group in an attempt to avoid the negative spillovers of the firm's default on the entire group. This, however, seems to be the case only for firms which belong to financially strong groups. In contrast, financially distressed groups are unable to provide the intra-group funds to assist their affiliates.

[Insert Table 4 About Here]

7 Group affiliation and access to internal financing

Evidence so far indicates that firms belonging to a group display a lower probability of loan default and our theoretical interpretation is that they are more likely to receive financial aid from internal capital markets. In this section, we empirically test the co-insurance hypothesis which assumes that affiliated firms are able to allocate internal capital and help their financially weaker affiliates during periods of high uncertainty. We focus on the firm's long-term debt because it includes the intra-group loans.[6] We choose the debt flow (annual change) rather than the outstanding debt level

[6] Unfortunately, only a fraction of affiliated firms report intra-group loans separately, so we had to use the more general measure of long-term debt. To strengthen further the identification, we have run the model using as the outcome variable the firm's short-term bank debt flows. In unreported results, we find no evidence of higher bank debt flow to affiliated firms compared to unaffiliated firms. Hence, we can confidently assume that flows of long-term debt are more likely to come from the other firms of the group rather than the banks.

because the firm's capital structure represents the accumulated stock of debt that is influenced by the firm's past decisions on finance and investment. In contrast, the annual change (debt flow) measure is more likely to capture an enhanced access of affiliated firms to intra-group loans at the time of credit rationing.

We control for the firm's z-score, size, age and number of banks as observable factors that are likely to affect the firm's access to finance. Moreover, changes in the capital investment of the firm are likely to be associated with changes in long-term bank debt. We therefore include the changes in firm's fixed assets as a control variable. Furthermore, the empirical analysis uses the firm level sample, thus we account for any unobserved firm characteristics using firm random effects. Finally, we include time and industry fixed effects to capture the unobserved annual trends or industry specific characteristics that affect access to external finance. Taken together, we estimate the Generalized Least Squares panel regression model:

$$\Delta\, LTD_{it} = \beta_0 + \beta_1 Group_i + \gamma FControls_{it} + Time\ Effects_t + Industry\ Effects_{it} + Firm\ Effects_i + \varepsilon_{it}$$

where $\Delta\, LTD_{it}$ is the annual change of the firm's long-term debt from year t-1 to year t and the error term ε_{it} is clustered at firm level.

The effects of the group affiliation in Table 5 column (1) is positive and statistically significant at the 1% level, which indicates that group affiliated firms have a higher long-term debt flow compared to their stand-alone counterparts. Furthermore, when we include only firms affiliated to financially distressed groups, the effect in Table 5 column (2) is no longer significant. In contrast, for firms affiliated to financially sound groups, the effect in Table 5 column (3) is positive and significant. Taken together, the empirical findings support the hypothesis that debt flow is higher for affiliated firms compared to unaffiliated ones.

Next, we apply the quasi-experiment analysis and examine the difference in debt flows between the affiliated and unaffiliated firms before and after the credit contraction. We therefore remove the bias of any permanent differences in debt flow

between those two firm types. Specifically, we test if the difference in debt flow between affiliated and non-affiliated firms is observed after the outset of the credit crisis by estimating the Generalized Least Squares panel data regression model:

$$\Delta\, LTD_{it} = \beta_0 + \beta_1 Group_i + \beta_2 Shock + \beta_3 Group_i \times Shock + \gamma FControls_{it} + Time\ Effects_t + Industry\ Effects_{it} + Firm\ Effects_i + \varepsilon_{it}$$

where, as previously, the dummy variable *Shock* takes the value of zero for years 2008-2010 and the value of one for years 2011-2015. If group-affiliated firms enjoyed higher debt flows compared to unaffiliated firms in principle, i.e. both before and after the credit shock, then the interaction effect β_3 of credit shock with the group, i.e. the time difference of the differences between affiliated and unaffiliated firms will not be significant.

The empirical results in Table 5 column (4) support the co-insurance hypothesis. Specifically, we find evidence at the 1% significance level, the difference in debt flows between affiliated and stand-alone firms is significant after the credit shock that resulted in the credit contraction. Moreover, in Table 5 column (5), we observe no difference in debt flows between firms belonging to financially distressed groups and unaffiliated firms during the credit contraction period while in Table 5 column (6), we observe a strong difference in debt flows between the firms affiliated to financially sound groups and unaffiliated firms after the credit shock.

We continue by examining the intra-group loan and receivables data, which is reported separately only by a fraction of affiliated firms. Thus, the empirical analysis for the co-insurance effect uses the sub-sample of 826 affiliated firms that report these two accounting items. Specifically, we look at the characteristics of the group affiliated firms that are more likely to be recipients (rather than providers) of intra group loans. If the co-insurance effect holds, firms with lower z-score should be more likely to be the loan receivers. Specifically, we estimate the Generalized Least Squares panel data regression model:

$$\Delta GLoan_{it} = \beta_0 + \beta_1 Zscore_{it} + \gamma FControls_{it} + Time\ Effects_t + Industry\ Effects_{it} + Firm\ Effects_i + \varepsilon_{it}$$

where $\Delta GLoan_{it}$ is the percentage change from year t-1 to t of firm's *i* intra group loans (net of intra group receivables) and the error term ε_{it} is clustered at the firm level. We use the firm's size, age and number of banks as well as the firm's capital investment proxy that are likely to affect the intra-group loan and we account for any unobserved firm characteristics using firm random effects. Finally, we include time and industry fixed effects to capture the unobserved annual trends or industry specific characteristics that affect access to external finance. The effect of the firm's z-score in Table 5 column (7) is negative and statistically significant, which indicates that group affiliated firms with a weaker financial position are more likely to receive intra-group loans.

