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THE UNLOVED STEPCHILD: WHY SOME FIRMS ARE ALLOWED TO DIE IN A BUSINESS GROUP

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The Unloved Stepchild:
Why Some Firms Are Allowed to Die in a Business Group

by

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Abstract

This study examines the nature of financial distress for firms within business groups across twenty-five European countries during 2000–2018. We show that business-group membership affects both the likelihood and resolution of financial distress. Whether tunneling or propping of a particular firm occurs depends on the group structure as well as the importance and value of the firm to the group. Our findings show how a firm's importance within a business group helps to explain how financial distress is resolved. We also observe the long-lasting effects of national legal regimes on how financial distress is resolved within a business group.

Keywords: bankruptcy, financial distress, business groups, ownership, legal origin
JEL Codes: G33, C23, G32

The Unloved Stepchild:

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1. Introduction

The literature on financial distress typically analyzes factors such as asset tangibility, debt quality, covenant design, contract enforcement, industry characteristics, or the macroeconomic environment. Further, these studies often focus on the immediate effects of financial distress and examine issues including bankruptcy and liquidation (Bellovary et al., 2007; Hillegeist et al., 2004; Hotchkiss et al., 2008; Li and Faff, 2019; Senbet and Wang, 2010). Fewer studies examine the longer-term response, which involves reorganization and corporate restructuring, allowing a return to profitable operations (Altman, 1968; Antill and Grenadier, 2019; Garrido et al., 2021).

While investigating both the short- and long-term responses to the financial crisis, this study introduces a previously unexamined factor to the analysis of financial distress: business-group membership. We examine how a firm's contribution to group value affects the decision to allow some members to be liquidated while others are reorganized. Indeed, a firm's value to the group affects whether it is even allowed to become distressed. Group members who are loved are not permitted to fail.

This study offers new insights into the propping and tunneling decisions made by higher-level units within a group. A distressed firm typically has access to group resources, which can be used to offset losses, provide liquidity, or support further capital investment. Member firms can be financially propped up by others in the group, thus avoiding distress or bankruptcy. As group

members, these firms can share in the group's brand and marketing activities as well as obtain access to critical industry or competitor intelligence. These privileges also contribute to making financial distress less likely for a member firm.

For firms that are viewed as important to the group, the ultimate owners can strategically transfer profits and liabilities across the group to ensure their survival (Desai and Dharmapala, 2009; Jara et al., 2019). These actions often occur at the expense of other firms within the group. Thus, the financial distress of one firm can be alleviated by tunneling assets from other group members. Such actions effectively transfer financial distress from a firm that is critical to group value to one that is less so.

Using mathematical graph theory insights, we identify which firms are less central to group operations. These firms are more likely to become distressed and allowed to liquidate. Our empirical findings are consistent with this kind of behavior within a business group. Firms that are more likely to contribute to group value will experience financial distress less frequently. They are also more commonly propped when circumstances require, and only rarely liquidated.

Because our analysis of business groups spans twenty-five different countries, our study necessarily introduces a multiplicity of legal environments in which financial distress occurs. In spite of efforts at standardization in the legal codes of our sample countries (McBryde et al., 2005; McBryde, 2004), there are reasons to believe that differences in country legal origin can affect our findings (Djankov et al. (2008). For instance, it might be that differences in the quality of shareholder and creditor protections across regimes influences the decisions about reorganization and liquidation. Or it might be that the quality of contract enforcement in the court system affects the usefulness of the bankruptcy process. Differences in legal regime can also determine the kinds of corporate disclosures and information releases that are provided to those involved in the financial distress process.

Given the potential effect of a country's legal regime on the financial distress process, we introduce a set of variables that control for the different origins of the relevant bankruptcy law (Djankov et al., 2008; Johnson et al., 2000; La Porta et al., 1999). We find that there is variation across legal regimes in the relationship between group membership and the likelihood of financial distress. Except for Nordic countries, we find that group membership has a strong negative effect on the likelihood of reorganization. This result is consistent with the premise that when a business-group member defaults, management makes a conscious choice to allow that to occur and is unlikely to pursue reorganization. Instead, liquidation or acquisition are the more likely outcomes for these firms. These results are consistent with risk-shifting and group-value optimization behaviors by the business-group's management. That is, the ultimate owners do not focus on maximizing the distressed firm's value but rather the group's aggregate value.

This study is organized into nine sections. Section 2 discusses the propping and tunneling effects that can occur within a business group. Section 3 presents our three sets of hypotheses regarding default, resolution, and the firm's importance to the group. Section 4 presents our data and sample construction. Section 5 explains our methodology and controls for possible endogeneity, while Section 6 provides an initial comparative analysis between stand-alone and business-group firms. Section 7 reports our major empirical findings regarding financial distress, business-group membership, and legal origin. Section 8 provides our results regarding how business group design and firm importance affect the financial distress process. We conclude in Section 9 with a summary of our results and a commentary on their importance for future research in the areas of business strategy and corporate finance. We provide full model specifications and details of various robustness tests in the Internet Appendix.

2. Propping, Tunneling, and Firm Importance within a Business Group

The literature discusses two different effects related to financial distress within a business group. One such effect, tunneling, can be seen as a possible cause of financial distress within the business group. The other effect, propping, is a response to financial distress and involves the extent to which the business group decides to rescue the distressed firm.

Tunneling occurs when resources are transferred from a lower- to a higher-level firm within the business group. For example, Colli and Colpan (2016) describe how a business group structure allows the ultimate owner to maintain control over the organization through profit shifting, transfer pricing, and limited liability. Examples of tunneling transactions include internal asset sales, advantageous transfer pricing arrangements, and even the outright cash expropriation of wealth from minority shareholders of lower-level firms. Consequently, the withdrawal of corporate assets from tunneling activities makes these firms vulnerable to financial distress.

Propping occurs when higher-level firms transfer resources to lower-level members and thus provide them with protection against bankruptcy or liquidation (Riyanto and Toolsema, 2008). While propping (supporting less efficient members) can be seen as an inefficient feature of the business group, we expect that it is selective. We argue that propping is more likely to occur when the firm is essential to the structural integrity of the business group, such as controlling multiple subsidiaries or providing critical services or inputs. In such a case, the ultimate owners are more likely to prop the firm against bankruptcy by providing additional resources. If the firm is not central to the group's operations, the ultimate owner has less financial incentive to provide support. We argue that firm importance is critical to the owners' decision of whether to prop or tunnel a given firm within the business group. We illustrate this discussion in Figure 1, where we show how tunneling and propping decisions influence a firm's journey through financial distress.

The importance of the firm's value to the business group in explaining the resolution of financial distress has been implied but not tested in previous studies. Riyanto and Toolsema (2008) find that both propping and tunneling effects must be present to explain the existence of business groups. Paligorova and Xu (2012) analyze the use of leverage in business group firms compared to stand-alone firms. They find that firms that are less important and more distant from the ultimate owners have higher leverage, making them more vulnerable to financial distress. They conclude that leverage and default risk depend on the firm's importance and location within the business group. Similarly, Buchuk et al. (2014) studied intra-group loans in Chile and found both lenders and borrowers within the group. Their findings suggest that propping is not uniformly provided to member firms but depends on the firm's importance to the group. Our study is the first to establish a link between a firm's importance to the business group and the resolution of its financial distress.

3. Hypothesis Development

3.1 Firm Default

The extent to which a firm is part of a business group is likely to affect the nature of its financial distress. Stand-alone firms might experience distress and bankruptcy differently than business-group members. Researchers including Almeida and Wolfenzon (2006a) and Almeida et al. (2011) contend that a group member's access to resources loosens financial constraints and allows for growth-oriented investment. Indeed, the extent to which the ultimate owners elect to provide financial propping to a firm reduces the likelihood of it experiencing financial distress.

The existing literature reports abundant evidence of propping activity within a business group. Khanna and Yafeh (2005) find that business groups facilitate mutual assurance among affiliated firms and shared risk-taking among Japanese, Korean, and Thai groups. Morck (2005), Morck et al. (2005b), Belenzon et al. (2013), and Colli and Colpan (2016) describe the existence

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of capital markets internal to business groups that provide funding under favorable terms to member firms. These internal capital markets permit more aggressive expenditures in areas such as M&A, capital expenditures, and R&D by member firms. Such behavior is implied by (Larrain et al., 2019), who find that firms reduce their leverage and capital expenditures after exiting a business group.

However, we contend that this propping will only occur for firms considered to be valuable or essential to the business-group's operations. Their ability to generate value for the group will justify propping if they should experience financial distress. Consequently, we offer the following hypothesis:

> H1A: *More important business-group members are less likely to default than similar stand-alone firms.*

But not all firms are equally important to the business group. Some firms might be located at the operational periphery of the group, own no lower-level firms, or be acquired simply to off-load group risk. These firms are less likely to be propped upon becoming distressed. Indeed, asset expropriation through tunneling might occur, making them even more likely to fail. Therefore, we offer a companion hypothesis:

> H1B: *Less important business-group members are more likely to default than similar stand-alone firms.*

3.2 Post-Default Outcomes

Because of the substantial resources present within a business group and the ability of the ultimate owner to redirect those resources, member firms can experience a variety of outcomes from financial distress (Almeida and Wolfenzon, 2006b; Bebchuk et al., 2000; Bertrand et al., 2002; Morck et al., 2005a; Wolfenzon, 1999). Resources can be channeled towards these firms to assist in their recovery or can be drained from them and accelerate their insolvency. The ultimate owner

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can decide to let a distressed firm fail or to rescue it if it is critical to the group's financial solvency. The parent company can terminate its support to a struggling subsidiary and allow it to default, taking advantage of the subsidiary's limited liability (e.g., Luciano and Nicodano (2014). Therefore, the default of a business-group firm implies that it is not crucial to the business group and can be expected to be liquidated. We offer the following hypothesis:

> H2A: *Defaulting members of a business group are more likely to be liquidated than reorganized.*

But if a business-group firm does enter reorganization, then the group's resources are available to support its recovery. Further, the group has decided not to liquidate the firm but rather give it another opportunity for viability by allowing reorganization to proceed. We hypothesize that such reorganizations will experience a higher success rate:

> H2B: *The successful reorganization of business-group members is more likely than that of stand-alone firms.*

3.3 Firm Importance to the Group

The ultimate owner's decision to support a member firm in distress or to liquidate it depends on its value to the group. Operating synergies, cost efficiencies due to shared services, or economies of scale and scope are possible sources of a firm's value to a business group. There is little incentive for the group to provide propping to firms viewed as less important when they experience financial distress. The group's organizational structure can provide indications of which firms are seen as essential and merit propping. For instance, firms that are more remote from the ultimate owner or own no firms within the group can be seen as less important. Their exit from the group is less likely to cause operational disruption or adversely impact profitability. Consequently, we hypothesize:

> H3: *Business-group firms that are more remote from the ultimate owner or own no other firms are more likely to be liquidated.*

4. Data and Sample Construction

4.1 Data

The Amadeus Database maintained by Bureau van Dijk/Moody's is our source for identifying the legal stages of financial distress and bankruptcy, determining the composition of the business group, and providing the necessary financial and accounting variables. The database is sufficiently lengthy in that it spans various macroeconomic conditions, business environments, and regulatory regimes.

The Amadeus dataset also contains essential legal and ownership data. For instance, it reports the firm's legal status (and date), which captures its stage in the process of financial distress. Further, it includes information on direct ownership, which we use to construct the business-group organization and to identify independent firms. The Amadeus dataset also provides firm-specific details on the firm's country of incorporation, industry membership, and the identity of the group's ultimate owner.

A characteristic of the Amadeus database is that it eliminates a firm's data after ten years, or when it becomes inactive, merges, or changes identification. Therefore, we build a database of ownership data using a series of historical queries in addition to the historical-ownership database and eleven annual versions of Amadeus. We generate a time-series of firm ownership and business-group membership from this database, along with the accompanying financial and accounting data.

Our database for this study contains more than 11.5 million observations. We eliminate firms with an unknown number of employees or those with missing ownership data. Like Klapper et al. (2006), we exclude financial services industries (i.e., NACE codes 65 and 66) because the financial ratios for these firms are incomparable to those of non-financial firms.[1] We also eliminate

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[1] We exclude financial firms from the distress analysis, but we keep them in the construction of the business group structure.

government/public entities, education, health and social sectors, private households, extra-territorial organizations, and firms that cannot be classified (i.e., NACE codes 75, 80, 85, $\geq$ 90). [2] Again, these exclusions are due to non-comparability because of specific regulations, statutes, or objectives. Firms in these industries or sectors are not comparable to the private for-profit firms that are the focus of this study.

