Corporate Pyramid Effects in the Creation and Resolution of Financial Distress

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Abstract

In this study, we examine the nature of financial distress within business groups across twenty-five European countries for the years 2000–2018. We discover that business group membership is positively associated with a greater likelihood of default. Group membership reduces the likelihood of reorganization, with liquidation or acquisition more likely. Deeper pyramids are less likely to have distressed members, but when they do, they are more likely to be liquidated or acquired. Lower-level firms within a pyramid are more likely to be liquidated. Our findings are consistent with agency theory, asset tunneling, and a wedge between cash flow and voting rights.

Keywords: bankruptcy, financial distress, business pyramids, ownership, exit strategy
JEL Codes: G33, C23, G32

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1. Introduction

The recent literature on firms' exits strategies from financial distress i.e., (merger-acquisition, bankruptcy, reorganization, liquidation) broadly focuses on associations with asset structure (i.e., asset tangibility), the quality of debt, and contract enforcement, (Djankov *et al.* 2008), industry conditions, or the macroeconomic environment. In this study, however, we introduce a new factor: business group membership. That is, what effect does affiliation with a business group affect how a firm responds to financial distress?

Despite the existence and importance of pyramidal ownership, past research does not differentiate between stand-alone firms and those located within a business group. But given the potential, however, for debt and profit shifting within a business group, the likelihood of financial distress for pyramid members might be significantly increased. Firms at the top of the hierarchy can shift the debt/profit across the pyramid to minimize taxes and/or to protect their key assets.

Thus both tunneling and propping effects can be present in a pyramid (Riyanto & Toolsema 2008). Bena and Ortiz-Molina (2013) show that firms in pyramids receive inside equity financing, especially financially constrained firms that cannot raise external funding. The investment activities of these firms are also less sensitive to profit shocks. These actions might cause the bankruptcy/liquidation of less valuable elements of the business group. This could potentially explain the paradox of firms declaring bankruptcy without any previous sign of failure (Balcaen & Ooghe 2006; Kücher *et al.* 2018). In this study, we analyze how business group membership can cause financial distress and affect the firm's journey through the bankruptcy process including exit.

Our analysis focuses on private companies which have been largely ignored in the literature even though they are the predominant type of business in most OECD countries (OECD 1997). To construct our sample, we use the Amadeus database of private European companies which covers twenty-five countries over the last nineteen years. The country variation and time span allow us to better capture the range of size and type of business groupings, resulting in more robust conclusions regarding their effect on financial distress and its resolution. We also control for country specific conditions including GDP growth and a variety of world governance indicators. In addition to various corporate and macroeconomic variables, we include several aspects of the business group itself. Specifically, we examine the complexity of the pyramid which represents the depth of the pyramid and the extent to which the ultimate owner is distant from the bottom-most firm. We include a measure of where the sample firm resides within its pyramid that indicates its relative depth with implications for the likelihood of it being subject to either tunneling or propping actions. The public or private nature of the pyramid is also examined based on the type of ultimate owner. The production ratio of the pyramid captures the number of firms at the bottom of the pyramid relative to the total number of firms in the pyramid. It has important indications for the potential for asset tunneling or the need for possible propping. Finally, the number of firms in the pyramid provides an indication of the size and capitalization of the pyramid.

This study provides several important contributions to both the bankruptcy and corporate organizational structure literature. We examine how pyramid membership influences the incidence and resolution of financial distress. We also investigate the channels by which the business pyramid affects both the occurrence of financial distress and its resolution. All of these questions are examined using an international sample that allows us to draw inferences about the global relevance and applicabiity of our findings.

We organize our study into seven sections. In Section 2 we discuss the literature and use it to develop our hypotheses. We discuss our data and sample in Section 3. Section 4 contains an explanation of our methodology while Section 5 provides an initial comparative analysis between standalone and business group companies. Section 6 reports our major empirical findings and a discussion of their importance. Section 7 provides a summary of our findings. Full model specifications and various robustness tests are available in the Online Appendix.

2. Pyramid Membership and Financial Distress

The extent to which a firm is part of a larger organization or business group is likely to affect the nature of its financial distress. That is, stand-alone firms might experience distress and bankruptcy differently from those that are a part of a business group. Almeida and Wolfenzon (2006a) and Almeida *et al.* (2011) contend that group membership and the access to other resources that such membership implies can loosen normal financial constraints. Khanna and Yafeh (2005) for instance 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 of capital markets internal to business groups that provide capital under favorable terms to its member firms. This can allow more aggressive expenditures in areas such as M&A, capital expenditures, and R&D. Riyanto and Toolsema (2008) contend that the practice of propping whereby higher level firms transfer resources to lower level members provide such firms with insurance against bankruptcy or liquidation. Masulis *et al.* (2011) confirm this possibility when they find an increase in investment expenditures by firms belonging to a business group. Khanna and Thomas (2009) explain how information sharing occurs for firms within a group and how that can positively influence corporate cash flows. Colli and Colpan (2016) describe how the business group structure

allows the ultimate owner to maintain control over the organization by profit shifting, transfer pricing, and limited liability. Consequently, we hypothesize:

H1: *Corporate pyramid membership affects the likelihood of financial distress.*

Because of the substantial resources associated with 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 (Wolfenzon 1999; Bebchuk *et al.* 2000; Bertrand *et al.* 2002; Morck *et al.* 2005a; Almeida & Wolfenzon 2006b). Resources can be channeled towards these firms to assist in their recovery or can be drawn from them, thus accelerating their insolvency. Consequently, we hypothesize:

H2: *Corporate pyramid membership affects how financial distress is ultimately resolved.*

The decision by the ultimate owner to support a member firm in distress or to liquidate it depends on the value of that firm in the pryamid. Distressed firms might be important to the pyramid given its location in the value chain or to synergies with other member firms. Operating synergies, cost efficiencies due to shared services, or economies of scale and scope are possible sources of firm value within a pryamid. Therefore, we offer our third hypothesis:

H3: *Pyramid structure and complexity affects the incidence of financial distress and its resolution.*

3. Data and Sample Construction

3.1 Data

The Amadeus Database maintained by Bureau van Dijk/Moody's is a useful data source for our analysis of financial distress and corporate business grouping. testing our hypotheses. The database is sufficiently broad in country coverage and deep in its time-series that a variety of macroeconomic conditions, business environments, and regulatory regimes can be examined. The

firm-level information contains corporate financial data along with information regarding the ownership and legal status of the firm. It is this data that allows us to examine the relation between business group membership, financial distress, and the resolution of that distress. Amadeus also allows us to identify which firms in financial distress are members of a business group and which are stand alone. Further, it provides details regarding characteristics of these business groupings such as their public/private nature, their depth, and size.

One of the characteristics of the Amadeus database is that it eliminates firm data after ten years, or for firms which become inactive, merge, or change identification. More critically, each version of the Amadeus contains only the latest available ownership structure. We therefore create our dataset using special historical queries to Amadeus and eight bi-annual versions of Amadeus. Using information about the starting date of the ownership and the release date in each update, we trace the ownership structure over time and construct the end-of-the-year ownership. Overall ownership information in the Amadeus database enables us to obtain information about the direct owners of a given company at the end of each of our sample years. We follow Hanousek and Shamshur (2011) and aggregate ownership type into nine categories[1].

Finally, we use direct ownership links to identify the business group ownership structure. Most of the algorithms described for construction of the pyramids typically first reconstruct all direct and indirect ownership links and then continue by constructing the ownership chain bottom-up (Belenzon & Berkovitz 2010). In complicated and more complex structures, it could be beneficial to use a modified approach. We describe the flow of our construction algorithm in Figure 2.

3.2 Variable Discussion and the Financial Distress Process

[1] These nine categories are family, corporate, active, state, institutional, anonymous corporate, anonymous individual, management, and unknown.

In this section we explain how we arrange the data used in our analysis. We assign the variables for our analysis into four categories: a) measures and indicators of financial distress, b) ownership structure dummies, c) firm-level financial or accounting variables, and d) macroeconomic variables and institutional quality indices. A detailed list of variables, including their definition and sourcing is provided in the Appendix Table A.1. Basic descriptive statistics are reported in Table 1.

There is no general agreement on the definition of financial distress or the identification of the best early warning indicator of firm bankruptcy (Sun *et al.* 2014). Previous research uses credit rating information, worsening of payment status code, various financial indicators (Petersen & Rajan 1994; Bassetto & Kalatzis 2011; Höwer 2016; Altman 2018). In this study we use legal definition of financial distress since it provides a more objective classification for that financial status. It is clearly linked with the legal criterion of bankruptcy.

To determine the firm's financial distress, we use the variable *LSTATUS,* which contains a textual categorization of a firm's legal status provided annually by the Amadeus database. For the purpose of our analysis, we identify four stages of financial distress: (1) Active/Solvent, (2) Default, (3) Restructuring, and (4) Liquidation. We separately examine M&A as a resolution outcome.[2]

Figure 1 describes transitions identified between the firms' legal status. The solid lines represent legal status changes after the firm enters financial distress while the dashed lines represent changes post reorganization. When a firm is unable to satisfy its financial obligations, it transitions from Active/Solvent to Default status. In this status the firm's liabilities exceed the market value of its assets. A firm could meet its financial obligations and return to Active/Solvent

[2] In our data, we omit the inactive (deferred) firms and observations with missing or unknown legal status. A detailed decomposition of our sample is provided in the Internet appendix.

status or remain insolvent and move to restructuring. In our sample countries, the restructuring plan must be approved by a court and the firm's major creditors. Restructuring could end successfully by the firm being reorganized and returned to Active/Solvent status. Alternatively, the firm could be liquidated, and its assets dispersed by various bankruptcy procedures or acquired in a M&A transaction.