Overall, the empirical results support the co-insurance effect, indicating that group membership ensures access to internal finance for the affiliated firms of the group compared to their stand-alone counterparts. The co-insurance mechanism provides an explanation for the empirical finding of the previous section that group affiliated firms are less likely to default on their loans during a period of credit contraction.

[Insert Table 5 About Here]

8 Group affiliation, bank evaluation and forbearance

The preceding discussion focused on how firms cope with credit shocks using internal resources. Banks that monitor the firms are likely to be aware of the internal support that group-affiliated firms enjoy. In this section, we investigate if banks handle differently the firms that belong to a group, compared to stand-alone firms, and whether business interests related to the group are behind the bank's selective approach.

In order to isolate the effect of group membership on the firm's credit score assigned by the bank from the financial position of the firm, we include as control variables the firm's z-score, the firm's size, age and the number of banks from which the

firm receives loans. In addition, we control for the collateral value pledged as additional security that the bank is likely to factor into the firm's credit evaluation. The inclusion of the firm's z-score and the other controls in the estimation implies that any affiliation effect on the credit evaluation is likely to be associated with soft rather than hard verifiable information about the firm. The bank is able to collect this soft information from the other firms of the group, thus reducing the information asymmetry between the bank and the firm. We conduct the empirical analysis using the firm-bank level sample, thus we use firm-bank random effects to capture any unobserved firm-bank relationship characteristics. Finally, we add time and industry fixed effects to account for the annual macro-economic and industry trends that are likely to affect the bank's credit evaluation of the firm respectively. Taken together, we examine the effect of group affiliation on the bank's credit evaluation of the firm by estimating the Generalized Least Squares panel data regression model:

$$CS_{ibt} = \beta_0 + \beta_1 Group_i + \gamma FBControls_{ibt} + \gamma FControls_{it} + Time\ Effects_t + Industry\ Effects_{it} + FirmBank\ Effects_{ib} + \varepsilon_{ibt}$$

where CS_{ibt} is the internal credit score assigned by bank *b* to firm *i*, at time *t*, and the error term ε_{ibt} is clustered at the firm-bank level.

The effect of group affiliation on the credit score in Table 6 column (1) is negative and statistically significant at the 1% level and, since a lower credit score means lower credit risk, we conclude that banks are likely to enhance the credit evaluation of an affiliated firm compared to a standalone firm in support of our third hypothesis *(H3)*. In addition, *H3* posits that this decision is conditional on the strength of the relationship between the bank and the group. If we examine the sample of firms affiliated to a group with a strong relationship with the bank, then the affiliation effect in Table 6 column (2) is negative (lower credit risk) and statistically significant. If, however, we focus on the sample of firms affiliated to a group with a weak relationship with the bank, the effect in Table 6 column (3) is positive (higher credit risk) and statistically significant only at the 10% level.

Hypothesis *H3* also posits that banks are likely to assign better scores to affiliated firms during periods of heightened information asymmetry by collecting private information from their group affiliates. In the following quasi-experiment analysis, we examine the difference in credit evaluations between the affiliated and unaffiliated firms before and after the credit contraction in order to remove the bias of any permanent score differences between those two firm types. Specifically, we test if the difference in credit scores between affiliated and non-affiliated firms has emerged after the outset of the credit crisis by estimating the Generalized Least Squares panel data regression model:

$$CS_{ibt} = \beta_0 + \beta_1 Group_i + \beta_2 Shock + \beta_3 Group_i \times Shock + +\gamma FBControls_{ibt} + \gamma FControls_{it} + Time\ Effects_t + Industry\ Effects_{it} + FirmBank\ Effects_{ib} + \varepsilon_{ibt}$$

In Table 6 column (4), the difference in bank evaluation between affiliated and unaffiliated firms has changed after the credit contraction shock. Furthermore, the difference in bank evaluation between firms affiliated to groups with a strong relationship has changed significantly in favor of the affiliated firms after the credit contraction shock, see Table 6 column (5). On the other hand, the results in Table 6 column (6), show no effect on the difference in bank evaluation between firms affiliated to groups with a weak relationship with the bank after the credit contraction. Summing up, we find support of the hypothesis that, during periods of high uncertainty in credit markets, banks may collect private information about an affiliated firm from other firms in the group and evaluate differently the affiliated from unaffiliated firms.

[Insert Table 6 About Here]

If group membership reduces the information asymmetries between the firm and its bank and creates a sense of implicit support from the group then in the fourth and last hypothesis *(H4)* we posit that banks are less likely to resort to legal action against affiliated firms that are in arrears with their loan payments. To isolate the effect of group membership on the bank's decision to take legal action, we include in the model all the observable factors that are associated with this decision. In particular, we control

for the amount of arrears, expressed as a percentage of the total loan exposure, i.e. the firm's NPL. The intuition is that the bank is less likely to resort to legal action against a firm that is delinquent to a small percentage of its liabilities. Further, we include as control variables the collateral value pledged by the firm to the bank as well as the firm's financial position, (i.e. the firm's z-score), and the firm's size. Finally, we use firm-bank random effects, industry fixed effects and time fixed effects to capture the unobserved firm-bank characteristics and the macro-economic and industry-specific trends that are likely to affect the bank's decision to take legal actions against the defaulted firm. Specifically, we estimate the panel data probit regression model:

$$P(LA_{ibt} = 1) = \Phi(\beta_0 + \beta_1 Group_i + \gamma FControls_{it} + \gamma FBControls_{ibt} + Time\ Effects_t + Industry\ Effects_{it} + FirmBank\ Effects_{ib} + \varepsilon_{ibt})$$

where LA_{ibt} is a dummy variable that takes the value of one if bank *b* has taken legal action against the firm *i*, at time *t* and zero otherwise and the error term ε_{ibt} is clustered at the firm-bank level.