To distinguish between stand-alone and business-group firms, we retain only firms without a change in their business-group status. We include only those firms that are either stand-alone or business-group members throughout their inclusion in the database. [3] This allows for an unambiguous classification of the firm's group membership. Deleted observations represent less than one percent of the entire sample.

Our final sample consists of firms located in twenty-five European countries over the 2000–2018 period. It contains 11,152,520 firm-year observations for 2,000,926 unique firms. About 28.8% of the sample belongs to business groups, and more than 92% of the sample consists of active/solvent firms. To complete our analysis of transition across the stages of financial distress, we use matched samples of similar firms.

4.2 Discussion of Variables and the Financial Distress Process

This section explains how we organize the data used in our analysis. We assign our variables into one of four different categories: (a) measures and indicators of financial distress, (b) ownership structure indicators and characteristics, (c) firm-level financial or accounting variables, and (d)

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[2] For NACE Rev. 2 encoding, we refer to https://ec.europa.eu/eurostat/web/nace-rev2 for details. Let us note that NACE groupings are analogous to SIC or NAIC codes in the U.S.
[3] Some of the early years in the Amadeus database may not have as detailed ownership information, and therefore some of the early stand-alone firms could later be shown to be business-group members without any factual change (M&A) in the ownership. Nevertheless, we did not correct any ownership information, and for precise identification, we excluded those firms from the analysis.

macroeconomic variables and institutional quality indices. A detailed list of variables, including their definition and sourcing, is provided in Appendix Table A.1. Basic descriptive statistics for these variables are reported in Table 1 and in the Internet Appendix.

There is no general agreement on the definition of financial distress or identifying the best early warning indicator of firm bankruptcy (Sun et al., 2014). Previous research uses credit rating information, worsening payment status codes, and various financial indicators (Altman, 2018; Bassetto and Kalatzis, 2011; Höwer, 2016; Petersen and Rajan, 1994). This study uses the legal definition of financial distress to minimize possible endogeneity, since it provides an exogenous classification of financial distress.

To determine the firm's stage in the financial distress process, we use the variable *LSTATUS*. This variable contains a textual categorization of a firm's legal status provided annually by the Amadeus database. Our analysis identifies four stages of the firm's financial distress status. Healthy firms are classified as active/solvent. Unhealthy firms can transition through three stages of financial distress: (1) default, (2) reorganization, and (3) liquidation or disposition through M&A.[4]

Figure 2 describes our sample firm's journey through the legal process associated with financial distress. The figure also identifies the table containing our empirical findings. Solvency represents the stage whereby the firm generates sufficient cash flow to make the required payments to its creditors. When the firm is unable to satisfy its creditors, a default occurs, and the firm enters the legal bankruptcy process. At this point, the firm faces a choice. Should it work under court protection to reorganize itself and seek a return to solvency, or should the firm decide to liquidate its assets and distribute the funds according to the priority rules in the national bankruptcy code? If

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[4] In our data, we omit the inactive (deferred) firms and observations with missing or unknown legal status. We keep \=08 M&A as a related status since some of them are associated with the worsening of the economic conditions and can therefore be viewed as forced M&A, as we do when analyzing the exit from financial distress. Detailed decomposition of our sample is provided in the Internet appendix.

a firm elects to reorganize, several outcomes are possible. The reorganization might be successful and the firm might return to solvency. Alternatively, the reorganization might fail leading to the firm defaulting again and re-entering the bankruptcy process (Denning et al., 2001). Another possibility is that the reorganized firm might be acquired through a merger or acquisition and thus cease existence as an independent entity.

5. Methodology

5.1 Graph Theory Descriptives

This section introduces several concepts from Graph Theory to help describe a business-group's structure and complexity. Graph Theory is a branch of discrete mathematics used to model pairwise relations between objects. It creates various mathematical tools to represent and analyze these relationships. This framework is ideal for discussing the multiple-dimensional relationships between firms within a business group. Graph theory allows us to discuss and analyze our sample firms' locational and ownership aspects within their business group.

A business group is a hierarchical structure where the connections between firms are defined using equity ownership (i.e., firm A owns firm B, etc.). This type of organization is very similar to mathematical structures called graphs (Bondy and Murty, 1976; Harary, 1969). Each business group can be seen as an individual hierarchical graph. Every firm in a business group is a "node" connected through (ownership) "links" with direction to distinguish between parent and subsidiary. The ultimate owner of the group is called the root since all ownership branches radiate from it.

We now introduce several variables that capture the design of a business group and a firm's location within that group. We begin by measuring the complexity of the business group. *BG (Business Group) Depth* is the number of organizational levels within a given business group.

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Depth measures the distance between the most remote firm and the ultimate owner and captures the group's hierarchy. Belenzon et al. (2013) note that a greater number of managerial levels implies a more complex organization. As group depth increases, the ultimate owner becomes more distant from actual operations.

Another dimension of group complexity is the distribution of firms across the group. Where is the center of gravity for the group? Is it on the top, following the subsidiary structure, in the middle, or even lower in the ownership chain? Consequently, we introduce *BG (Business Group) Breadth* as the proportion of firms in the group that own no other firm that belongs to the group. These firms are also referred to as "*end-points*" in graph theory. Note that end-point firms are candidates for being the least important units within the business group since they have no ownership in other firms and can be the easiest to discard.[5]

We also include variables that capture the firm's importance within the business group. The first is a measure of the firm's hierarchical standing within the group, *Level*. This variable refers to the managerial level (i.e., the specific depth) within the business group where the sample firm resides. *Level* is measured from top to bottom, with larger values indicating the greater distance from the ultimate owner and a lower position within the group's hierarchy.

We also construct a variable, *Relative value*, which is the ratio of the number of firms that a firm owns in an ownership chain scaled by the total number of firms in the business group. This variable serves as an additional proxy for the relative importance of the firm to the business group.

Figure 3 provides several illustrative examples of business-group design and complexity. Example (1) illustrates a pure subsidiary structure. There is only one level, with the ultimate

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[5]Note that $1/N \leq BG\ Breadth \leq 1$, where N represents the total number of the firms in the group (not counting the ultimate owner), the *BG Size*. 1/N corresponds to the situation when all firms are lined up in one ownership chain with the only endpoint on the bottom of the structure, while BG Breadth=1 represents a pure subsidiary structure with all firms located at level 1, directly connected to the ultimate owner.

owner directly controlling each of these subordinate firms. Hence the depth of this subsidiary form is one. The breadth of the group is also one since all firms are endpoints. That is, none of the subsidiary units has any subordinate units. One hundred percent of the group members are endpoints themselves.

Example (2) illustrates a group structure that is more complex than the subsidiary organizational form since it has three levels. Further, its breadth is smaller since only four of the six group firms are endpoints. Firms B and F both own other firms within the business group.

Example (3) shows an even more complex business group. It has five levels and less breadth than Example (2). Six of the eleven firms within the group are endpoints. Firms (D) and (E) are on the same level, but (D) is an end-point firm, while (E) is the control firm for a sub-group containing six other members.

5.2 Identification of the Business Group

We use direct ownership links to construct the business-group structure. Most of the algorithms used in the literature for building business groups typically begin by reconstructing all direct and indirect ownership links. They then construct the ownership chain bottom-up (Belenzon and Berkovitz, 2010) and match the names of the ultimate owners to build the business group (Belenzon et al., 2019). The Amadeus database recently provided an "independence" indicator for each firm that can be used to sort stand-alone firms and business-group members. Nevertheless, we have to construct the entire business group for the complexity measures and the firm's relative importance to the group.

We elect to use the top-down approach, starting with those individuals or firms representing the ultimate owner. It is important to note that some ownership identifiers correspond to vaguely defined (anonymous) owners, which can incorrectly identify unrelated firms with the same owners.

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Therefore, we first filter out vaguely-defined ultimate owners using successive applications of our algorithm. Because the unique identification of the top owners is central to our analysis, the top-down approach to creating our business groups is preferred. We refer the reader to the online appendices for details regarding the construction of the business groups. Finally, the Amadeus ownership database contains information about the type of owner within each business group. We aggregate ownership types into five main categories, family/individual-owned, corporate, state, institution-owned, and unknown ownership, to measure the effectiveness of the direct (closest) owner consistently with (Estrin et al., 2022).

5.3 Factors Affecting the Firm's Transition Through Financial Distress

We use logistic regressions to estimate the transition probabilities for a firm as it progresses through the various stages of financial distress. Let $P(K = k)_{it}$, and $P(K = k, L = l)_{it}$ represent the probabilities that the company's legal status is equal to category k, or that the state of financial distress changes from category k to category l, respectively.

Specification (1) considers only the additive effect of the business group on the probability of a firm being in status k.

$$P(K = k)_{it} = \alpha_0 + \beta X_{it} + \gamma(BG_{it} = 1) + \sum_{s=2}^{S} \gamma_k(OType(s) = 1)_{it} +$$
$$+ \lambda_c Macro_{ct} + PerFE + IndFE + \varepsilon_{it}, \tag{1}$$

Specification (2) introduces the sensitivity of business-group membership to firm-generated cash flow (cf):

$$P(K = k)_{it} = \alpha_0 + \beta X_{it} + \gamma(BG_{it} = 1) * cf + \sum_{s=2}^{S} \gamma_k(OType(s) = 1)_{it} + \tag{2}$$
$$+ \lambda_c Macro_{ct} + PerFE + IndFE + \varepsilon_{it},$$

A similar set of structural and control variables are used to analyze the change in legal status from state k to state l in the specification (3) below:

$$P(K = k, L = l)_{it} = \alpha_0 + \beta X_{it} + \gamma_p(BG_{it} = 1) + \sum_{s=2}^{S} \gamma_k(OType(s) = 1)_{it} +$$
$$+ \lambda_c Macro_{ct} + PerFE + IndFE + \varepsilon_{it}, \tag{3}$$

Similarly to specification (2), we introduce the sensitivity of legal-state transition to cashflow in the specification (4) below:

$$P(K = k, L = l)_{it} = \alpha_0 + \beta X_{it} + \gamma_p(BG_{it} = 1) * cf + \sum_{s=2}^{S} \gamma_k(OType(s) = 1)_{it} +$$
$$+ \lambda_c Macro_{ct} + PerFE + IndFE + \varepsilon_{it}, \tag{4}$$

As in all our model specifications, the vector X_{it} contains firm-specific control variables. We use assets and the number of employees to capture company size using variables *Ln(Total Assets)* and *Ln(Employees)*. Using the number of employees as an additional proxy for firm size might mitigate possible endogeneity bias because a significant decline in the value of total assets could be affected by a worsening of the firm's financial situation (Jones and Wang, 2019; Mramor and Valentincic, 2003).

We also include a number of additional control variables, as suggested by the literature. These include proxies for profitability (*ROA*), the structure of the company assets (*tangibility*), capital structure (*leverage*), *cash flows*, and *cash*, both scaled by total assets and *firm* age. These variables have been used as standard measures for profitability, liquidity, and solvency to capture the likelihood of bankruptcy (Almamy et al., 2016; Altman, 1968; Altman et al., 2017; Bhimani et al., 2014; Mselmi et al., 2017). We expect that the zero-leverage phenomenon might play a crucial role for privately held firms. Therefore, we include a dummy variable for zero leverage, *levgt*, (Bessler et al., 2013; Strebulaev and Yang, 2013). Cash flow is an essential factor for assessing firm profitability and sustainability. Consequently, we interact it with the business-group dummy (Almamy et al., 2016; Bao et al., 2012; Hall et al., 2014; Mulier et al., 2016).

Further, we include the standard set of country-specific macroeconomic variables to control for national legal, regulatory, and information effects. Each country offers different protection

levels to its investors and operates in a distinctive regulatory/legal infrastructure (Aminadav and Papaioannou, 2020; Bose et al., 2020; Hernández-Cánovas and Koëter-Kant, 2008). Therefore, we include various macroeconomic variables to address cross-country variation in business conditions, the quality of the national institutions (Buehler et al., 2010), and the influence of national financial conditions (Arcuri and Levratto, 2020). To control for unobserved time-invariant heterogeneity, we also use fixed effects for industry and time periods (i.e., 2000, 2005, 2008, 2010, 2013, 2016, and 2018).