3.3 Sample Construction

The starting dataset uses nine bi-annual versions of Amadeus and special historical queries. Our sample covers twenty-five European countries over the 2000–2018 period. We eliminate from our sample those firms with an unknown number of employees or with an unknown ownership structure. Similar to Klapper *et al.* (2006), we exclude the financial services industries (NACE codes 65 and 66), because the financial ratios for these companies are not comparable to those of non-financial companies. We also drop the government/public sector, education, health and social sectors, activities of organizations, private households, extra-territorial organizations, and firms that cannot be classified (NACE codes 75, 80, 85, ≥ 90).[3]

Our initial dataset contains 11,572,925 firm-year observations for 1,587,725 unique firms. About 27.8% of the sample belongs to business groups and more than 91% of the sample consists of Active/Solvent firms. The sample structure is provided in Panel A of Table 1 which contains the distribution across corporate legal status for both business groups and stand-alone firms. The detailed distribution for defaulting firms, by country, industry, and year is presented in the other panels of Table 1 which are discussed in Section 5.

[3] 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.

Methodology

4.1 Factors Affecting the Firm's Corporate Legal Status

To estimate the transition probabilities across corporate legal status, we use logistic regressions. Let $P(K = k)_{it}$, and $P(K = k, L = l)_{it}$ represent the probabilities that company legal status is equal to category *k*, or that the legal status changes from category *k* to category *l*, respectively. The corresponding logit models for the respective legal status category can be specified as follows.

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

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

and

$$P(K = k)_{it} = \alpha_0 + \beta X_{it} + \gamma_p(BG_{it} = 1) * pos\_cf + \gamma_n(BG_{it} = 1) * neg\_cf + \\ + \sum_{s=2}^{S} \gamma_k (OType(s) = 1)_{it} + \boldsymbol{\lambda_c} Macro_{ct} + PerFE + IndFE + \varepsilon_{it}, \quad (3)$$

Specification (1) considers only the additive effect of the business group on the probability of a firm being in status j. Extensions (2) and (3) model the sensitivity of business group membership to firm-generated cash flow (cf). We also decompose cash flow into separate negative and positive elements (pos_cf, neg_cf).

A similar set of structural and control variable are used to analyze the change in legal status from state k to state l:

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

As in all our model specifications, the vector X_{it} contains firm-specific control variables. For company size we use *Total Assets* or *Ln(Total Assets)* and *Ln(Employees)*. The use of 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 (Mramor & Valentincic 2003; Jones & Wang 2019). Additional control variables include proxies for profitability (*ROA*), 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 control variables for profitability, liquidity and solvency, and are used by researchers such as (Altman 1968; Bhimani *et al.* 2014; Almamy *et al.* 2016; Altman *et al.* 2017; Mselmi *et al.* 2017) to capture the likelihood of bankruptcy. We expect that the zero leverage phenomena might be especially important for privately held companies; therefore, we include a dummy variable for zero leverage, *levgt*, as a control variable (Bessler *et al.* 2013; Strebulaev & Yang 2013). Cash flow is especially important for assessing firm profitability; hence we interact it with the business group dummy (Bao *et al.* 2012; Hall *et al.* 2014; Almamy *et al.* 2016; Mulier *et al.* 2016).

In addition, we use the standard set of country-specific macroeconomic variables, including World Governance Indicators. Each country offers different protection levels to its investors and operates a unique regulatory/legal infrastructure (Hernández-Cánovas & Koëter-Kant 2008; Aminadav & Papaioannou 2020; Bose *et al.* 2020). Therefore, we include standard macroeconomic variables to address cross-country variation in business conditions, the quality of the institutional environment (Buehler *et al.* 2010) and to reflect the influence of national capital and financial conditions (Arcuri & Levratto 2020). To control for unobserved time invariant heterogeneity, we use fixed effects for industry and time periods (i.e., 2000, 2005, 2008, 2010, 2013, 2016, and 2018).

4.2 Balancing the Subsamples

We note that the number of observations in each legal category and in the cells of the transition matrix are disproportional. The overwhelming majority of all firms are active, regardless of business membership status. Defaulting firms, however, represent less than 1.2% of the entire sample. Therefore, to estimate the status determinants of a category with a very low observed incidence, we must compare the results of the entire sample estimation to those obtained from more balanced subsamples. To reduce the share of firms in Active/Solvent status, we employ the nearest neighbor matching technique. As is common, firms with a financial distress status *j* (*j*=2, 3, 4, 5) will be considered as a treatment group, while the control group consists of similar firms that remain active and stable. Firms should have a similar size, operating in the same industry and country over the same time period and belonging to the same business structure (stand-alone/business group). In other words, approximate matching is based on firm covariates: *ln (TOAS)*, *ln(EMPL)*, and *tangibility*; we require an exact match for country*industry cluster, time period, and firms' structure (stand-alone versus business group).

4. Comparative Analysis

In this section we provide a comparative descriptive analysis of our sample. In particular, we present an initial comparison of defaulting firms in business groups and those that are stand alone.

4.1 Legal Status Distribution.

Panel A of Table 1 shows the incidence of legal statuses for stand-alone and business group firms. Our initial sample contains 11,572,925 observations, of which 27.8% are firms from a business group. Financial distress as captured by default of payment is observed for 130, 752 firms, representing 1.13% of the total sample. The frequency of observed default is 1.21% and 1.10% for

business groups and stand-alone firms, respectively. It is clearly visible, however, that the lower share of Solvent firms from the business groups is driven by higher probabilities of liquidation and M&A. On the other hand, we observe a much lower probability of restructuring for pyramidal firms. These observations are consistent with our hypothesis of different incidence, dynamics, and resolution of financial distress for firms with a business group. The patterns observed are also consistent with the increased flexibility of firms operating within a business group and the existence of an internal capital market. Further, the low probability of restructuring for pyramid firms suggests that valuable firms are likely to receive the resources to prevent default or never enter into default initially.