The effect of affiliation on the probability of the bank taking legal actions in Table 7 column (1) is negative and statistically significant at the 1% level. The estimated marginal effect suggests that affiliation reduces the probability of legal action by 13.91 percentage points, compared to stand-alone firms. Furthermore, the results in Table 7 column (2) show that the effect of affiliation on the probability of the bank taking legal action against the defaulted firm is statistically significant for firms belonging to a group with a strong relationship with the bank. In contrast, the results in Table 7 column (3) show that the effect of affiliation on the probability of the bank taking legal action against the firm is not statistically significant for firms belonging to a group with a weak relationship with the bank.

We conclude with the quasi-experiment analysis where we examine the difference in legal actions between the affiliated and unaffiliated firms before and after the credit contraction in order to remove the bias of any permanent differences in banks forbearance between those two firm types. Specifically, we test if the difference in the

likelihood of legal actions between defaulted affiliated and unaffiliated firms has changed after the outset of the crisis by estimating the panel data probit regression model:

$$P(LA_{ibt} = 1) = \Phi(\beta_0 + \beta_1 Group_i + \beta_2 Shock + \beta_3 Group_i \times Shock + \gamma Controls_{it} + Time\ Effects_t + Industry\ Effects_{it} + FirmBank\ Effects_{ib} + \varepsilon_{ibt})$$

In Table 7 column (4) we find no evidence that during the credit contraction, banks were more likely to show forbearance to defaulted affiliated firms compared to defaulted unaffiliated firms. Nevertheless, the results in Table 7 column (5) show that banks were less likely to take legal actions against defaulted firms belonging to a group with a strong relationship with the bank compared to defaulted unaffiliated firms. In contrast, the results in Table 7 column (6) show that during credit contraction, banks were equally likely to take legal actions against defaulted firms belonging to a group with a weak relationship with the bank and against defaulted unaffiliated firms. Thus, we conclude that, despite the limited liability property of affiliated firms, banks are likely to avoid taking legal action against defaulted firms that belong to a group compared to a standalone firms, assuming their relationship with the group is strong enough to allow the bank to derive future benefits from it. In contrast, there is no evidence of forbearance to firms affiliated to groups with a weak relationship with the bank.

[Insert Table 7 About Here]

9 Matching analysis

An alternative interpretation of our findings is that this difference in default risk is the outcome of the ex-ante quality differentiation between group-affiliated and stand-alone firms, which would suggest a “selection” effect. If the selection effect is true, then affiliated firms cope better with financial distress not because they receive support from their group affiliates, but because they are intrinsically better firms and they have been “selected” to be members of the group. To reduce the “selection” effect in the analysis so far, we have controlled for firms’ observable characteristics such as financial

condition (z-score), size and age. In addition, we have employed random effects at the firm-bank level to capture any time invariant unobservable characteristic of the firm's debt to the bank. Furthermore, we run a quasi-experiment using the exogenous shock to Greek lenders to examine if we observe a significant differentiation in the affiliated and unaffiliated firms risk profile before and after the credit shock. By looking at the time difference of the credit expansion and contraction difference, the quasi-experiment analysis removes any potential biases in the second period comparison between the affiliated and unaffiliated firms that could be the result of permanent differences between those two firm types.

Still, a point of criticism is that there is no random assignment of firms to affiliated and unaffiliated firms in the quasi-experiment, leaving some concerns about confounding bias. We provide further evidence about the internal validity of our findings by applying a matched case-control study. In a matched case-control study, the affiliated firm is matched with one or more unaffiliated firms, known as the controls. With observational data, nearest-neighbor matching imputes the missing potential outcome for the affiliated (unaffiliated) firm by using an average of the outcomes of similar affiliated (unaffiliated) firms. Similarity between subjects is based on a weighted function of the covariates for each observation. In our example, similarity is measured by the Mahalanobis distance where the weights are derived from the inverse of the covariates' variance–covariance matrix. Because nearest-neighbor matching estimators are not consistent when matching on two or more continuous covariates (Abadie and Imbens 2006), a linear function of the specified covariates is used to correct for a large-sample bias. The reported bias-corrected estimator is consistent.

In Table 8 column (1) we present the results of the matched case-control analysis of loan default risk. Every affiliated firm is matched to an unaffiliated firm from the same industry at the same year with similar size, financial solvency (z-score), age, relationship with the bank and collateral. We observe no difference in loan default risk between affiliated and unaffiliated firms during credit expansion since the effect is statistically

not significant. However, we find evidence at the 5% significance level of a difference in loan default risk between affiliated and unaffiliated firms during the period of credit contraction. In particular, the default rate of affiliated firm is 1.2 percentage points lower than the matched unaffiliated firms, ceteris paribus.