5.4 Instrumenting Business-Group Membership

Previous researchers (Brouthers, 2002; Martin, 2013; Zhang et al., 2016) observe that business-group composition is not random but is often motivated by product integration, supply-chain requirements, operating performance, and global-diversification needs. Further, business-group membership might reflect organizational inertia and an inherent structural persistence. To address this issue, we limit our sample to only firms with stable business-group membership.

Several studies (Guillén, 2002; Holmes et al., 2018; Khanna and Yafeh, 2005, 2007; Mahmood and Mitchell, 2004) report that business groups from similar countries, industries, and institutional environments behave similarly. Further, they observe that business-groups' composition is affected by external factors such as market conditions, government role, corruption level, and the rule of law.

Based upon the above finding, we select a set of instruments for business-group membership to address the possibility of endogeneity in our analysis of business-group membership's effect on financial distress. Specifically, we include Governance effectiveness (*ge*), Regulatory quality (*rc*),

the Rule of law (*rl*), and Control of corruption (*cc*)[6]. Our instruments also include country and industry dummies, while the national factors interacted with a firm size measure. We elect to interact firm size with the country factors since it is likely that firms will have different experiences with their national institutions depending on their size. We measure firm size with a size quartile dummy (*rsize*). Formally, the instrumented regression has the following form:

$$P(BG = 1)_{it} = \alpha_0 + \beta rsize_{it} * CountryFE + \gamma rsize_{it} * IndustryFE + \delta_1 rsize_{it} * ge + \delta_2 rsize_{it} * rc + \delta_3 rsize_{it} * rl + \delta_4 rsize_{it} * cc + PerFE + \varepsilon_{it}, \tag{5}$$

The remaining empirical issue is the appropriate estimation technique for equations (1) through (4). Angrist (2001) showed that technical difficulties with endogenous binary variables in logit/probit models are not an issue when studying interpretable causal coefficients (i.e., marginal effects). Cragg (1971) introduces the approach of using a two-part model to choose functional forms. Therefore, a linear probability model (LPM) or logit/probit can be used interchangeably in the first and second-stage estimation. Because the *BG* variable is binary, a nonlinear first stage using probit or logit models may seem appropriate for the 2SLS estimation. In this case, researchers including Angrist (2001) and Lewbel et al. (2012) show that the second-stage estimates are inconsistent unless the first-stage conditional expectation function model is correct.

Conventional 2SLS estimates using a linear probability model (LPM), however, are consistent whether the first-stage conditional expectation function is linear or not. Moreover, if we do not include a relevant instrument, a 2SLS approach will lose efficiency, but any maximum likelihood, system, or control function estimator will generally become inconsistent (Lewbel et al., 2012). Therefore, using a linear probability model in the first stage is safer (Angrist (2001).

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[6] According to WGI construction, all indexes ranged from -2.5 to 2.5; higher means better. *Government Effectiveness (ge)* is designed to capture perceptions of the quality of civil and public services, policy formulation, and interpretation. *Regulatory Quality (rq)* should reflect (perceptions of) the ability of the government to form and implement sound policies/regulations that affect private sector development. *Rule of Law (rl)* should capture the quality of contract enforcement, property rights, and the courts. Finally, *Control of Corruption (cc)* is constructed primarily to summarize (perceptions of) the extent of state corruption by elites and private interests.

Moreover, when estimating marginal effects in means, the LPM provides very similar results to the estimated marginal effects employing logit/probit models and the delta method (Angrist, 2001; Angrist and Pischke, 2009). Therefore, given the data size and associated asymptotics, we use the 2SLS estimation with an LPM in the first stage. We show similar results for the logit and the LPM in the second stage.

5.5 Balancing the Subsamples

It is important to note that the number of observations in each legal category and the number of firms observed transitioning from one category to another is disproportional. The majority of firms are solvent, regardless of business-membership status. Defaulting firms represent less than 1.7% of the entire sample. Therefore, to estimate the determinants of a firm's status in the financial distress process when there is a low observed status incidence, we must compare the results of the estimation of the whole sample to those obtained from more balanced subsamples.

To reduce the share of firms in the Active/Solvent status, we employ the nearest neighbor matching technique. Firms with a financial distress status j (j=2, 3, 4) form the treatment group, while the control group consists of similar firms that remain solvent[7]. For matching, we require that firms have a similar size, operate in the same industry and country over the same time period, and have the same business structure (stand-alone/business group). That is, approximate matching is based on firm covariates: *ln(TOAS)* and *tangibility*, while we require an exact match for country, industry cluster, period, and business structure. In this study, we provide a sensitivity analysis for

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[7] These statuses correspond to the following stages of financial distress: (2) default, (3) reorganization, (4) bankruptcy/liquidation, and (5) (forced) M&A. In the main text, we present only the results for j=2, which corresponds to the transition from the solvent to the default stage. For the sake of space, we do not present the analysis of other stages in the main text, but they are available on request or in the Internet appendix.

the defaulting firms, supporting the stability of the results for different (randomly selected) control group sizes.

6. Comparative Analysis

This section provides a comparative descriptive analysis of our sample firms. In particular, we present an initial comparison of defaulting firms operating in business groups to those located in independent firms.

6.1 Distribution of Firms in the Financial Distress Process.

Panel A of Table 1 shows the incidence of a firm's state in the financial distress process for independent and business-group firms. Our initial sample contains 11,152,520 firm-year observations, of which 28.8% are for firms operating within a business group. Financial distress is observed for 853,168 observations, representing 7.65% of the total sample. The observed default frequency is 1.08% and 1.21% for business groups and independent firms, respectively. Further, one can see a lower ratio for reorganization (0.97%) and a higher incidence of liquidation (4.75%) within the business-group category.

These observations are consistent with our hypothesis of a different incidence and resolution of financial distress for firms belonging to a business group. This result might be due to the greater financial resources available to firms operating within a business group due to internal capital markets. These internal capital markets can allow firms to access the resources necessary to restore solvency.

Another possible explanation for these differences is related to the origin of the country's bankruptcy law. It might be that the legal foundation of a country's bankruptcy laws affects both the incidence and resolution of financial distress. The various legal regimes that characterize international law have fundamental differences relating to minority shareholder rights, contract

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enforceability, creditor protections, disclosure, and voting (Djankov et al., 2008; Johnson et al., 2000; La Porta et al., 1999). Consequently, it is helpful to examine how the underlying origin of a country's legal system affects the financial distress within a business group.

Based on Djankov et al. (2008), we classify our sample countries into four groups according to the legal origin on which their bankruptcy laws are constructed: *English* (i.e., UK and Ireland), *French* (i.e., Belgium, France, Italy, Portugal, Romania, and Spain), *German* (i.e., Czechia, Croatia, Germany, Hungary, and Slovakia) and *Nordic* (i.e., Finland, Norway, and Sweden).

In Panel B of Table 1 we report how both the incidence and response to financial distress differ across legal regimes. We observe that the most significant relative incidence of default occurs in English legal systems (1.42%), while it is least common in the German legal regime (0.65%). Reorganization occurs most commonly for firms operating under English-origin law (1.15%), while it is least likely for firms following French-origin law (0.88%). Liquidation most commonly occurs under the French legal regime (5.74%), while it is least likely to occur under a German-origin legal code (2.34%). Merger and Acquisition is a low-probability event representing only 0.59% of our sample observations, but it is most common for firms operating in Nordic countries when it does occur. We conclude from Panel B that there are differences in the incidence and resolution of financial distress across legal regimes.

6.2 Accounting and Financial Characteristics

In Panel C of Table 1, we compare various accounting and financial characteristics between business groups and independent firms. First, we observe that independent firms are smaller than their business group counterparts as measured by total assets. Business groups contain, on average, firms with a slightly higher share of fixed and tangible assets. This finding is consistent with the observed higher redeployability (and value) of liquidated business-group firms (Bena and Xu,

2017; Kim and Kung, 2016). Independent firms are more profitable, measured by the return on assets, sales growth, and standardized cash flow. They are also characterized by greater asset tangibility and a higher level of gross investment. We note that business-group firms are more employee intensive than independent firms and are younger. Surprisingly, business groups contain a larger share of zero-leverage firms. However, it is important to note that firms in business groups have access to an internal capital market that can mitigate the effect of any funding restrictions. Finally, we observe that business-group firms use less debt than independent firms and hold less cash.

6.3 Industry, Country, and Time-Series Characteristics

Table 2 examines the sample distributions by industry, country, and year. In Panel A, we present our sample's distribution by industry group. We observe that defaults occur most commonly within the wholesale and retail trade industries. Other industries with high default levels include manufacturing (second highest) and construction (third highest. These results suggest the expected presence of industry-specific factors in the default experience of firms in addition to business group effects.

In Panel B, we observe an important difference in the incidence of default for business groups and independent firms in our country cross-tabulation. For example, the Czech Republic has a default rate of 0.40%, while the highest rate is observed for Romania at 3.95%. Also, five of our twenty-five sample countries have a percentage of defaulting firms higher among independent firms than for business-group firms. These variations might be due to differences in creditor protection, bankruptcy law, or the legally allowable operations of business groups. It supports the idea that the place of origin of the bankruptcy law still affects the incidence and resolution of financial distress.

Panel C contains our time-series data regarding comparative default rates. We observe a low number of insolvencies at the beginning of the sample due to limited initial data availability in Amadeus. The defaults, however, is reasonably stable between independent and business-group firms.

7. Business-Group Membership and Financial Distress

This section discusses our main empirical findings regarding a firm's transition through the different stages of financial distress. All tables present the marginal effect of changes in an explanatory variable when discussing our logistic regressions.[8] We begin by examining whether business-group membership influences the likelihood of default. We then investigate what happens to firms after they reorganize.

7.1 The Likelihood of Default

Table 3 presents our findings from a logit regression of the effect of business-group membership on the likelihood of default. For better interpretation, in Table 3, as with all tables, we present the marginal effects of the variable of interest. We build our model of expected default by incorporating a set of firm and macroeconomic controls, including a variety of country factors. The dependent dummy variable assumes a value of one when the firm status change from solvent to default and zero otherwise (i.e., the firm has been solvent all the time)[9].

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[8] Marginal effects are preferred to logit regression coefficients because they provide a direct and easily interpreted answer to the research question of interest. In our case, we use a delta method to compute them.

[9] Note that Table 2 presents results based on a reduced (matched) sample of the Active/Solvent firms. The incidence of default status in the original sample is 1.2%, and using the total sample for the estimation would result in (a) possible bias and (b) the marginal effects being very low and needing to be adjusted by the incidence rate for the mean effects. Please note that the effects of the main variables of interest remain unchanged. We present the results for different incidence rates in the Internet Appendix.

To address possible bias and estimation precision, we employed a matched-samples strategy to lower the control-sample size.[10] A potential concern of this approach is whether the control-group size drives the estimates of the business-group coefficient. The Internet Appendix provides a sensitivity analysis of the matched samples to different incidence rates. The results show that the mean effect, which is the mean effect of business-group membership on the likelihood of default, is robust to the matched sample size and remains consistent across specifications.

Table 3 is computed with the control group providing the default incidence rate of 16%.[11] In column (1) of Panel A, we observe that business-group membership is negatively associated with the likelihood of default. A lower probability of default for business-group firms is consistent with the idea that firms in a business group have access to internal financing. Furthermore, it suggests that propping will occur more frequently than tunneling in a business group. In column (2), we see that cash flow also plays a significant role. Intuitively, higher cash flows are associated with a lower incidence of default. This effect, however, is partially mitigated for firms in business groups. While this effect might seem counter-intuitive, it is consistent with the proposition that a firm's importance to the group is a key factor in determining whether it will be propped in the event of financial distress. We conclude that business-group membership does affect the likelihood of financial distress, with business-group members being less likely to default than similar stand-alone firms.

In this analysis of business-group default, we also include the effect of ownership type. That is, does the identity of the direct owner influence the likelihood of default? The sign and size of the ownership effects are as expected. State ownership is associated with a reduced likelihood of

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[10] The (nearest neighbor) matching is based on firms from the same country, industry, and time with similar size (TOAS) and asset structure (tangibility).