4.2 Accounting and Financial Characteristics

In Panel B of Table 1 we compare various accounting and financial characteristics between business group and stand-alone firms. First, we observe that stand-alone firms are smaller than their business group counterparts, measured by their total assets. Business groups contain, on average, firms with a slightly higher share of fixed and tangible assets. This is consistent with the observed higher redeployability (and value) of liquidated pyramidal firms (Kim & Kung 2016; Bena & Xu 2017). Stand-alone firms are also more profitable as measured by return on assets, sales growth, and standardized cash flow. Stand-alone firms also are characterized by greater asset tangibility and a higher level of gross investment. We note that business group firms use more employees than stand-alone firms and are also younger. One important result is that a larger share of business groups are zero leverage firms, rather than for stand-alone firms. However, it is important to note that firms in business groups have access to the internal market within the business group, which could mitigate the effect of restriction in the modes of funding. Lastly, the

business group firms also use less debt than stand-alone firms, but also conversely hold less cash. This may be consistent with the idea of using debt (or lower cash in case of zero leverage firms) as a managerial tool since it forces the management to be more efficient and constrains their ability to undertake empire-building negative net present value projects.

4.3 Industry, Country, and Time-Series Distribution

In Panel C we report the industry distribution of our sample of defaulting firms. We note that the relative incidence of default is very similar across the two sets of firms. Defaults are most common in the wholesale and retail trade industries for both stand-alone and business group firms. A comparable relation occurs for the industry with the second most set of defaults (manufacturing), third-most (construction), and the fourth most (professional, scientific, and technical activities). This suggests the presence of industry-specific factors in the default experience of firms in addition to business group effects. The last column of Panel C contains the distribution of observed defaults across industries regardless of a business group membership.

Panel D contains the distribution of defaulting firms across our sample of twenty-five European countries. Contrary to the industry distribution, we observe differences between the incidence of default for business groups and stand-alone firms. However, this is consistent with the fact that each country has specific regulations regarding defaults and business groups, suggesting that there is also a country factor explaining the incidence of default.

Lastly, we present the time-series distribution of our sample of defaults in Panel E of Table 1. We note that the highly varying number of defaults is primarily caused by the low number of observations at the beginning of the sample due to data availability in the Amadeus database. However, the incidence of defaults is reasonably stable between stand-alone firms and firms in a

business group. Importantly, we observe a higher number of defaults in the last year of our sample, 2018. This is primarily caused by the Amadeus database and its increased coverage of problematic firms in the later years, which leads to delays in the database entry and the classification of defaulted firms.

5. Major Empirical Findings

In this section, we discuss our major empirical findings as they relate to our hypotheses. We follow the transition between legal status in several ways. First, we examine whether business group membership influences the likelihood of default. Second, we continue and analyze transitions from the default stage to the restructuring phase. Third, we investigate final exits from the restricting. Finally, we explore the effects of business group characteristics and the firm's relative group positioning on the probability of transition across the stages of financial distress. We finish our analysis of business group characteristics by a channel analysis in which we examine how key financial variables can explain the decisions made regarding financial distress for pyramid firms.

5.1 Business Group Membership and the Likelihood of Default

Table 2 presents our findings from a logit regression of the effect of business group membership on the likelihood of default for the entire sample of firms. We build our model of expected default incorporating a set of firm and macroeconomic controls, including institutional environment variables. The dependent dummy variable assumes a value of one when the firm is in default status and zero otherwise.

We observe in Table 2 that business group membership compared to stand-alone firms (control group) is positively associated with a greater likelihood of default. Note that in Table 2

we present results based on a reduced (matched) sample of the Active/Solvent firms.[4] A *ceteris paribus* higher probability of default for business group firms might initially appear counter-intuitive. If the group has additional resources, why do they let the firm default? Why does membership in a business group make default more likely? It is true that firms in pyramid groups should have access to increased resources with an internal capital market facilitating required funding (Deloof & Jegers 1996; Shin & Stulz 1998).

We argue that a higher likelihood of default for pyramid firms is consistent with group-level optimization. It also aligns with the phenomenon that risky projects in a business group are allocated to companies more distant from the ultimate owner, and with the phenomenon that in the business group risky projects are allocated in (new/special purpose) companies distant from the top (Almeida & Wolfenzon 2006a; Bena & Ortiz-Molina 2013; Cho 2019). In case of some financial problems, the pyramid actually allows some debt shifting and essentially sacrificing selected firms (and getting rid of bad debt). This option is not available for stand-alone firms.

Also, when an important pyramid firm experiences financial problems, it can off-load at least a part of its liabilities to another firm which can be liquidated instead. This practice is consistent with our earlier univariate finding that firms in business groups suffer from a reduced return on assets and lower cash flow. Because sales growth is higher for firms in business groups, it suggests possible profit shifting and using cash flow draining as a management tool. It is consistent with the cash flow optimization due to lower information asymmetries and enhanced allocation of resources (Locorotondo *et al.* 2014). On the contrary, stand-alone firms, especially family firms tend to hold more cash flow (Kuan *et al.* 2011).