Table 8 column (2) displays the results of the matched case-control analysis of financing. Every affiliated firm is matched with an unaffiliated firm from the same industry, at the same year with similar size, financial solvency (z-score), age, number of banks and capital expenditure. While we observe no significant effect on debt flow during credit expansion, there is a significant positive effect on debt flow during credit contraction. In particular, the debt flow of an affiliated firm is 16.2% higher than the debt flow of the matched unaffiliated firms, ceteris paribus.

We continue with the results of the matched case-control analysis of bank's credit evaluation. Affiliated and unaffiliated firms from the same year and industry are matched by size, financial solvency (z-score), age, number of banks and capital expenditure. In Table 8 column (3), we find evidence of a significant effect group affiliation on credit evaluation produced by the bank during both the credit expansion and contraction periods.

Finally, in Table 8 column (4) we examine the effect of affiliation on legal action. We match affiliated and unaffiliated defaulted firms from the same year and industry and similar size, financial insolvency (z-score), percentage of non-performing loans to total bank loans and collateral. Strangely, group affiliation has a significant positive effect on the likelihood of legal action during credit expansion. In particular, we find that during credit expansion the affiliated firm has 21.6 percentage points higher probability of legal action. In contrast, during credit contraction the number of legal actions has increased significantly. For this period, we find evidence at the 5% significance level of a difference in the probability of legal action between affiliated and unaffiliated firms. In particular, we observe that during credit contraction an affiliated firm has 8.0 percentage points lower probability of legal action.

[Insert Table 8 About Here]

10 Concluding remarks

In this paper, we examine the impact of affiliation to a group on the firm's ability to service its financial obligations during a period of limited external financing. In particular, using a loan data set of Greek firms and the Greek sovereign debt crisis as an exogenous shock to credit flows to businesses, we show that group membership offered financial relief to the firms and helped them to stay solvent. Our findings show that financial support was offered primarily from groups with a stronger financial position.

Lenders, on the other hand, acknowledge the benefits of group affiliation in several ways. The bank's relationship with the group helps banks to acquire private information about the prospects of the affiliated firms, hence reduce the information asymmetry. This includes information about explicit or implicit support that affiliated firms receive from the group. Consequently, we find that banks assign a higher credit evaluation to affiliated firms compared to their unaffiliated peers. Finally, banks are more likely to avoid taking any legal action against the defaulted firms that belong to a group. One possible explanation of this result is that forbearance from taking legal action enables the bank to delay additional loan charge-offs and loss provisions and to avoid any negative spillovers to their business with the other solvent group affiliated firms.

Our findings are important to the banks, as our results show how internal credit risk evaluation may reflect the economic effects of group membership. In particular, if group membership reduces default risk, then banks are justified to consider this information when they calculate credit risk. However, this co-insurance effect is dependent on the group's overall financial position. Hence, in their evaluations of affiliated firms, banks are advised to consider the credit profile of the entire group. More importantly, maintaining a strong relationship with the group is an important

condition for the bank to derive important information about its borrowers and to ensure any future benefits from this relationship.

Finally, our findings are of interest to the supervisory authorities. In particular, our results have two policy implications. First, we provide strong evidence in support of the adoption of the "single risk" approach by the regulatory guidelines on connected clients. Based on our conclusion that delinquency risk of an affiliated firm is dependent on the group's overall delinquency risk, banks are advised to treat firms belonging to a group as one economic unit and evaluate the overall risk exposure to the group. Second, we find that banks show forbearance to delinquent firms which belong to a group with a strong relationship with the bank. Consequently, supervisory authorities need to be vigilant for imprudent bank forbearance. Any differential treatment of defaulted firms must be based on evidence. Otherwise, banks' forbearance may jeopardize the stability of the banking system by fostering a strategic default behavior of affiliated firms if they know that their group membership protects them from legal consequences in case of default. The latter is an important observation especially because the loans to affiliated firms tend to have lower level of collateralization, which implies a stronger incentive to strategic default.

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Table 1. Firm-bank (loan) data descriptive statistics. The top panel includes data for group affiliated firms, the bottom panel includes data for unaffiliated firms. The left column contains data for credit expansion period, the right column contains data for the credit contraction period. Definitions of variables: Bank loan is the bank's reported total loan exposure to the firm (€ mil), NPL is the bank's reported non-performing loan of the firm (% total loan exposure to the bank), Collateral is the bank's reported collateral from the firm (% total loan exposure to the bank), Firm-bank relationship is the firm's total loans exposure to the bank (% firm's total loans), Firm's banks is the number of banks with loans to the firm, Firm's credit evaluation is the credit score assigned by the bank to the borrower with the lower score of 1 representing the lowest credit risk and the highest score of 7 representing the highest credit risk, Group bank loan is the bank's reported total loan exposure to group (€ mil), Group NPL is the bank's reported non-performing loan of the group (% total loan exposure to the bank), Group-bank relationship is the group's total loans exposure to the bank (% group's total loans) Group's bank is the number of banks with loans to the group.