[11] Similar tables for different matched samples and, therefore, different incidence rates are available in the Internet Appendix. Note that the results are very similar.

default by eight basis points compared to family ownership (base category). This is not surprising, given the financial, legal, and staffing resources available to the state. Further, state-owned firms can receive favorable lending terms due to state guarantees and closer firm-bank relationships, especially in countries where state-owned banks predominate (Chen et al., 2021; Harrison et al., 2019). Institutional owners, represented mainly by financial institutions, lower the likelihood of default by seven basis points.

In Panel B, we examine whether the legal regime affects the likelihood of default within a business group. We find that the legal regime is a significant predictor of the incidence of default, even in the presence of firm, industry, institutional, and time controls. Firms operating under French-origin law demonstrate the highest likelihood of default, followed by Nordic, English, and German legal origins. The lesser default rates for firms with a German-origin legal regime might reflect the automatic triggers for formal bankruptcy if a firm experiences over-indebtedness (Jostarndt and Sautner, 2010)[12].

We also interact the business-group membership dummy variable with the legal regime to understand how they both affect the likelihood of default. While the baseline effect is negative and similar to the original specification, we see that the result is the opposite for German firms and is significantly mitigated for English firms. The different origins of the legal system, including shareholder protections, also lead to a different likelihood of default for the business-group members. Except for German legal origin, we see that, on average, business-group members are more likely propped than tunneled.

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[12] Because filing for bankruptcy implies replacing the management with a court-appointed administrator, the German system provides particularly strong incentives for managers close to default to adjust firm debt and obligations quickly to avoid the automatic bankruptcy trigger and their loss of control (ibid).

7.2 The Initial Resolution of Financial Distress

We now examine the effect of business-group membership on the initial resolution of financial distress with our analysis presented in Table 4. We compare defaulting firms that reorganize to those that liquidate. The dependent dummy variable is a dummy variable that assumes a value of 1 if the firm is reorganized and 0 otherwise (i.e., liquidated).

We observe in Panel A of Table 4 that BG membership does not appear to affect default resolution. However, it is essential to note that the origin of bankruptcy law has a significant effect, especially in countries with Nordic law. Our sample's Nordic business-group members are more likely to be restructured and less likely to be liquidated when compared to stand-alone firms. It might be that the effect of Nordic countries washes out the significance of the business-group coefficient in this initial analysis.

In Panel B, we exclude Nordic countries from the analysis. We find that business-group members are more likely to be liquidated after default. This result is consistent with Balcaen et al. (2012), who show that business groups focus their decisions on maximizing value for the entire business group. Liquidation of a distressed member allows the reallocation of assets to those group members with greater return potential. Consequently, business groups will redeploy assets to enhance the firm's liquidation value (Chen et al., 2020; Kim and Kung, 2016; Rong et al., 2020; Shleifer and Vishny, 1992). The management of independent firms, however, is limited in their ability to operate in a like manner. More typically, they behave similarly to a family-owned firm. This leads to a higher likelihood of reorganization for independent firms.

We report the results after controlling for legal origin in Panel C. The highest probability of restructuring is observed in countries with German-origin bankruptcy law, followed by English, French, and Nordic countries. As outlined earlier, despite recent legal convergence and unification of European insolvency law, we observe a lasting effect of the Nordic legal regime. Interestingly,

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while it is more common for the Nordic-country group to liquidate than reorganize, Nordic business-group firms are more likely to reorganize. Djankov et al. (2008) explain that Nordic countries do not use foreclosure and maintain defaulting firms as a going concern.

Moreover, they describe that Nordic countries achieve the highest efficiency and recovery rates during financial distress. As a result, firms inside a business group with access to internal financing are more capable of maintaining operations and paying their debts. The estimates of business-group membership do not significantly differ for other countries from the baseline estimates.

We also examine the effects of cash flow on the likelihood of reorganization of financially distressed firms. Reorganization leads to substantial asset and debt restructuring and, consequently, a reduction in financial distress (Antill and Grenadier, 2019; Hotchkiss et al., 2008; Kang et al., 2020). After controlling for the bankruptcy-law origin, we fail to find any significant effects of cash flow on the likelihood of reorganization, regardless of a business-group membership.

Lastly, we observe the effects of different owners on resolving financial distress. Consistent with previous literature, family-owned firms are most likely to reorganize, followed by institutional owners, corporate owners, and state owners.

7.3 Post-Reorganization Outcomes

In this section, we examine what happens to the firm after reorganization. As shown in Figure 2, several outcomes are possible after exiting reorganization. Because the number of observations is limited, we can only compare successful and failed reorganizations. We present our analysis in Table 5.

A successful reorganization occurs when a firm returns to solvency or is acquired. An unsuccessful reorganization is when the firm is liquidated or quickly defaults. We classify these serial bankruptcies as failed reorganizations since they are unable to produce the financial stability and prolonged solvency that is the objective of restructuring.

We find that business-group membership is not a significant factor for a successful reorganization. Combined with the previous results, we conclude that business-group members are less likely to restructure, but if they do so, the likelihood of a successful process is not significantly different from stand-alone firms. The only exceptions are firms with positive cash flow. Overall, bankruptcy law origin remains a significant factor associated with the successful reorganization. English bankruptcy law is associated with the lowest successful reorganization rate, followed by France law (base category); a positive effect is observed for Nordic countries, and German bankruptcy law shows the highest likelihood of successful reorganization. As mentioned earlier, a higher baseline likelihood for Nordic countries reflects their specific approach to the going concern. The highest likelihood of successful reorganization for German bankruptcy law countries could be explained by automatic triggers for formal bankruptcy if a firm experiences over-indebtedness. As a result, firms that are managed by debt or have high leverage might enter insolvency proceedings, even though they can still service the debt.

Consistent with expectations, cash flow is a positive and significant factor for stand-alone firms, and the effect is even more vital for business-group firms. These results suggest that ultimate owners might be more inclined to prop profitable or valuable firms inside the business group.

We conclude from the evidence presented in Tables 3 and 4 that business-group membership affects how financial distress is resolved.

8. Business-Group Design, Firm Importance, and Financial Distress

This section examines how the business-group's structure and the firm's importance might influence the incidence of default and how that financial distress is resolved. To undertake our analysis of business-group complexity, we use the graph-theory-inspired measures of *BG Depth*, *BG Breath*, *BG Size* and *Level*, *Endpoint*, and *Relative value*[13]. We also include a dummy variable, *Public*, that equals one if the ultimate owner is a public firm and zero otherwise. Publicly owned groups will be subject to greater disclosure and regulatory scrutiny than those which are privately held, thus reducing the likelihood of tunneling.

The results of our analysis are presented in Tables 6 through 8. We provide estimates of the LPM and Logit models in every panel. As outlined in the methodology section, a linear probability model (LPM, 2SLS) should be preferred since any maximum likelihood, system, or control function estimator will generally become inconsistent if it is not specified correctly (Lewbel et al., 2012). We include, however, the logit marginal effects estimated using the delta methods to allow comparison of the estimates (Angrist, 2001; Angrist and Pischke, 2009).

8.1 Defaulting and Solvent Firms

In Table 6, we compare the defaulting and solvent firms. We find that when we control for the size of the business group, the coefficients for the business-group complexity variables are all significantly positive, ranging between 0.06 and 0.015. This effect, however, is mitigated by the size of the group, with larger business groups generally decreasing the likelihood of financial distress. This result is intuitive since those business groups will have more capital to prop firms. The size effect, however, is offset by the firm's position and importance within the group. We see that firms that are more distant from the ultimate owners have a higher likelihood of financial

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[13] The endpoint and bottom-level firms are usually tunneled and liquidated or often sold via M&A since their bottom location makes pruning easy with little disruption to group integrity.

distress. This effect is strengthened for end-point firms. This result is consistent with our expectation that more distant firms, which are deeper in the group and potentially end-points, are more likely to be sacrificed to maximize group value. It is further supported by the estimate of relative value, which increases the likelihood that the firm never defaults. These results are consistent with our hypothesis that BG owners will selectively prop more essential firms.

8.2 Reorganized and Solvent Firms

Table 7 compares the reorganized and solvent firms in Panel B. We find that more complex business groups are more likely to go through reorganization, with the effect being mitigated by the size of the business group. Moreover, the likelihood of defaulting firms being reorganized decreases with the distance from the top. The result is partially adjusted for the firms at the end of the ownership chain. While this might seem counter-intuitive, it is essential to point out that end-point firms are far more likely to suffer financial distress, as seen in Table 6. Therefore, more of them will potentially go through reorganization.

Overall, as seen in Table 6, firms that are important to business-group owners are far less likely to default. Business-group owners will prop their key firms to prevent their default. Therefore, firms which enter default are less important for the group and will likely be liquidated.

8.3 Liquidated and Solvent Firms

Lastly, we compare the liquidated and solvent firms in Table 8. We do not see any significant BG complexity or firm size effects on the decision to liquidate. Instead, we see strong results associated with the importance of the firm to the group. As expected, liquidated firms are more distant from the top and, as such, are more likely to be end-point firms. End-point firms are less vital to the group. In particular, each level adds three basis points to the likelihood of default. Being an end-

point firm increases the likelihood by another 15 basis points. If the firm is located far from the top or at the bottom of an ownership chain, it could serve as a special vehicle for risky projects. This helps to transfer risk away from the group owner. We also again see that relative value is a negative predictor of liquidation, consistent with the idea that business-group owners are going to prop important firms and prevent them from being liquidated.

We conclude from this analysis that business-group design influences both the likelihood of financial distress and how the firm responds to it. We find that business-group complexity, group breadth, and the firm's location within the business group are significant factors in explaining the resolution of financial distress within a business group. These results are consistent with our hypothesis that business group structure and complexity affect the incidence of financial distress and its resolution. They also support our hypothesis that a firm's importance to the business group affects the incidence of financial distress and its resolution.

9. Conclusion and Discussion

This study is the first to describe and analyze the nature of financial distress within a business group for an international sample of firms. We find that business-group membership is associated with a lower likelihood of default. This effect is consistent with the idea that firms in a business group have access to internal financing. It also suggests that propping occurs more frequently than tunneling in a business group.

We further discover that business-group membership influences how financial distress is resolved. We find that group membership has a strong negative effect on the likelihood that a firm reorganizes after default. Our findings are consistent with the conclusion that default by a firm within a business group is intentional and that management is unlikely to pursue reorganization. Rather, liquidation or acquisition is the more likely outcome for these firms.

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We conclude that the incidence and resolution of financial distress differ significantly when business groups are involved. The existence of an internal capital market allows higher-level units to transfer capital to a group member or alternatively remove funds from it. Consequently, the usual outcomes resulting from financial distress can be altered in a business group due to propping or tunneling practices by superior units.

But our study of financial distress within a business-group distress extends beyond a comparative analysis based on group membership. The location of a firm within a business group and its ability to contribute to the group's value also affect how it experiences financial distress. Consequently, we introduce business-group complexity and design measures into our analysis.

We find that a firm's importance to the group helps to explain both the incidence and resolution of financial distress. When firms become distressed, they are generally distant from the ultimate owners and, most often, end-point firms with no ownership of other members. These are the firms that are more likely to become distressed and, correspondingly, are more likely to be liquidated rather than restructured. Most probably, this occurs because these firms are less central to the group's operations.

We further observe the presence of country factors in our analysis of financial distress within a business group. Despite a claimed convergence of the European bankruptcy law, we find a significant effect of national legal regimes across all stages of financial distress. It is most likely that national differences in creditor and shareholder protections, information disclosure and transparency, and regulatory enforcement drive these effects. Each of these factors can influence the likelihood of tunneling and propping practices within the business group. We determine that the legal regime is a significant predictor of the incidence of default, even in the presence of firm, industry, institutional, and time controls. Firms operating under French-origin law demonstrate the highest likelihood of default, followed by Nordic, English, and German legal origins. The highest

probability of restructuring is observed in countries with German bankruptcy-law origin, followed by English, French, and Nordic countries. On the other hand, the chance of business-group firms entering the restructuring phase is highest in Nordic countries.

This study raises important questions about other strategic decisions that are made within business groups and how group complexity might affect them. For instance: how is dividend policy made in the context of a business group, or how is capital investment allocated across members? Might a business group elect to sacrifice a firm through liquidation by transferring the liabilities of more promising units to it? This study is an initial investigation regarding how a firm's membership in a business group causes it to act differently from independent business entities.