[4] The incidence of default status in the original sample was about 1.2 percent and using the full sample for the estimation would cause a) possible bias and b) the marginal effects will be very low and should be adjusted by the incidence rate for the mean effects. Let us note that effects of the main variables of interest remains unchanged, and we present the results of the full sample estimation in the Internet Appendix.

The higher probability of default for business group firms is also consistent with the literature on business group tunneling and the exploitation of lower-level units within a pyramid by more senior owners. This leads to default for lower-level units. It might also be explained by the observation that firms in non-core activities are voluntarily terminated, especially when the group is becoming financially distressed (Dewaelheyns & Van Hulle 2006).

A critical variable that we introduce into our analysis is the interaction between the business group dummy and the firm's cash flow. Clearly, the presence of a positive cash flow affects corporate solvency and the likelihood of default. As expected, we observe in the model (1) a significantly negative effect of cash flow. That is, the higher the cash flow, the lower the likelihood of firm default. This might especially be the case for the zero-leverage firms, which are even more restricted in their funding, either because of a decision of lenders or because of the owner's strategy (Bessler *et al.* 2013; Strebulaev & Yang 2013).

We more explicitly examine the effects of cash flow in its interaction with the business group dummy by decomposing it into positive and negative components.[5] For the firms with positive cash flow, we see no additional effect on the likelihood of default associated with the business group. It is interesting that firms with a negative cash flow have a strong and significant increased likelihood of default compared to stand-alone firms. Despite the existence of internal markets, this result is in line with our previous findings that firms in groups tend to be terminated when the operations of these businesses of those firms become unprofitable or inefficient. Contrary to business groups, we find that negative cash flow does not significantly affect the likelihood of

[5] We decompose the cash flow variable into separate positive and negative cash flow measures. Positive cash flow is equal to cash flow for positive values and zero otherwise; negative cash flow is equal to minus cash flow for negative values and zero otherwise.

default for the stand-alone firms which strive to keep their business alive even when they are financially distressed.

These differences in the likelihood of the default are further analyzed from the perspective of the effects of ownership type, where individual and family-owned firms serve as the refernce (omitted) category. The sign and size of the ownership effects are mostly expected. The likelihood of default for state-owned firms should be the lowest. The direct ownership of corporations and institutional owners should reflect similar motives as business group membership, hence increasing the probability of default. Compared to family-owned firms, state-owned firms receive favorable lending conditions due to state guarantees and closer firm-bank relationships, especially in countries where state-owned banks predominate. The favorable lending conditions help state-owned firms survive even if they are less productive (Harrison *et al.* 2019; Chen *et al.* 2021). Yet the institutions, especially banks, might want to decrease the possible future burden of their balance sheets, so their adjustment in the default probability is rather low (Peek & Rosengren 2005; Höwer 2016). Clearly, family and management-owned firms strive to keep their businesses alive, even for highly inefficient and rotten firms.

6.2 Business Group Membership and the Resolution of Distress after Default

In Table 3 we examine the effect of pyramid membership on the resolution of financial distress. To undertake our analysis, we restrict the sample to those firms in default and then analyze their subsequent status change. The dependent dummy variable is a dummy variable that assumes a value of 1 if the firm is reorganized and 0 otherwise.

We observe that group membership has a strong negative effect on the likelihood that a firm reorganizes after default. This is consistent with Balcaen *et al.* (2012) who show that firms

belonging to a business group are more likely to be liquidated, rather than reorganized. This result is also consistent with our previous findings that business groups tend to reallocate capital using internal resources and optimizing their objectives with respect to the entire pyramid. Moreover, the managers of business groups might better reallocate underutilized tangible assets to group members where they can be more profitably used. Consequently, business groups increase asset redeployability Feldman and Sakhartov (2021) and, therefore, increase the liquidation value of the firm (Shleifer & Vishny 1992; Kim & Kung 2016; Chen *et al.* 2020; Rong *et al.* 2020). The management of stand-alone firms, however, is limited in such optimization and behaves similar to family-owned firms, leading to a higher chance of reorganization.

Similarly, as in previous specifications, we also again analyze the asymmetric effects of the cash flow on the likelihood of reorganization of financially distressed firms. Active reorganization leads to substantial asset and debt restructuring, and consequently to a reduction in financial distress (Hotchkiss *et al.* 2008; Antill & Grenadier 2019; Kang *et al.* 2020). We find positive and significant marginal effects of positive cash flow on the likelihood of reorganization, whether firms are involved in a business group or not. This is consistent with the general wisdom that transition to reorganization should be associated with operational efficiency and the potential to generate positive cash flow.

Nevertheless, we do not observe any statistically significant effect of negative cash flow or differences in the sensitivity to positive/negative cash flows for the business group firms. This implies that no significant additional resources were allocated to aid the transition of business groups firms into reorganization. This finding confirms the previous arguments related to the focus of family and individual owners on firm survival in contrast to the voluntary liquidation tendency observed for corporate-type owners. Finally, the greatest negative effect on reorganization is

observed for state-owned firms, which is consistent with the belief that state-owned firms default only when they are disincorporated from the executive branch, which would mean reorganization is less likely.