Group affiliated firms-banks	Credit expansion (N=9,920)				Credit contraction (N=12,756)			
Loan default rate	2.09%				12.66%			
	mean	st.dev	p1	p99	mean	st.dev	p1	p99
Bank loan	8.624	36.69	0.002	82.50	9.986	31.66	0.001	98.24
NPL	0.006	0.061	0	0.201	0.045	0.161	0	1
Collateral	0.762	19.850	0	2.540	1.105	55.014	0	2.354
Firm-bank relationship	0.333	0.321	0.001	1	0.387	0.335	0.001	1
Firm's banks	4.797	2.800	1	13	3.888	2.263	1	11
Firm's credit evaluation	3.146	1.160	1	6	4.003	1.545	1	7
Group bank loan	20.355	53.494	0.009	239.053	31.210	67.576	0.006	320.643
Group bank NPL	0.02	0.14	0	1	0.13	0.32	0	1
Group-bank relationship	0.243	0.238	0.001	1	0.290	0.252	0.002	1
Group's banks	6.292	3.016	1	13	5.105	2.612	1	13

Unaffiliated firms-banks	Credit expansion (N=24,371)				Credit contraction (N=21,609)			
Loan default rate	2.92%				15.54%			
	mean	st.dev	p1	p99	mean	st.dev	p1	p99
Bank loan	3.102	10.30	0.003	26.60	3.341	8.66	0.001	28.91
NPL	0.014	0.104	0	0.722	0.098	0.271	0	1.000
Collateral	1.096	36.853	0	3.890	1.470	26.345	0	4.447
Firm-bank relationship	0.516	0.375	0.004	1	0.607	0.372	0.009	1
Firm's banks	3.075	2.174	1	10	2.424	1.694	1	8
Firm's credit evaluation	3.299	1.223	1	6	4.152	1.545	1	7

Table 2. Firm data descriptive statistics. The top panel includes data for group affiliated firms, the bottom panel includes data for unaffiliated firms. The left column contains data for credit expansion period, the right column data for credit contraction period. Definitions of variables: Total assets (€ mil), LT Debt is the reported Long Term Debt (% of Total Assets), Working Capital is the difference of current assets and current liabilities (% of Total Assets), Ret. Earnings is the reported retained earnings (% of Total Assets), EBIT is the reported Earnings before interest & tax (% of Total Assets), Book Equity is the reported Shareholder equity (% of Liabilities), z-score is calculated using modified Altman z-score for emerging markets (see section xxx), age is the difference of the founded year from the reporting year, Group total assets is the consolidated total assets (€ mil), Group z-score is calculated using modified Altman z-score for emerging markets (see section xxx), Group firms is the number of firms belonging to group.

Group affiliated firms	Credit expansion (N=3,308)				Credit contraction (N=4,949)			
	mean	st.dev	p1	p99	mean	st.dev	p1	p99
Total assets	119.0	721	1	1210	125.0	680.0	0.4	1540
LT Debt	0.195	0.206	0.000	0.885	0.186	0.215	0.000	0.843
Working Capital	0.025	0.478	-1.142	0.661	-0.164	2.356	-2.848	0.665
Ret. Earnings	-0.112	0.651	-2.254	0.396	-0.470	4.560	-5.792	0.488
Ebit	0.010	0.168	-0.490	0.262	-0.015	0.222	-0.691	0.252
Book Equity	0.768	1.389	-0.444	6.107	0.889	3.370	-0.734	7.641
z-score	3.923	5.931	-12.122	12.958	1.476	30.663	-37.694	14.462
Fixed Assets	0.470	0.287	0.004	0.987	0.505	0.288	0.002	0.989
Age	19.20	14.40	1	75	23.97	16.58	3	86
Group total assets	1000	2230	9	10300	940	1980	10	8030
Group z-score	8.478	44.622	-6.702	145.72	4.024	24.427	-31.53	13.78
Group firms	5.697	9.606	1	48	6.396	10.225	1	49

Unaffiliated firms	Credit expansion (N=12,582)				Credit contraction (N=13,118)			
	mean	St st dev	p1	p99	mean	st.dev	p1	p99
Total assets	17.2	136	0	124	16.5	135.0	0.4	110
LT Debt	0.211	0.584	0.000	0.993	0.234	0.384	0.000	1.161
Working Capital	0.083	0.348	-0.824	0.776	-0.216	18.142	-1.110	0.765
Ret. Earnings	-0.107	1.004	-1.578	0.321	-0.660	31.070	-2.651	0.439
EBIT	0.023	0.148	-0.347	0.283	-0.164	19.595	-0.419	0.260
Book Equity	0.785	3.108	-0.317	6.724	2.411	154.374	-0.504	10.030
z-score	4.427	6.066	-7.378	13.517	1.109	367.026	-14.456	16.588
Fixed Assets	0.399	0.299	0.002	0.987	0.443	0.304	0.002	0.991
Age	14.65	11.04	1	51	19.26	13.12	2	67

Table 3. Firm's industrial sectors. Initially, firms are classified into industries at a level equivalent to the four-digit standard industrial classification (SIC) and then we use the Bank of Greece classification groups.