Our findings also have important suggestions for future research in corporate finance and business organizational theory. Our study raises questions that will lead to a greater understanding of how business activity can best be organized for success. How is risk managed within a business group, and what strategies are employed to mitigate or transfer that risk? How efficient are internal capital markets within a business group, and whose interests do they serve? What is an effective organizational design for a business group, and how do the various group characteristics interact to impact value or profitability? All of these questions are exciting avenues for future research.

Appendix: Variable Definitions

Variable	Definition

Firm financial-distress indicators

Grouped legal status | We aggregate company legal status (*LSTATUS*) into the following sub-categories: Active, Default of Payments, Internal steps taken (reorganization, rescue plan), and external actions taken (Insolvency, Bankruptcy/liquidation, Merger or take-over). We exclude missing/unknown status and active yet dormant companies.

Business-group characteristics and firms' position within the business group

Business Group | A dummy equals one if a firm belongs to a business group.

BG depth | Business-group depth – Maximum number of levels (ownership layers) in the business group.

NF | The number of firms (with 50% control) within the business group.

Public | A dummy equals one if at least one firm in the business group is publicly traded. Private=1-Public.

Complex | Qualitative variable on complexity (number of the levels within the business group).
=1 for the business group with just one level
=2 if 1< business group depth ≤ 3
=3 if 3< business group depth ≤ 5
=4 if business group depth >5

BG Breadth | Business-group breath is the ratio of the number of end-points (firms that do not own any other firms) divided by the total number of firms within the business group.
$$\text{BGC\_indx} = \frac{Number\ of\ endpoints}{Number\ of\ firms}$$

Level | The level (the distance from the top) where the firm is located within the business group

End-point | A firm that does not own any other firm within the business group

Relative value | The number of firms that a firm owns in an ownership chain is standardized by the total number of firms within the business group.

Ownership type
Source: Amadeus database provided by the Bureau van Dijk, authors' computation

D_type	Direct ownership type. The categorical variable contains aggregated ownership type categories for the owner with the highest share. Based on variable *SH_TYPE* initially covering fifteen different categories: [14]

We employ the following comprehensive categorization:
• *Family*: (=1), *SH_TYPE* = I ("Named individuals or families") and Anonymous individual: (=7), *SH_TYPE* = D ("Anonymous Private Stockholders"). This is our base category.
• *Corporate*: (=2), *SH_TYPE* = C ("Trade and Industry organization") and Anonymous corporate: (=6), *SH_TYPE* = L ("Other named Shareholders")
• *State*: (=4), *SH_TYPE* = S ("Public authority/ State/ Government")
• *Institutional*: (=5), *SH_TYPE* = B ("Bank"), F ("Financial Companies"),
   J ("Foundations"), Y ("Hedge funds"), and E ("Mutual/Pension fund/Trust").
• *Unknown*, missing: (=9), *SH_TYPE* has missing value/unknown ownership type

We observe only a few firms with the following ownership categories. Therefore, we exclude the following:
• Active: (=3), *SH_TYPE* = P ("Private Equity firms") or V ("Venture Capital")
• Management: (=8), *SH_TYPE* = M ("Employees/Managers/Directors")

Firm-level control variables Source: Amadeus database provided by the Bureau van Dijk

Ln (Employees)	Natural logarithm of the number of employees (*EMPL*).
Ln (Total Assets)	Natural logarithm of total assets (*TOAS*) in million USD.
Tangibility	Tangible fixed assets (=*TFAS*) scaled by total assets (*TOAS*).
Sales Growth	Sales $(TURN)_t$ minus lagged sales $(TURN)_{t-1\ scaled}$ by lagged sales $(TURN)_{t-1}$.
Profitability	We use the ROA – Operational profit or loss (= *OPPL*) scaled by total assets (*TOAS*).
Cash Flow	Profits/loss plus depreciation (= *C.F.*) scaled by total assets (*TOAS*).
Leverage	Long-term debt (*LTDB*) plus bank loans (*B.L.*) scaled by total assets (*TOAS*).
Zero leverage (*levgt*)	The dummy is equal to one if firm leverage is equal to zero.

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[14] The aggregated ownership types use the ownership classification from the Amadeus (variable SH_TYPE): A = Insurance company, B = Bank, C = Trade and Industry organization, D = Nameless private stockholders, aggregated, E = Mutual and Pension fund / Nominee / Trust / Trustee, F = Financial company, I = One or more named individuals or families, J = Foundation / Research Institute, L = Other named shareholders, aggregated, M = Employees/Managers/Directors, P = Private Equity firms, S = Public authority/ State/ Government, V = Venture Capital, Y = Hedge funds, Z = Public (Publicly listed companies)

Age	Firm age since the (local) incorporation. It is computed as *YEAR* minus year of incorporation (*YEARINC*) plus 1. Winsorized at 50, i.e., the variable is set to 50 for age exceeding this value.
Missing Age	If age is missing, then missing age equals 1; otherwise, 0.
Cash	Cash reserves (=*CASH*) scaled by total assets (*TOAS*).
Gross Investment	Defined as fixed assets (*FIAS*) minus lagged fixed assets plus depreciation (*DEPRE*), scaled by total assets (*TOAS*).
Value-Added Growth	Value Added $(V.A.)_t$ minus lagged value added $(V.A.)_{t-1}$, scaled by lagged value added $(V.A.)_{t-1}$.

Country-level macroeconomic variables Source: WDI and WGI (World Bank)

Private Credit/GDP	Private credit is scaled by GDP. Private credit is a deposit by money banks and other financial institutions.
GDP Growth	The GDP's annual percentage nominal growth rate is denominated in the local currency.
GDP Per Capita	Real GDP per capita in 2010 USD (a proxy for country income)
GDP	Real GDP in 2010 USD (a proxy for country size), (in trillions)
Institutional Control Variables	Include the World Governance indicators: Voice and Accountability, Political stability, absence of violence, Government effectiveness, Regulatory quality, the rule of law, and Control of corruption. According to WGI construction, all indexes ranged from -2.5 to 2.5; higher means better. Government Effectiveness (ge) is designed to capture perceptions of the quality of civil and public services, policy formulation, and interpretation. Regulatory Quality (rq) should reflect (perceptions of) the ability of the government to form and implement sound policies/regulations that affect private sector development. Rule of Law (rl) should capture the quality of contract enforcement, property rights, and the courts. Finally, Control of Corruption (cc) is constructed primarily to summarize (perceptions of) the extent of state corruption by elites and private interests. As an alternative, we also used the index of the creditor's rights (1 to 4, 1 is the highest) and bankruptcy law origin taken from Djankov et al. (2008)

Control Variables

Macro Control Variables	Consist of Private Credit to GDP, GDP Growth, GDP in constant USD, and GDP per Capita (constant USD). Plus, the set of WGI indicators.
Time period dummies	The dummies set periods with breaks in the following years: 2000, 2005, 2008, 2010, 2013, and 2016.

Partial Firm Controls	Include cash flow/total assets, firm age, missing age indicator (=1), log (total assets), tangibility (=tangible/total assets), leverage (debt/total assets), and zero debt indicator (=1).
Full Firm Controls	Include cash flow/total assets, firm age, missing age indicator (=1), log (total assets), log (employees), tangibility (=tangible/total assets), CAPEX (investment ratio to total assets), leverage (debt/total assets), zero debt indicator (=1), cash/ total assets.

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Figure 1: Propping versus Tunnelling Effects in the Financial Distress Process
The symbols (P) and (T) denote Propping and Tunnelling effects, respectively.
Dashed lines separate the various stages of the financial distress process. The definition of the financial distress categories is provided in the Amadeus database.
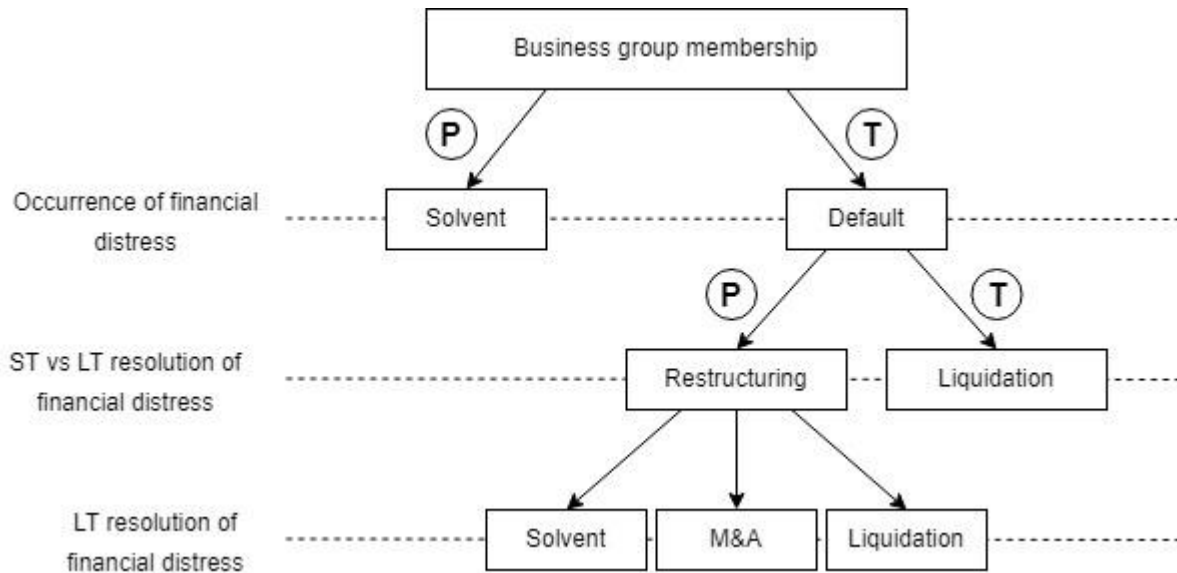
Figure 2: The Financial Distress Process

This table illustrates the path of a firm through the financial distress process as well as the structure and order of our analysis. It shows the alternatives available to a firm upon default and how it can reenter the process by repeated defaults.
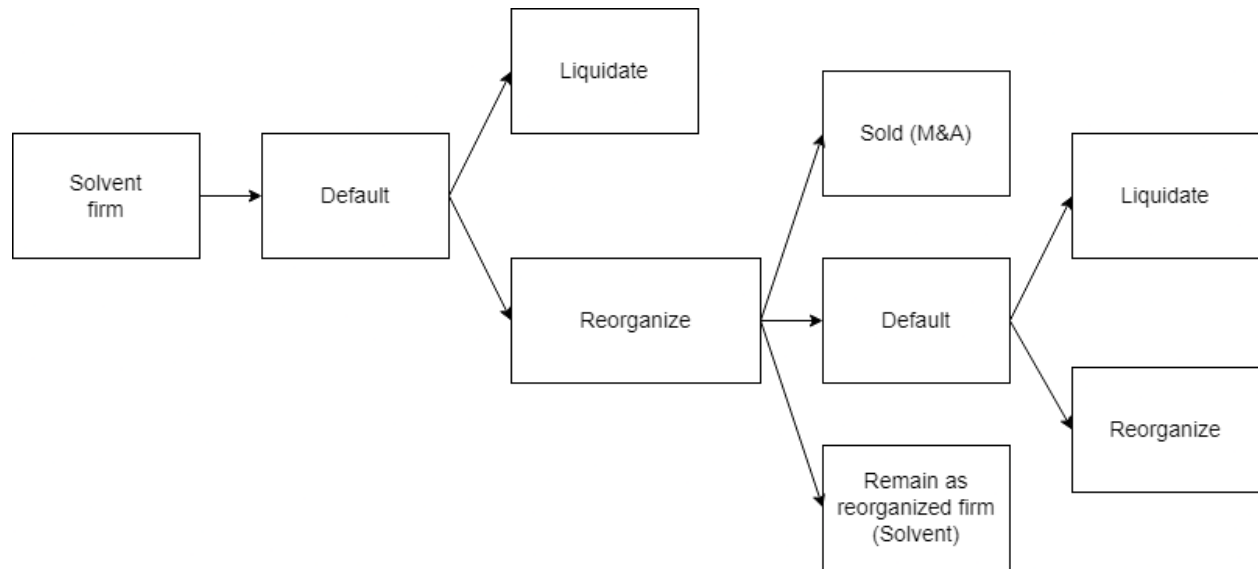
Figure 3. Examples of Business-group Complexity and Firm Importance

Example (1) illustrates the pure subsidiary structure and no firm other than the ultimate owner owns any other firm. All firms are equally distant from the owner and appear to be of equivalent importance. Example (2) introduces a business group that has multiple levels and member firms owning other members. Members A and C are less important while members B and F are likely to be important to the group. Example (3) presents a more complex group with multiple levels and various internal ownership chains. Firms J and K are strong candidates for being classified as less important to the group and unlikely to be propped.