In Panel B we show the comparison of Reorganizing and (return to) the Active/Solvent stage after Default. That is, we compare the characteristics of firms returning from Default into the Active/Solvent stage without undergoing any restructuring. It is clear that a short-term appearance in the default of payments stage is lower for business group firms. Moreover, it might be expected that firms with higher cash flow would return to solvency more swiftly, without restructuring. While this is true for business group firms, it is not the case for stand-alone firms, for which higher positive cash flows increase the probability of restructuring and lower the probability of quick return to solvency. Unfortunately, when we employ a similar set of control variables, the effect of type of the owner is not identifiable in most cases.

6.3 Business Group Membership and the Resolution of Distress after Restructuring

We continue our analysis of subsequent status changes after the firm undergoes reorganization. Since we are now examining the final stage of the chain of worsening financial distress, the large starting sample has shrunk to a few thousand observations. As before, because of the low number of observations and low variation in explanatory factors, we cannot use the full set of control variables, including industry fixed effects. The results are presented in following Table 4, where we use a different setting for the target and control groups for analysis transitions after restructuring.

It has been shown that acquisitions relieve financial frictions in target firms (Faelten & Vitkova 2014; Erel *et al.* 2015). In the first comparison, we address a question related to M&A

following and induced by, financial distress. That is, whether stand-alone or business group firms are more likely to be the acquisition target after the restructuring. As we can see from the first two columns of Table 4, the likelihood of M&A is higher for the business group firms by about 1.9 percentage points.

Because the incidence of M&A is about 2 percent, it is clear that even after controlling for firm-level characteristics, the distress-invoked M&A occurs primarily among the business group firms. The ability of firms to generate a positive cash flow increases the probability of being acquired.

In the second sub-analysis, we compare firms that exited Reorganization to be liquidated with those that returned to Active/Solvent. The sample is more balanced; the incidence rate of liquidation is about 53 percent. In the parsimony model, without the cash flow-business group interaction variable, business group membership implies an approximately 3% higher probability of being liquidated than a stand-alone firm. The significance of the business group indicator is transferred in the expanded model to a much higher reaction to the negative cash flow for the business group firms. This means that business group firms try to resolve reorganization faster – firms with negative cash flow are much more likely to be liquidated.

Finally, the third set of logit regressions contrasts long-lasting reorganization versus firm (voluntary) liquidation. The dependent variable for the logit regression has a value of 1 if liquidated and 0 otherwise. Again, we have confirmation that firms in the business group are more likely to be liquidated if they do not show enough progress during reorganization. That is, instead of continuing the restructuring, the business group members are significantly more likely to be liquidated than stand-alone firms. The mean effect is 0.6 percentage points, but it is a significant effect within the 3.7 percent representing the likelihood of liquidation. In addition, business group

firms have an additional increase of the probability of being liquidated if the company generates negative cash flows. The effect of exiting reorganization for faster liquidation is supported by additional strong effects for Corporate and institutional owners.

6.4 Pyramid Complexity and Financial Distress

In this section, we examine how the pyramid structure itself might influence the incidence of default and how that financial distress is resolved. To undertake this analysis, we introduce a number of pyramid structural variables. We begin with a set of complexity dummies that captures the number of organizational levels within a pyramid. As pyramid depth increases, the ultimate owner has control over an increasing number of firms as well as becoming more remote from actual operations. This might both encourage and facilitate corporate tunneling of the assets located at lower levels of the pyramid. We next include the number of firms in a pyramid, as a measure of the size of the business group and to again represent the potential for tunneling or exploitation of minority shareholders. The *production firm ratio* is the proportion of firms at the bottom of the pyramid (e.g., production firms) to the total number of firms in the business group. This variable is important because firms at the bottom of the pyramid are, by definition, least important for the pyramid structure and could, therefore, be the easiest to discard. *Public* is a dummy variable that equals 1 if the ultimate owner is a public firm and zero otherwise. Lastly, *Level* refers to the specific depth within the pyramid where the sample firm resides. The level is measured from top to bottom, with larger values indicating a lower location within the business group. In Table 5 we introduce our measures for *pyramid complexity* into the incidence and resolution of financial distress.

We observe in the model (1) of Table 5 that the coefficients for pyramid complexity are all significantly positive. This result is consistent with our earlier finding that business group

membership is positively associated with default. Interestingly, the effect on default probability declines as the pyramid becomes more complex, but that is when we do not account for the level of the firm. We can see that the level of the pyramid in which the sample firm is located is positively related to the likelihood of default. The size of the level coefficient shows that the decline in effect as the pyramid becomes more complex is outweighed by the level effect, especially for firms at the bottom of the pyramid.

In model (2) we examine how complexity might affect the decision to restructure. We find that deeper pyramids are more likely to be restructured, although the coefficient for the greatest pyramid depth (i.e., complexity =4) is statistically insignificant. Similarly, to the model (1) we again see that this effect is complemented by the level effect, where the lowest firms are more likely to be restructured. We also observe that pyramids with more productive firms at their base are more likely to reorganize. This might be done to maintain the supply chains to these productive firms and stabilize the revenue that flows back to the ultimate owner.