Sector	Obs	%
Agriculture	600	1.77
Energy	1,024	3.02
Manufacturing	8,652	25.48
Construction	4,112	12.11
Commerce	9,283	27.34
Shipping (incl. coastal)	147	0.43
Transportation	878	2.59
Hotels	3,225	9.5
Food services	417	1.23
Telecommunication & IT	1,336	3.93
Real estate	1,646	4.85
Health services	608	1.79
Other	2,029	5.98
Total	33,957	

Table 4. Group affiliation and default risk. Tests (1)-(3) of loan default risk during credit contraction. (1) All affiliated firms: group affiliated firms have a lower loan default risk compared to unaffiliated firms. (2) Firms affiliated to financially distressed groups: firms affiliated to groups with z-score below the distress threshold have a higher loan default risk compared to unaffiliated firms. (3) Firms affiliated to financially strong groups: firms affiliated to groups with z-score above the distress threshold have a lower loan default risk compared to unaffiliated firms. Tests (4)-(6) of loan default risk using an exogenous shock to credit supply. (4) All affiliated firms: group affiliated firms have a lower loan default risk compared to unaffiliated firms and this effect becomes stronger during credit contraction. (5) Firms affiliated to financially distressed groups: there is no difference on loan default risk between firms affiliated to groups with z-score below the distress threshold and unaffiliated firms. (6) Firms affiliated to financially strong groups: firms affiliated to groups with z-score above the distress threshold have a lower loan default risk compared to unaffiliated firms and this effect becomes stronger during credit contraction. All models are probit panel regressions. Robust, clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

	(1) Default	(2) Default	(3) Default	(4) Default	(5) Default	(6) Default
Group	-0.463***	0.364***	-0.623***	-0.346***	0.336**	-0.462***
	(0.0614)	(0.107)	(0.0684)	(0.0893)	(0.148)	(0.106)
Credit shock				2.633***	2.745***	2.727***
				(0.0934)	(0.106)	(0.101)
Group *Credit shock				-0.249***	-0.235	-0.303***
				(0.0872)	(0.161)	(0.104)
Firm z-score	-0.152***	-0.132***	-0.159***	-0.151***	-0.134***	-0.159***
	(0.00621)	(0.00714)	(0.00703)	(0.00554)	(0.00621)	(0.00627)
Firm age	-0.000481	0.00127	-0.000739	-0.000431	0.000986	-0.000552
	(0.00161)	(0.00199)	(0.00173)	(0.00145)	(0.00176)	(0.00157)
Firm size	-0.0427**	-0.0320	-0.0702***	-0.0146	0.00586	-0.0486**
	(0.0204)	(0.0250)	(0.0222)	(0.0185)	(0.0221)	(0.0197)
Firm-Bank relationship	0.0214	0.142*	0.0679	-0.0211	0.0783	-0.0302
	(0.0747)	(0.0863)	(0.0787)	(0.0667)	(0.0754)	(0.0700)
Loan collateral	-0.0872**	-0.119***	-0.107**	-0.0354	-0.0466	-0.0572*
	(0.0391)	(0.0440)	(0.0419)	(0.0323)	(0.0357)	(0.0347)
Constant	-1.339***	-1.663***	-0.943**	-3.280***	-3.687***	-2.834***
	(0.381)	(0.477)	(0.410)	(0.350)	(0.426)	(0.371)
Firm-bank effects	yes	Yes	yes	yes	yes	yes
Industry effects	yes	Yes	yes	yes	yes	yes
Year effects	yes	Yes	yes	yes	yes	yes
Observations	34,363	23,923	32,047	68,654	49,669	64,963
Number of Firm-banks	13,101	9,866	12,551	18,733	14,953	18,417

Table 5. Group affiliation and internal financing. Tests (1)-(3) of internal capital market during credit contraction. (1) All affiliated firms: affiliated firms have a higher debt flow compared to unaffiliated firms. (2) Firms affiliated to financially distressed groups: there is no difference in debt flow between firms affiliated to groups with z-score below the distress threshold and unaffiliated firms. (3) Firms affiliated to financially strong groups: firms affiliated to groups with z-score above the distress threshold have a higher debt flow compared to unaffiliated firms. Tests (4)-(6) of internal capital market using an exogenous shock to credit supply. (4) All affiliated firms: group affiliated firms have a higher debt flow than unaffiliated firms during credit contraction compared to credit expansion period. (5) Firms affiliated to financially distressed groups: there is no difference in debt flow between firms affiliated to groups with z-score below the distress threshold and unaffiliated firms during credit contraction compared to credit expansion period. (6) Firms affiliated to financially strong groups: firms affiliated to groups with z-score above the distress have a higher debt flow than unaffiliated firms during credit contraction compared to credit expansion period. Test (7) of intra-group loans for firms affiliated groups only during credit contraction. (7) Affiliated firms in financial distress (with z-score below the distress threshold) have a higher intra-group loans flow. All models are GLS panel regressions. Robust, clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	%Δ LTDebt	%Δ LTDebt	%Δ LTDebt	%Δ LTDebt	%Δ LTDebt	%Δ LTDebt	Δ Intra-Loans
Group affiliation	0.124***	0.000949	0.136***	-0.0191	-0.00554	-0.0236	
	(0.0435)	(0.0928)	(0.0472)	(0.0552)	(0.139)	(0.0594)	
Credit shock				0.0933	0.0702	0.128*	
				(0.0641)	(0.0703)	(0.0677)	
Group *Credit shock				0.150**	-0.0319	0.179***	
				(0.0633)	(0.163)	(0.0683)	
Firm leverage							
Firm z-score	0.00127	-0.00193	-0.00444	0.000293	-0.00361	-0.00445	-0.0381**
	(0.00424)	(0.00492)	(0.00486)	(0.00392)	(0.00459)	(0.00445)	(0.0185)
Firm age	0.00210	0.00260	0.00208	0.00199	0.00143	0.00216	-0.00350
	(0.00154)	(0.00190)	(0.00162)	(0.00140)	(0.00161)	(0.00146)	(0.00481)
Firm size	0.0780***	0.0649***	0.0879***	0.0744***	0.0688***	0.0823***	0.0371
	(0.0163)	(0.0170)	(0.0178)	(0.0141)	(0.0150)	(0.0151)	(0.101)
No of banks	-0.0100	-0.0117	-0.0137	-0.0156	-0.0117	-0.0147	0.0221
	(0.0129)	(0.0148)	(0.0136)	(0.00964)	(0.0117)	(0.0104)	(0.0430)
%ΔCapEx	0.589***	0.408***	0.588***	0.618***	0.496***	0.592***	0.353
	(0.0829)	(0.0824)	(0.0848)	(0.0631)	(0.0668)	(0.0632)	(0.301)
Constant	-1.055***	-0.825***	-1.143***	-0.883***	-0.744***	-0.962***	-0.792
	(0.253)	(0.263)	(0.274)	(0.230)	(0.253)	(0.247)	(1.547)
Firm effects	yes	yes	yes	yes	yes	yes	yes
Industry effects	yes	yes	yes	yes	yes	yes	yes
Year effects	yes	yes	yes	yes	yes	yes	yes
Observations	12,174	9,070	11,503	19,176	14,671	18,232	1,152
Number of firms	4,099	3,313	3,955	4,894	4,087	4,799	381