Pure Subsidiary Structure	Less Complex Business Group	More Complex Business Group
(1)	(2)	(3)
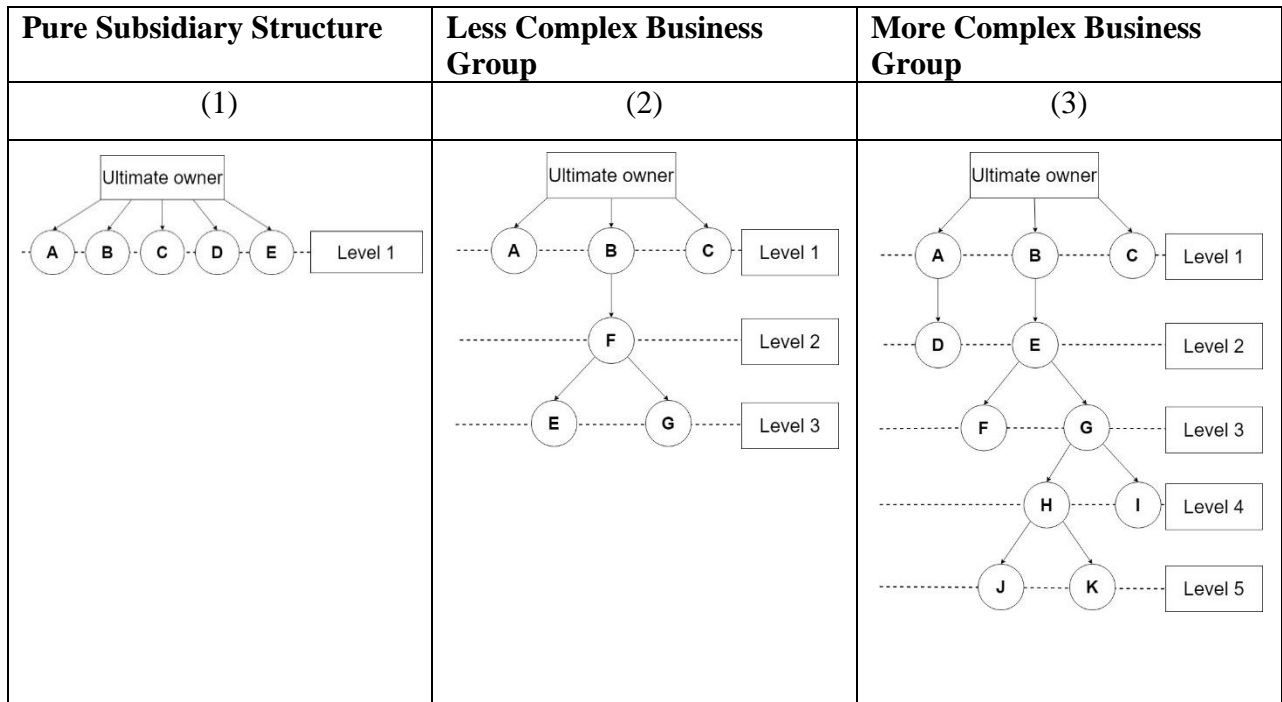
Table 1: Comparative Analysis Between Business-groups and Stand-alone Firms

Panel A compares the number of observations for the various legal statuses associated with financial distress between the business group and independent firms. The first row contains the total number of observations (firm[*]year), while the second and third rows correspond to row and column percentages. *Panel B* compares outcomes from financial distress across the various bankruptcy legal regimes. *Panel C* compares mean (median) differences in selected financial and accounting characteristics between the business group and stand-alone firms. For mean difference, we apply the classical t-test, unequal variances, and for the difference in medians, Mann-Whitney median test. [***], [**], and [*] indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

A. *Distribution by the firm's legal status and business group status*

Financial Distress Stage	Business-group	Stand-alone	Total
Active/Solvent	7,375,626	2,923,503	10,299,129
	71.61	28.39	100
	92.85	91.1	92.35
Default	85,563	38,814	124,377
	68.79	31.21	100
	1.08	1.21	1.12
Reorganization	76,869	21,820	98,689
	77.89	22.11	100
	0.97	0.68	0.88
Liquidation	377,047	187,414	564,461
	66.8	33.2	100
	4.75	5.84	5.06
Merged/Acquired	28,203	37,661	65,864
	42.82	57.18	100
	0.36	1.17	0.59
Total	7,943,308	3,209,212	11,152,520
	71.22	28.78	100
	100	100	100

Panel B: Distribution of the firm's legal status and bankruptcy law origin

Financial Distress	Bankruptcy Legal Origin				Total
	English	French	German	Nordic	
Active/Solvent	166,440	7,620,017	2,028,956	483,716	10,299,129
	1.62	73.99	19.7	4.7	100
	91.99	91.51	96	91.11	92.35
Default	2,565	101,274	13,781	6,757	124,377
	2.06	81.43	11.08	5.43	100
	1.42	1.22	0.65	1.27	1.12
Reorganization	2,083	73,167	20,091	3,348	98,689
	2.11	74.14	20.36	3.39	100
	1.15	0.88	0.95	0.63	0.88
Liquidation	9,848	478,216	49,395	27,002	564,461
	1.74	84.72	8.75	4.78	100
	5.44	5.74	2.34	5.09	5.06
Merged/Acquired	0	54,544	1,218	10,102	65,864
	0	82.81	1.85	15.34	100
	0	0.66	0.06	1.9	0.59
Total	180,936	8,327,218	2,113,441	530,925	11,152,520
	1.62	74.67	18.95	4.76	100
	100	100	100	100	100

Note: First number in each cell is the total number of firms, second and third represents row and column percentages, respectively.

Panel C: Comparative financial and accounting characteristics

Variable	Business-group Firms			Stand-alone Firms			Median difference	Median difference
	N	mean	median	N	mean	median		
Log (Total assets)	3,209,212	14.099	14.130	7,943,308	13.624	13.623	0.475***	0.507***
Fixed assets/ total assets	3,121,381	0.312	0.231	7,808,087	0.315	0.250	-0.003***	-0.019***
Asset tangibility	3,209,212	0.318	0.232	7,943,308	0.317	0.249	0.001***	-0.017***
Employees/ total assets[+]	3,098,722	15.953	6.942	7,830,746	19.223	9.079	-3.270***	-2.137***
Total debt/total assets	3,202,039	0.162	0.047	7,930,287	0.183	0.098	-0.021***	-0.051***
Zero debt dummy	3,209,212	0.362	0.000	7,943,308	0.288	0.000	0.074***	0.000***
Sales growth	2,940,534	1.225	0.026	7,533,524	0.959	0.019	0.266***	0.007***
Return on assets	3,208,268	0.049	0.042	7,941,838	0.054	0.044	-0.005***	-0.002***
Cash flow/total assets	3,209,212	0.065	0.055	7,943,308	0.071	0.059	-0.006***	-0.004***
Gross investment	2,717,593	0.045	0.017	6,736,824	0.047	0.019	-0.002***	-0.002***
Age	3,209,212	14.720	11.000	7,943,308	15.385	13.000	-0.665***	-2.000***
Cash /Total Assets	3,094,837	0.133	0.060	7,693,630	0.144	0.073	-0.011***	-0.013***

Table 2: Sample Distribution Characteristics

This table presents a description of our sample with comparative distributions across industry, country, and sample period. *Panel A* provides an industry distribution of our sample. *Panel B* shows the distribution of defaults across our sample of twenty-five countries. *Panel C* presents our sample of default by calendar year over our 2000-2018 sample period. Similar tabulation for remaining stages of the firm legal status are available in the Internet Appendix.

Panel A; Default distribution by industry

Industry Classification	Business-group		Stand-alone		Industry
A. Agriculture, Forestry, and Fishing	62,507	0.86%	177,061	0.73%	1.40%
B. Mining and Quarrying	14,575	1.19%	25,317	0.74%	0.28%
C. Manufacturing	665,716	1.24%	2,009,788	1.14%	23.93%
D. Electricity, Gas, Steam, and Air Conditioning Supply	23,107	1.06%	20,425	0.74%	0.30%
E. Water Supply; Sewerage, Waste Management and Remediation Act.	39,678	1.10%	66,052	0.98%	0.83%
F. Construction	395,180	1.34%	1,242,371	1.24%	15.83%
G. Wholesale and Retail Trade; Repair of Motor Vehicles	833,612	1.18%	2,329,420	1.09%	26.95%
H. Transportation and Storage	171,555	1.10%	411,040	0.95%	4.42%
I. Accommodation and Food Service Activities	192,420	1.21%	512,485	1.12%	6.18%
J. Information and Communication	160,551	1.25%	309,362	1.07%	4.07%
L. Real Estate Activities	171,399	1.23%	203,647	1.02%	3.21%
M. Professional, Scientific and Technical Activities	258,670	1.14%	549,407	1.01%	6.51%
N. Administrative and Support Service Activities	144,171	1.30%	289,591	1.12%	3.92%
Q. Arts, Entertainment, and Recreation	80,612	1.16%	213,206	0.90%	2.18%
Total	3,213,753	1.21%	8,359,172	1.10%	100.0%

Panel B: Default distribution by country

Country	Business-group		Stand-alone		Country	Business-group		Stand-alone	
AT	9,304	1.19%	7,099	2.51%	HU	11,091	0.95%	29,614	1.15%
BE	119,187	0.71%	201,389	1.13%	IE	6,555	1.30%	10,151	2.04%
BG	18,550	1.00%	47,527	0.99%	IT	1,366,256	1.25%	2,809,561	1.83%
CZ	157,803	0.46%	533,143	0.52%	LV	3,421	1.75%	8,396	2.37%
DE	103,730	1.98%	119,756	3.48%	NL	1,845	1.73%	741	6.07%
DK	43,996	1.09%	32,392	2.74%	NO	128,330	1.50%	194,930	2.09%
EE	31,940	0.61%	106,840	0.68%	PL	9,286	1.12%	29,778	1.79%
ES	276,124	0.73%	1,423,539	0.74%	PT	135,860	1.42%	873,790	1.47%
FI	31,841	1.59%	115,678	1.64%	RO	16,551	4.66%	89,514	4.87%
FR	311,100	1.97%	863,461	2.74%	SE	22,508	1.23%	34,996	1.75%
GB	80,029	1.55%	116,895	2.45%	SI	22,646	0.99%	81,557	1.15%
HR	75,161	1.05%	183,634	1.30%	SK	153,408	0.28%	272,050	0.43%
					UA	77,231	0.75%	172,741	0.69%
					Total	3,213,753	1.21%	8,359,172	1.56%

Panel C: Defaults across the sample period

Year	Stand-alone		Business-group		Year	Stand-alone		Business-group	
2000	2,045	0.05%	7,819	0.10%	2010	165,813	0.64%	519,228	0.82%
2001	3,675	0.71%	14,071	0.85%	2011	217,007	0.67%	662,171	1.01%
2002	7,768	0.86%	32,843	0.82%	2012	226,476	0.64%	667,578	1.22%
2003	36,151	0.36%	143,901	0.57%	2013	237,377	0.69%	656,852	0.93%
2004	74,779	0.69%	305,389	0.89%	2014	250,873	0.37%	615,954	0.86%
2005	62,408	1.65%	255,486	1.89%	2015	290,011	0.95%	651,986	0.98%
2006	82,004	1.95%	345,225	2.23%	2016	364,263	0.50%	659,868	0.70%
2007	141,220	0.97%	459,137	1.16%	2017	356,681	0.74%	652,656	1.06%
2008	182,379	1.13%	567,992	1.29%	2018	333,952	5.01%	589,827	8.05%
2009	178,871	0.91%	551,189	1.05%	Total	3,213,753	1.21%	8,359,172	1.56%

Panel D: Summary of the First-stage Regressions: Dependent variable BG dummy

Explanatory variables include the World Governance indicators: Political stability, absence of violence, Government effectiveness, Regulatory quality, the rule of law, and Control of corruption and their interactions with firm-size dummies (total assets quartiles). Detailed coefficient estimates are available upon request; the final model is (5).