We examine the determinants of the decision to liquidate in the model (3). Unlike other decisions, pyramid complexity does not appear to influence the liquidation decision. Rather, it is the firm's location within the pyramid that is the only pyramid characteristic with explanatory significance. Our findings indicate that lower-positioned units are more likely to be liquidated, which is consistent with previous findings. This might be since their departure would be least disruptive to any internal supply chain that might be operating within the group.

Lastly, model (4) presents our findings regarding merger or acquisition as the ultimate resolution of financial distress. We again find that firms located in deeper pyramids are more likely to be acquired, perhaps due to their wider set of networks and greater connections to other firms. The negative coefficient for the Production Firm Ratio might indicate some reluctance of pyramids

to sell firms' production within their group since their departure could disrupt the production chain by subordinate units at the bottom.

We conclude from this analysis that pyramid characteristics influence not only the incidence of financial distress but also how the firm exits from it. We find that pyramid complexity, the relative distribution of productivity with the pyramid, and the firm's location within the pyramid are significant factors in explaining the nature of financial distress within a business group. Additionally, we show that the public/private identity of the ultimate owner as well as the number of firms in the pyramid is not significant for describing how business groups react to financial distress. These results are consistent with our three hypotheses regarding the significance of pyramid membership on the incidence and resolution of financial distress.

6.5 Channel analysis

Finally, we investigate the channels by which pyramid structures can result in financial distress. In particular, we examine asset tangibility, leverage, cash flow, cash holdings, sales growth, and operating profitability as possible measures of corporate behavior which can result in financial distress and require an exit strategy. They are also widely used predictors of financial distress (Altman 1968; Bhimani *et al.* 2014; Almamy *et al.* 2016; Altman *et al.* 2017; Mselmi *et al.* 2017). The specific effects of pyramid complexity, the production firm ratio, and the public/private nature of the pyramid on these channels are explicitly examined in the various panels of Table 6.

In Panel A we focus our analysis on firms that default. We immediately observe that pyramid complexity has an adverse effect on the firm's profitability as measured by its operating margin. This effect is especially present for public pyramids. There is also some evidence that asset tangibility increases with more complex pyramids while the use of leverage decreases. This

suggests that any default which occurs in a pyramid is due less to the asset or capital structure problems, but rather poor profitability and weak cash flow.

Panel B examines those firms that reorganize following financial distress. For these firms, pyramid complexity has a positive effect on asset tangibility. As the pyramids in which these firms reside become more complex, their asset tangibility increases. This makes them more valuable while they are in the process of reorganization and planning a return to operation. Interestingly, pyramid complexity is associated with reduced levels of cash flow, cash, and operating margin. These results are consistent with the transfer of liquid assets from the reorganized firm to higher-level units in the pyramid. Although the firm has been reorganized, it might be partially hollowed out with a reduced ability to generate profit. earnings capability. The other explanatory variables also provide insights into the nature of these reorganized firms. Pyramids with a higher percentage of production firms relative to the size of the pyramid tend to have higher levels of asset tangibility and leverage. Public pyramids, however, have lower levels of both asset tangibility and leverage. We observe similar results for firms located on lower levels of the pyramid.

We examine our set of liquidating firms in Panel C. We find that complex pyramids are associated with reduced levels of cash, lower sales growth, and declining profitability. Such poor prospects for these firms are consistent with the decision to liquidate them. But these same firms enjoy greater asset tangibility. This increase in asset tangibility might be a strategy by upper-level management to transfer cash into assets that can be transferred upwards under the guise of business operations and leave behind only a shell company to be liquidated to satisfy creditors.

We analyze those firms which are acquired in Panel D. For the most complex pyramids, there is some evidence that the firms which are sold have fewer tangible assets but are less

leveraged. These firms also appear to generate lower levels of cash flow, encouraging management to view them as candidates for acquisition.

6. Conclusion and Discussion

In this study, we examine the causes and consequences of financial distress within a business group. Because of the resources available to firms within a group and the agency problems that potentially exist between the ultimate owner and the other member firms, the outcomes from financial distress might be different for these firms relative to stand-alone companies. Indeed, our empirical findings are consistent with such a conclusion.

We find that corporate pyramid membership does affect the likelihood of financial distress. Specifically, we discover that business group membership is positively associated with a greater likelihood of default. This effect is more pronounced in the presence of negative cash flow. These results are consistent with risk-shifting and group value optimization behaviors by management.

We further determine that corporate pyramid membership affects 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 premise that when business group firms default it is a conscious choice by management to allow that to occur and consequently are unlikely to reorganize the firm. Liquidation or acquisition is the more likely outcome for these firms.

Finally, we examine how pyramid complexity and the firm's position within the pyramid affects the incidence of financial distress and resolution. We find that deeper pyramids are less likely to have firms become distressed. But when such firms do become distressed, they are more likely to be liquidated, perhaps because they are less central to the group's operations.