Table 6. Group affiliation and bank's credit evaluation. Tests (1)-(3) of banks' view on affiliated firms during credit contraction. (1) All affiliated firms: Banks evaluate group membership positively by assigning a higher credit score to affiliated firms compared to unaffiliated firms. (2) Firms affiliated to a group with strong relationship with the bank: banks assign a higher credit score to firms affiliated with a group that have a strong relationship compared to unaffiliated firms. (3) Firms affiliated to a group with weak relationship with the bank: firms affiliated to groups with weak relationship with the bank have a lower credit score compared to unaffiliated firms. Test (4)-(6) of banks' view on affiliated firms using an exogenous shock to credit supply. (4) All affiliated firms: banks evaluate group membership more positively during credit contraction by assigning a higher credit score to affiliated firms than unaffiliated firms compared to the period of credit expansion. (5) Firms affiliated to a group with strong relationship with the bank: banks assign a higher credit score to firms affiliated with a group that have a strong relationship compared to unaffiliated firms and this effect becomes stronger during credit contraction compared to credit expansion. (6) Firms affiliated to a group with weak relationship with the bank: firms affiliated to a group with weak relationship with the bank have no different credit scores compared to unaffiliated firms during credit contraction compared to credit expansion. All models are GLS panel regressions. Robust, clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10.

	(1) Credit Evaluation	(2) Credit Evaluation	(3) Credit Evaluation	(4) Credit Evaluation	(5) Credit Evaluation	(6) Credit Evaluation
Group affiliation	-0.152***	-0.303***	0.0690*	-0.145***	-0.176***	-0.0389
	(0.0288)	(0.0328)	(0.0366)	(0.0212)	(0.0248)	(0.0279)
Credit shock				1.078***	1.038***	1.083***
				(0.0271)	(0.0287)	(0.0300)
Group affiliation*Credit shock				-0.0921***	-0.209***	-0.0226
				(0.0269)	(0.0321)	(0.0354)
Firm z-score	-0.0713***	-0.0717***	-0.0778***	-0.0775***	-0.0772***	-0.0835***
	(0.00281)	(0.00310)	(0.00303)	(0.00236)	(0.00259)	(0.00250)
Firm size	-0.0312***	-0.0112	-0.0415***	-0.0250***	-0.0117	-0.0296***
	(0.0102)	(0.0112)	(0.0119)	(0.00773)	(0.00836)	(0.00874)
Firm age	-0.00136*	-0.00156*	-0.00136	-0.000357	-0.000430	-0.000388
	(0.000732)	(0.000797)	(0.000839)	(0.000631)	(0.000683)	(0.000708)
Number of banks	-0.00784	-0.0186**	-0.0216***	-0.00578	-0.00870*	-0.0131***
	(0.00650)	(0.00762)	(0.00760)	(0.00448)	(0.00500)	(0.00507)
Loan collateral	-0.0714***	-0.0779***	-0.0907***	-0.0844***	-0.0887***	-0.0891***
	(0.0177)	(0.0186)	(0.0188)	(0.0130)	(0.0139)	(0.0137)
Constant	5.184***	4.900***	5.380***	4.129***	3.950***	4.247***
	(0.172)	(0.192)	(0.197)	(0.131)	(0.144)	(0.147)
Firm-bank effects	yes	Yes	yes	yes	yes	yes
Industry effects	yes	Yes	yes	yes	yes	yes
Year effects	yes	Yes	yes	yes	yes	yes
Observations	31,255	26,006	24,699	62,047	52,620	50,587
Number of Firm-banks	11,849	10,353	10,319	16,746	15,079	15,170