Group of variables	(1)	(2)	(3)	(4)	(5)
Size (Quartile dummies)	X	X	X	X	X
Country dummies	X	X	X	X	X
Interactions Country*size		X	X	X	X
Industry dummies	X	X	X	X	X
Interactions industry*size			X	X	X
Regulatory quality(rqe)	X	X	X	X	X
Interactions rqe*size				X	X
The rule of law (rle)	X	X	X	X	X
Interactions rle*size				X	X
Control of corruption (cce)	X	X	X	X	X
Interactions cce*size					X
Voice and Accountability	X	X	X	X	X
Political Stability	X	X	X	X	X
Observations (N)			11,135,147		
R^2-adjusted	.07510	.07510	.08258	.08303	.08306

Table 3: Business-group Membership and the Likelihood of Default

This table examines the effect of business-group affiliation on the likelihood of a solvent firm becoming financially distressed. *Panel A* contains the 2SLS results using a linear probability model with instrumented Business group membership dummy. The ownership structure's base (omitted) category is a stand-alone firm. Omitted (base) category for the ownership type is a Family/individual-owned firm. All unscaled control variables are denominated in U.S. dollars. Because of the low incidence of Default (1.21%) in the primary sample, the estimation employs a balanced subsample constructed using nearest-neighbor matching. In this matched sample, Default and Solvent firms should have similar sizes measured by total assets and asset structure (tangibility). Firms should operate in the same industry (letter classification of NACE2 system) and country during the same period and have the same business structure (stand-alone versus business group), using exact matching. Detailed estimation results are provided in the Internet Appendix, including the first-stage regressions. The complete set of firm-level control variables includes cash flow/ total assets, firm age, missing age indicator (=1), log (total assets), log (employees), tangibility (=tangible/total assets), CAPEX (investment ratio to total assets), leverage (debt/total assets), zero debt indicator (=1), cash/ total assets. See the Appendix for variable definitions and group control variable definitions. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively. *Panel B* introduces the four different legal regime variables and their business group interactions as regressors into the analysis.

Panel A. Results for matched samples with the incidence of default at 16%

Variables	Explanatory Variable, Transition Solvent to Default *(Default=1, Solvent=0)*		
	(1)	(2)	(3)
Business-group (=1)	-0.070***	-0.071***	-0.066***
	(0.001)	(0.001)	(0.001)
Cash flow	-0.047***	-0.050***	-0.052***
	(0.003)	(0.003)	(0.003)
Cash flow * BG (=1)		0.020***	0.020***
		(0.007)	(0.007)
Corporate owner			-0.076***
			(0.001)
State ownership			-0.084***
			(0.004)
Institutional owner			-0.071***
			(0.002)
Unknown owners' type			-0.091***
			(0.001)
Firm controls	Full	Full	Full
Macro control, governance	yes	yes	yes
Period dummies	yes	yes	yes
Industry dummies	yes	yes	yes
Adjusted R^2	0.168	0.168	0.179
Observations (N)	657,393	657,393	657,393
Percent of defaulting firms	16.0%	16.0%	16.0%

Panel B. Controlling for bankruptcy law origin with the incidence of default at 16%

Variables	Explanatory Variable, Transition Solvent to Default *(Default=1, Solvent=0)*		
	(1)	(2)	(3)
Bankruptcy law origin dummies (base category French law origin)			
German	-0.232***	-0.232***	-0.230***
	(0.001)	(0.001)	(0.001)
English	-0.084***	-0.084***	-0.079***
	(0.002)	(0.002)	(0.002)
Nordic	-0.034***	-0.034***	-0.034***
	(0.002)	(0.002)	(0.002)
Business-group, BG (=1)	-0.040***	-0.041***	-0.038***
(below are interactions)	(0.002)	(0.002)	(0.002)
	0.058***	0.058***	0.058***
BG*German	(0.002)	(0.002)	(0.002)
	0.027***	0.027***	0.027***
BG*English	(0.003)	(0.003)	(0.003)
	-0.009***	-0.009***	-0.002
BG*Nordic	(0.003)	(0.003)	(0.003)
Cash flow	-0.021***	-0.023***	-0.026***
	(0.003)	(0.003)	(0.003)
Cash flow * BG (=1)		0.011	0.011
		(0.007)	(0.007)
Corporate owner			-0.073***
			(0.001)
State ownership			-0.043***
			(0.004)
Institutional owner			-0.069***
			(0.002)
Unknown owners' type			-0.089***
			(0.001)
Firm controls	Full	Full	Full
Macro control, governance	yes	yes	yes
Period dummies	yes	yes	yes
Industry dummies	yes	yes	yes
Adjusted R^2	0.206	0.206	0.216
Observations (N)	657,393	657,393	657,393
Percent of defaulting firms	16.0%	16.0%	16.0%

Table 4: Business-group Membership and the Initial Resolution of Distress

This table examines the effect of business group affiliation on the initial resolution of financial distress. The dependent variable is a dummy variable that assumes one if the firm is reorganized and zero if liquidated. *Panel A* contains the 2SLS results for all firms using a linear probability model with instrumented Business group membership dummy. The ownership structure's base (omitted) category is a stand-alone firm. Omitted (base) category for the ownership type is a Family/individual-owned firm. All unscaled control variables are denominated in U.S. dollars. The complete set of firm-level control variables includes cash flow/ total assets, firm age, missing age indicator (=1), log (total assets), log (employees), tangibility (=tangible/total assets), CAPEX (investment ratio to total assets), leverage (debt/total assets), zero debt indicator (=1), cash/ total assets. See the Appendix for variable definitions and group control variable definitions. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively Detailed estimation results are provided in the Internet Appendix

Panel B contains the results excluding the Nordic countries. *Panel C* contains a model using bankruptcy law origin variables and their interactions with business group membership as additional regressors.

Panel A: All firms

Variables	**Explanatory Variable, Resolving Default** *(Reorganized =1, Liquidation=0)*		
	(1)	(2)	(3)
Business-group (=1)	0.014	0.012	0.020**
	(0.009)	(0.009)	(0.009)
Cash flow	0.010	0.007	0.003
	(0.010)	(0.010)	(0.010)
Cash flow * BG (=1)		0.044	0.039
		(0.053)	(0.053)
Corporate owner			-0.077***
			(0.006)
State ownership			-0.108***
			(0.025)
Institutional owner			-0.022**
			(0.010)
Unknown owners' type			-0.036***
			(0.005)
Firm controls	Full		Full
Macro control, governance	yes		yes
Period dummies	yes		yes
Industry dummies	yes		yes
Adjusted R^2	0.083	0.083	0.088
Observations (N)	36,374	36,374	36,374
Percent of defaulting firms	15.1%	15.1%	15.1%

Panel B: Excluding Nordic countries

Variables	Explanatory Variable, Resolving Default		
	(Reorganized =1, Liquidation=0)		
	(1)	(2)	(3)
Business-group (=1)	-0.069***	-0.061***	-0.052***
	(0.009)	(0.010)	(0.010)
Cash flow	-0.038***	-0.029**	-0.033***
	(0.011)	(0.011)	(0.011)
Cash flow * BG (=1)		-0.145***	-0.147***
		(0.052)	(0.052)
Corporate owner			-0.090***
			(0.006)
State ownership			-0.106***
			(0.023)
Institutional owner			-0.045***
			(0.011)
Unknown owners' type			-0.028***
			(0.005)
Firm controls	Full		Full
Macro control, governance	yes		yes
Period dummies	yes		yes
Industry dummies	yes		yes
Adjusted R^2	0.101	0.101	0.107
Observations (N)	32,745	32,745	32,745
Percent of defaulting firms	15.0%	15.0%	15.0%

Panel C: Controlling for legal origin

Variables	Explanatory Variable, Resolving Default *(Reorganized =1, Liquidation=0)*		
	(1)	(2)	(3)
Bankruptcy law origin dummies (base category French law origin)			
German	0.088***	0.088***	0.085***
	(0.010)	(0.010)	(0.010)
English	0.035*	0.035	0.051**
	(0.021)	(0.021)	(0.021)
Nordic	-0.120***	-0.120***	-0.128***
	(0.014)	(0.014)	(0.014)
Business-group, BG (=1)	-0.085***	-0.085***	-0.076***
(below are interactions)	(0.010)	(0.010)	(0.010)
	0.050*	0.050*	0.042
BG*German	(0.029)	(0.029)	(0.029)
	-0.016	-0.016	-0.025
BG*English	(0.032)	(0.032)	(0.032)
	0.385***	0.385***	0.388***
BG*Nordic	(0.023)	(0.023)	(0.023)
Cash flow	-0.001	-0.001	-0.006
	(0.010)	(0.010)	(0.010)
Cash flow * BG (=1)		-0.000	-0.006
		(0.052)	(0.051)
Corporate owner			-0.080***
			(0.006)
State ownership			-0.156***
			(0.028)
Institutional owner			-0.030***
			(0.010)
Unknown owners' type			-0.034***
			(0.005)
Firm controls	Full	Full	Full
Macro control, governance	yes	yes	yes
Period dummies	yes	yes	yes
Industry dummies	yes	yes	yes
Adjusted R^2	0.099	0.099	0.105
Observations (N)	36,374	36,374	36,374
Percent of defaulting firms	15.1%	15.1%	15.1%

Table 5: Business-group Membership and the Long-term Resolution of Financial Distress

This table examines the effect of business group affiliation on the long-term resolution of financial distress. We analyze the exits of the restructuring based on business group membership. The dependent variable is a dummy variable depending upon the exit from restructuring. The table contains the marginal effect for each variable for continuous variables computed by the delta method. All unscaled firm control variables are denominated in U.S. dollars. We exclude the ownership categories from the specification because of collinearities and perfect predictability. Detailed estimation results are provided in the Internet Appendix Table A.4. See Appendix for variable and group control variable definitions. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	Comparisons of Exits from Reorganization			
	1= Successful reorganization (Solvent or Acquired) 0= Unsuccessful reorganization (Default or Liquidation)			
	(1)	(2)	(3)	(4)
Bankruptcy law origin dummies (base category French law origin)				
German			0.202***	0.212***
			(0.028)	(0.029)
English			-0.090**	-0.076*
			(0.038)	(0.042)
Nordic			0.117**	0.110*
			(0.057)	(0.058)
Business Group, BG (=1)	-0.002	-0.001	-0.029	0.016
(below are interactions)	(0.028)	(0.028)	(0.028)	(0.042)
BG*German				-0.085
				(0.066)
BG*English				-0.091
				(0.080)
BG*Nordic				-0.017
				(0.067)
Cash flow	0.116***	0.114***	0.083**	0.107***
	(0.034)	(0.034)	(0.034)	(0.033)
Cash flow * BG (=1)	0.242	0.233	0.308**	0.176
	(0.150)	(0.151)	(0.121)	(0.148)
Corporate owner		-0.016		-0.006
		(0.019)		(0.019)
State ownership		0.199		0.198
		(0.246)		(0.251)
Institutional owner		-0.050		-0.038
		(0.032)		(0.032)
Unknown owners' type		-0.007		-0.008
		(0.013)		(0.013)
Firm controls	Partial	Partial	Partial	Partial
Macro control, governance	yes	yes	yes	yes
Period dummies	yes	yes	yes	yes
Industry dummies	yes	yes	yes	yes
Adjusted R^2	0.111	0.111	0.121	0.121
Observations (N)	6,920	6,920	6,920	6,920
Percent of defaulting firms	35.2%	35.2%	35.2%	35.2%

Table 6: Comparing Defaulting and Solvent Business-group Members

This table examines how the nature of the business group (BG) and the firm's location with the group affect both the likelihood of financial distress and the resolution of that distress. Specifically, we introduce the following business group structural variables: A set of complexity dummies based on the business group depth, which captures the number of organizational levels within the business group. The number of firms in a business group represents the business group's size. BG Breadth is the proportion of the firms at the end of the business group (e.g., firms that do not own/control any other firm in the structure). The public is a dummy variable that equals one if the ultimate owner is a public firm and zero otherwise. Level refers to the specific depth within the business group where the sample firm resides. Endpoint is a dummy variable, indicating the firm at the end of the ownership chain, and relative value is a percentage of the number of controlled companies in the firm ownership chain scaled by the size of the business group. Columns (1) and (2) contain results from the LPM, and columns (3) and (4) contain marginal effects from the corresponding logit model (computed by the delta method). The base (omitted) category for the complexity is the subsidiary structure (Business-groups depth=1), for the ownership type is a Family/individual-owned firm, and for the distance, it is a firm in level one (directly owned by the ultimate owner). All unscaled firm control variables are denominated in U.S. dollars. Full estimation results are provided in the Internet Appendix or available upon request. See the Appendix for variable definitions and group control variable definitions. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	Comparison Between Defaulting and Solvent Firms			
	1= Firms in default stage 0= Always solvent firms			
	(1) LPM	(2) LPM	(3) Logit	(4) Logit
Bankruptcy law origin dummies (base category French law origin)				
German	0.024***	0.023***	0.020***	0.019***
	(0.002)	(0.002)	(0.004)	(0.004)
English	-0.057***	-0.057***	-0.063***	-0.063***
	(0.003)	(0.003)	(0.004)	(0.004)
Nordic	-0.006*	-0.006*	-0.003	-0.003
	(0.004)	(0.004)	(0.005)	(0.005)
BG Complexity=2 (2 ≤ BG depth ≤ 3)	0.012***	0.006**	0.012***	0.007**
	(0.002)	(0.003)	(0.002)	(0.003)
BG Complexity=3 (4 ≤ BG depth ≤ 5)	0.013***	0.011***	0.010***	0.009**
	(0.003)	(0.004)	(0.004)	(0.004)
BG Complexity=4 (BG depth > 5)	0.010**	0.015***	0.003	0.009*
	(0.004)	(0.005)	(0.005)	(0.005)
BG size (# firm)		-0.004***		-0.003***
		(0.001)		(0.001)
BG Breadth	-0.001	-0.003	0.000	-0.001
	(0.003)	(0.004)	(0.004)	(0.004)
Public (=1)	0.014***	0.016***	0.014***	0.019***
	(0.004)	(0.004)	(0.005)	(0.005)
Level	0.002***		0.003***	
	(0.001)		(0.001)	
Distance=2 (2 ≤ level ≤ 3)		0.009***		0.008***
		(0.002)		(0.002)
Distance=3 (4 ≤ level ≤ 5)		0.005		0.007*
		(0.003)		(0.004)
Distance=4 (level > 5)		0.014**		0.021***
		(0.006)		(0.007)

Endpoint (=1)	0.006***	0.000	0.006***	0.001
	(0.002)	(0.002)	(0.002)	(0.002)
Relative value		-0.000**		-0.000*
		(0.000)		(0.000)
Corporate owner	-0.026***	-0.027***	-0.020***	-0.021***
	(0.001)	(0.001)	(0.001)	(0.002)
State ownership	-0.011**	-0.010**	-0.010	-0.004
	(0.005)	(0.005)	(0.007)	(0.006)
Institutional owner	-0.027***	-0.028***	-0.020***	-0.020***
	(0.002)	(0.002)	(0.002)	(0.002)
Unknown owners' type	-0.028***	-0.029***	-0.018***	-0.018***
	(0.002)	(0.002)	(0.003)	(0.003)
Firm controls	Full	Full	Full	Full
Macro control, governance	yes	yes	yes	yes
Period dummies	yes	yes	yes	yes
Industry dummies	yes	yes	yes	yes
Adjusted or Pseudo R^2	0.087	0.087	0.150	0.151
Observations (N)	299,564	299,564	299,564	299,564
Percent of defaulting firms	8.4%	8.4%	8.4%	8.4%

Table 7: Comparing Reorganized and Solvent Business-group Members

This table examines how the nature of the business group (BG) and the firm's location with the group affect both the likelihood of financial distress and the resolution of that distress. Specifically, we introduce the following business group structural variables: A set of complexity dummies based on the business group depth, which captures the number of organizational levels within the business group. The number of firms in business groups represents the business group's size. BG Breadth is the proportion of the firms at the end of the business group (e.g., firms that do not own/control any other firm in the structure). The public is a dummy variable that equals one if the ultimate owner is a public firm and zero otherwise. Level refers to the specific depth within the business group where the sample firm resides. Endpoint is a dummy variable, indicating the firm at the end of the ownership chain, and relative value is a percentage of the number of controlled companies in the firm ownership chain scaled by the size of the business group. Columns (1) and (2) contain results from the LPM, and columns (3) and (4) contain marginal effects from the corresponding logit model (computed by the delta method). The base (omitted) category for the complexity is the subsidiary structure (Business groups depth=1), for the ownership type is a Family/individual-owned firm, and for the distance, it is a firm in level one (directly owned by the ultimate owner). All unscaled firm control variables are denominated in U.S. dollars. Full estimation results are provided in the Internet Appendix or available upon request. See the Appendix for variable definitions and group control variable definitions. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	Comparison Between Reorganized and Solvent Firms			
	1= Firms in the Reorganized stage 0= Always solvent firms			
	(1) LPM	(2) LPM	(3) Logit	(4) Logit
Bankruptcy law origin dummies (base category French law origin)				
German	0.001	0.002	0.003	0.004
	(0.005)	(0.005)	(0.005)	(0.005)
English	-0.014***	-0.013***	-0.016***	-0.015***
	(0.004)	(0.004)	(0.005)	(0.005)
Nordic	0.043***	0.043***	0.041***	0.040***
	(0.009)	(0.009)	(0.011)	(0.011)
BG Complexity=2	0.011***	0.015***	0.011***	0.016***
($2 \leq$ BG depth ≤ 3)	(0.003)	(0.004)	(0.003)	(0.004)
BG Complexity=3	0.001	0.020***	-0.002	0.020***
($4 \leq$ BG depth ≤ 5)	(0.005)	(0.006)	(0.006)	(0.006)
BG Complexity=4	-0.020***	0.014**	-0.036***	0.002
(BG depth > 5)	(0.006)	(0.007)	(0.008)	(0.008)
BG size (# firm)		-0.009***		-0.011***
		(0.001)		(0.001)
BG Breadth	0.014***	0.005	0.011**	0.001
	(0.005)	(0.005)	(0.005)	(0.006)
Public (=1)	0.002	0.012**	-0.003	0.009
	(0.006)	(0.006)	(0.009)	(0.009)
Level	-0.003***		-0.004**	
	(0.001)		(0.002)	
Distance=2		-0.007**		-0.009***
($2 \leq$ level ≤ 3)		(0.003)		(0.003)
Distance=3		-0.011**		-0.014**
($4 \leq$ level ≤ 5)		(0.005)		(0.007)
Distance=4		-0.021***		-0.025*
(level > 5)		(0.007)		(0.014)
End-point (=1)	0.013***	0.016***	0.015***	0.019***

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	(0.003)	(0.003)	(0.003)	(0.004)
Relative value		0.000		0.000
		(0.000)		(0.000)
Corporate owner	-0.025***	-0.022***	-0.025***	-0.021***
	(0.002)	(0.002)	(0.002)	(0.002)
State ownership	-0.075***	-0.072***	-0.098***	-0.096***
	(0.007)	(0.007)	(0.015)	(0.015)
Institutional owner	-0.021***	-0.019***	-0.022***	-0.019***
	(0.003)	(0.003)	(0.003)	(0.003)
Unknown owners' type	-0.030***	-0.028***	-0.033***	-0.030***
	(0.003)	(0.003)	(0.004)	(0.004)
Controls are the same as in other tables	Full	Full	Full	Full
Adjusted or Pseudo R^2	0.041	0.042	0.077	0.079
Observations (N)	125,883	125,883	125,883	125,883
Percent of defaulting firms	8.1%	8.1%	8.1%	8.1%

Table 8: Comparing Liquidated and Solvent Business-group Membership

This table further examines how the nature of the business group (BG) and the firm's location within the group affect both the likelihood of financial distress and the resolution of that distress. Specifically, we introduce the following business group structural variables: A set of complexity dummies based on the business group depth, which captures the number of organizational levels within the business group. The number of firms in business groups represents the business group's size. BG Breadth is the proportion of the firms at the end of the business group (e.g., firms that do not own/control any other firm in the structure). The public is a dummy variable that equals if the ultimate owner is a public firm and zero otherwise. Level refers to the specific depth within the business group where the sample firm resides. Endpoint is a dummy variable, indicating the firm at the end of the ownership chain, and relative value is a percentage of the number of controlled companies in the firm ownership chain scaled by the size of the business group. Columns (1) and (2) contain results from the LPM, and columns (3) and (4) contain marginal effects from the corresponding logit model (computed by the delta method). The base (omitted) category for the complexity is the subsidiary structure (Business groups depth=1), for the ownership type is a Family/individual-owned firm, and for the distance, it is a firm in level one (directly owned by the ultimate owner). All unscaled firm control variables are denominated in U.S. dollars. Full estimation results are provided in the Internet Appendix or available upon request. See the Appendix for variable definitions and group control variable definitions. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	Comparison Between Liquidated and Solvent Firms			
	1= Firms in the Liquidation stage 0= Always solvent firms			
	(1) LPM	(2) LPM	(3) Logit	(4) Logit
Bankruptcy law origin dummies (base category French law origin)				
German	-0.047^{***}	-0.047^{***}	-0.061^{***}	-0.062^{***}
	(0.002)	(0.002)	(0.003)	(0.003)
English	-0.101^{***}	-0.103^{***}	-0.119^{***}	-0.121^{***}
	(0.002)	(0.002)	(0.003)	(0.003)
Nordic	0.027^{***}	0.027^{***}	0.030^{***}	0.029^{***}
	(0.003)	(0.003)	(0.004)	(0.004)
BG Complexity=2 ($2 \leq$ BG depth ≤ 3)	-0.000	0.000	-0.002	-0.001
	(0.002)	(0.002)	(0.002)	(0.002)
BG Complexity=3 ($4 \leq$ BG depth ≤ 5)	0.007^{***}	0.008^{***}	0.005^{*}	0.006^{**}
	(0.003)	(0.003)	(0.003)	(0.003)
BG Complexity=4 (BG depth > 5)	0.006^{*}	0.007^{*}	0.003	0.005
	(0.003)	(0.004)	(0.003)	(0.004)
BG size (# firm)		-0.000		-0.001
		(0.000)		(0.000)
BG Breadth	-0.020^{***}	-0.014^{***}	-0.022^{***}	-0.015^{***}
	(0.003)	(0.003)	(0.003)	(0.003)
Public (=1)	0.019^{***}	0.014^{***}	0.017^{***}	0.014^{***}
	(0.004)	(0.004)	(0.003)	(0.003)
Level	0.003^{***}		0.003^{***}	
	(0.001)		(0.001)	
Distance=2 ($2 \leq$ level ≤ 3)		-0.003^{*}		-0.001
		(0.001)		(0.002)
Distance=3 ($4 \leq$ level ≤ 5)		-0.004		-0.003
		(0.003)		(0.003)
Distance=4 (level > 5)		0.004		0.005
		(0.005)		(0.005)
End-point (=1)	0.015^{***}	0.011^{***}	0.017^{***}	0.012^{***}

	(0.001)	(0.002)	(0.001)	(0.002)
Relative value		-0.000***		-0.000***
		(0.000)		(0.000)
Corporate owner	0.005***	0.006***	0.004***	0.004***
	(0.001)	(0.001)	(0.001)	(0.001)
State ownership	0.030***	0.025***	0.031***	0.026***
	(0.005)	(0.004)	(0.005)	(0.005)
Institutional owner	0.011***	0.012***	0.010***	0.011***
	(0.001)	(0.001)	(0.002)	(0.002)
Unknown owners' type	-0.012***	-0.012***	-0.014***	-0.014***
	(0.002)	(0.002)	(0.002)	(0.002)
Controls are the same as in other tables	Full	Full	Full	Full
Adjusted or Pseudo R^2	0.059	0.060	0.089	0.089
Observations (N)	722,442	722,442	722,442	722,442
Percent of defaulting firms	10.6%	10.6%	10.6%	10.6%