Table 7. Group affiliation and bank forbearance. Tests (1)-(3) of banks' actions against defaulted affiliated firms during credit contraction. (1) All defaulted affiliated firms: banks are less likely to take legal actions against defaulted affiliated firms compared to unaffiliated defaulted firms. (2) Defaulted firms affiliated to groups with strong relationship with the bank: banks are less likely to take legal actions against defaulted firms that belong to groups with strong relationship with the bank compared to unaffiliated defaulted firms. (3) Defaulted firms affiliated to groups with weak relationship with the bank: banks are equally likely to take legal actions against defaulted firms that belong to groups with weak relationship with the bank compared to unaffiliated defaulted firms. Tests (4)-(6) of banks' actions against defaulted affiliated firms using an exogenous shock to credit supply. (4) All defaulted affiliated firms: banks are equally likely to take legal actions against defaulted affiliated firms than unaffiliated defaulted firms during credit contraction compared to credit expansion. (5) Defaulted firms affiliated to groups with strong relationship with the bank: banks are less likely to take legal actions against defaulted firms that belong to groups with strong relationship with the bank than against unaffiliated defaulted firms during credit contraction compared to credit expansion period. (6) Defaulted firms affiliated to groups with weak relationship with the bank: banks are equally likely to take legal actions against defaulted firms that belong to groups with weak relationship with the bank than against unaffiliated defaulted firms during credit contraction compared to credit expansion period. All models are probit panel regressions. Robust, clustered standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10

VARIABLES	(1) Legal action	(2) Legal action	(3) Legal action	(4) Legal action	(5) Legal action	(6) Legal action
Group affiliation	-1.771***	-1.450**	-3.227	-0.748	0.583	-5.240
	(0.587)	(0.633)	(2.664)	(0.783)	(0.743)	(7.300)
Credit shock				9.579***	9.099***	15.11
				(1.746)	(1.312)	(15.56)
Group affiliation*Credit shock				-1.157	-2.501***	1.276
				(0.743)	(0.755)	(3.614)
Firm z-score	-0.224***	-0.171***	-0.444	-0.256***	-0.226***	-0.424
	(0.0603)	(0.0625)	(0.379)	(0.0555)	(0.0498)	(0.457)
Firm size	0.462**	0.486**	0.674	0.540***	0.516***	1.002
	(0.191)	(0.214)	(0.553)	(0.176)	(0.157)	(1.104)
Firm npl	2.139***	1.467**	1.632	2.195***	1.367***	1.923
	(0.711)	(0.683)	(1.393)	(0.629)	(0.487)	(2.200)
Loan collateral	-0.444	-0.137	-0.416	-0.404	-0.264	-0.899
	(0.346)	(0.346)	(0.534)	(0.295)	(0.275)	(1.116)
Constant	-12.85***	-10.01**	-11.02	-17.26***	-12.99***	-22.76
	(4.191)	(3.914)	(8.832)	(4.218)	(2.967)	(24.45)
Firm-bank effects	yes	Yes	yes	yes	yes	yes
Year effects	yes	Yes	yes	yes	yes	yes
Observations	1,901	1,645	1,594	2,422	2,122	2,063

Number of Firm-banks	1,112	976	969	1,373	1,227	1,216

Table 8. Robustness Tests. Treatment effects from observational data by nearest-neighbor matching imputes the missing potential outcome for affiliated (unaffiliated) firms by using an average of the outcomes of similar affiliated (unaffiliated) firms. Similarity between subjects is based on a weighted function of the covariates for each observation. Similarity is measured by Mahalanobis distance, in which the weights are based on the inverse of the covariates' variance–covariance matrix. Because nearest-neighbor matching estimators are not consistent when matching on two or more continuous covariates (Abadie and Imbens 2006), a linear function of the specified covariates is used to correct for a large-sample bias. The reported bias-corrected estimator is consistent. (1) **Group affiliation and loan default risk.** Affiliated and unaffiliated firms from the same year and industry matched by size, financial solvency (z-score), age, firm-bank relationship and collateral. No effect on loan default risk by group affiliation during credit expansion. Group affiliation has a significant negative effect on loan default risk during credit contraction. (2) **Group affiliation and financing**. Affiliated and unaffiliated firms from the same year and industry matched by size, financial solvency (z-score), age, number of banks and capital expenditure. No effect on long-term debt flow by group affiliation during credit expansion. Group affiliation has a significant positive effect on long-term debt flow during credit contraction. (3) **Group affiliation and bank's credit evaluation**. Affiliated and unaffiliated firms from the same year and industry matched by size, financial solvency (z-score), age, number of banks and capital expenditure. Group affiliation has a significant positive effect on credit evaluation (lower risk) during both the credit expansion and contraction periods. (4) **Group affiliation and legal action**. Affiliated and unaffiliated defaulted firms from the same year and industry matched by size, financial insolvency (z-score), the percentage of non-performing loans to total bank loans and collateral. Group affiliation has a significant positive effect on likelihood of legal action during credit expansion. Group affiliation has a significant negative effect on likelihood of legal action during credit contraction. Robust standard errors in parentheses. *** p<0.01, ** p<0.05, * p<0.10

	(1) Default		(2) %Δ LTDebt	
	Credit Expansion	Credit Contraction	Credit Expansion	Credit Contraction
Average treatment effect (Affiliated vs Non Affiliated)	-0.004	-0.012**	0.073	0.162***
Std.Error	(0.003)	(0.006)	(0.067)	(0.053)
z-value	-1.36	-2.06	1.09	3.05
p-value	0.173	0.039	0.275	0.002

	(3) Credit Evaluation		(4) Legal Action	
	Credit	Credit	Credit	Credit

	Expansion	Contraction	Expansion	Contraction
Average treatment effect (Affiliated vs Non Affiliated)	-0.116***	-0.079**	0.216**	-0.080**
Std.Error	(0.023)	(0.031)	(0.107)	(0.037)
z-value	-5.01	-2.51	2.03	-2.17
p-value	0.000	0.012	0.043	0.030

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