We further discover that pyramid complexity affects both cash flow and asset tangibility. Increasing pyramid complexity tends to depress cash flow while increasing asset tangibility. These effects help to identify the channels through which pyramid structures influence both the incidence and resolution of financial distress.

We conclude from this study that both the incidence and resolution of financial distress differ significantly when business groups are involved. Our findings are consistent with previous results in the corporate finance literature on agency theory, asset tunneling, and control vs voting rights. They also might explain the occurrence of "sudden" or "unexpected" bankruptcies that have been observed.

This study raises important questions about other strategic decisions that are made within business pyramids 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 pyramid elect to sacrifice a firm through liquidation by transferring the liabilities of more promising units to it? This study is simply an initial investigation regarding how a firm's membership in a business group differs from that of independent entities.

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), External steps taken (Insolvency, Bankruptcy/liquidation, Merger or take-over). We exclude missing/unknown status and active, yet dormant companies.
Business group characteristics, position firms within the pyramid	
Business group	Dummy equals one if a firm belongs to a business group.
Pyramid depth	Maximum number of levels (ownership layers) in the business group.
NF	Number of firms (with 50% control) within the pyramid.
Public	Dummy equals one if at least one firm in the pyramid is publicly traded. Private=1-Public.
Complex	Qualitative variable on complexity (number of the levels within the pyramid). =1 for pyramid with just one level =2 if 1< pyramid depth ≤ 3 =3 if 3< pyramid depth ≤ 5 =4 if pyramid depth >5
Pyr_inx	*Pyramidal Structure Index,* also called Pyramidal Index or PI. This measure is computed as: $$PI = \frac{2(\sum_{i=1}^{PD} i * Share(i) - 1)}{\#\, firms - 1}$$ where *PD* is dept of the pyramid (i.e., the maximum number of levels in the group), #firms denote the number of the firms in the pyramid ***P***, and *Share(i)* is the ratio of the firms located in the *level(i)*. The pyramidal index PI was introduced in (Belenzon & Berkovitz 2010) as a measure of the complexity of the ownership nexus (Claessens *et al.* 2002).
PF_ratio	We suggest using another measure of the (functional) pyramid complexity based on leaves (i.e., production units). *PF*, production firm ratio of the pyramid, which is the number of the production units (leaves) over the total number of business' group affiliated firms.

$$PF = \frac{\#\ of\ production\ units}{\#\ firms}$$

Level	The pyramid level where the firm is located within the pyramid

Ownership type

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

D_type	Categorical variable containing aggregated ownership type categories for the owner with the highest share. Based on variable *SH_TYPE* originally covering fifteen different categories: [6] We employ the following comprehensive categorization: • Family: (=1), *SH_TYPE* = I ("Named individuals or families"). This is our base category. • Corporate: (=2), *SH_TYPE* = C ("Trade& Industry organization"). • Active: (=3), *SH_TYPE* = P ("Private Equity firms") or V ("Venture Capital") • 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/Nominee /Trust"). • Anonymous corporate: (=6), *SH_TYPE* = L ("Other named Shareholders") • Anonymous individual: (=7), *SH_TYPE* = D ("Anonymous Private Stockholders") • Management: (=8), *SH_TYPE* = M ("Employees/Managers/Directors") • Unknown, missing: (=9), *SH_TYPE* has missing value/unknown ownership type

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 $(TURN)_{t\text{-}1\ scaled}$ by lagged sales $(TURN)_{t\text{-}1}$.
Profitability	Measured by ROA. Operational profit or loss (= *OPPL*) scaled by total assets (*TOAS*).
Cash Flow	Profits/loss plus depreciation (=*CF*) scaled by total assets (*TOAS*).
Leverage	Long-term debt (*LTDB*) plus bank loans (*BL*) scaled by total assets (*TOAS*).
Zero leverage (*levgt*)	The dummy is equal one if firm leverage is equal zero.

[6] The aggregated ownership types use the ownership classification from the Amadeus (variable SH_TYPE): A = Insurance company, B = Bank, C = Trade & Industry organization, D = Nameless private stockholders, aggregated, E = Mutual & 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. Computed as *YEAR* minus year of incorporation (*YEARINC*) plus 1. Truncated at 50, i.e., variable is set to 50 for age exceeding this value.
Missing Age	If age is missing, then missing age is equal to 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 $(VA)_t$ minus lagged value added $(VA)_{t-1}$, scaled by lagged value added $(VA)_{t-1}$.

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

Private Credit/GDP	Private credit scaled by GDP. Private credit is the deposit by money banks and other financial institutions.
Market Cap/GDP	Total value of all listed shares on the national stock exchange as a percentage of GDP.
GDP Growth	The annual percentage nominal growth rate of GDP 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)
Institutional Control Variables	Include the World Governance indicators: Political stability, absence of violence, Government effectiveness, Regulatory quality, Rule of law, and Control of corruption. As an alternative we also used the index of the creditor's rights (1 to 4, 1 is the highest) taken from Djankov at al (2007).

Control Variables Groupings

Macro Control Variables	Consist of Private Credit to GDP, Stock Market Capitalization to GDP, GDP Growth, GDP in constant USD, and GDP per Capita (constant USD). Plus, the set of WGI indicators.
Time period dummies	The set of dummies indication periods with the 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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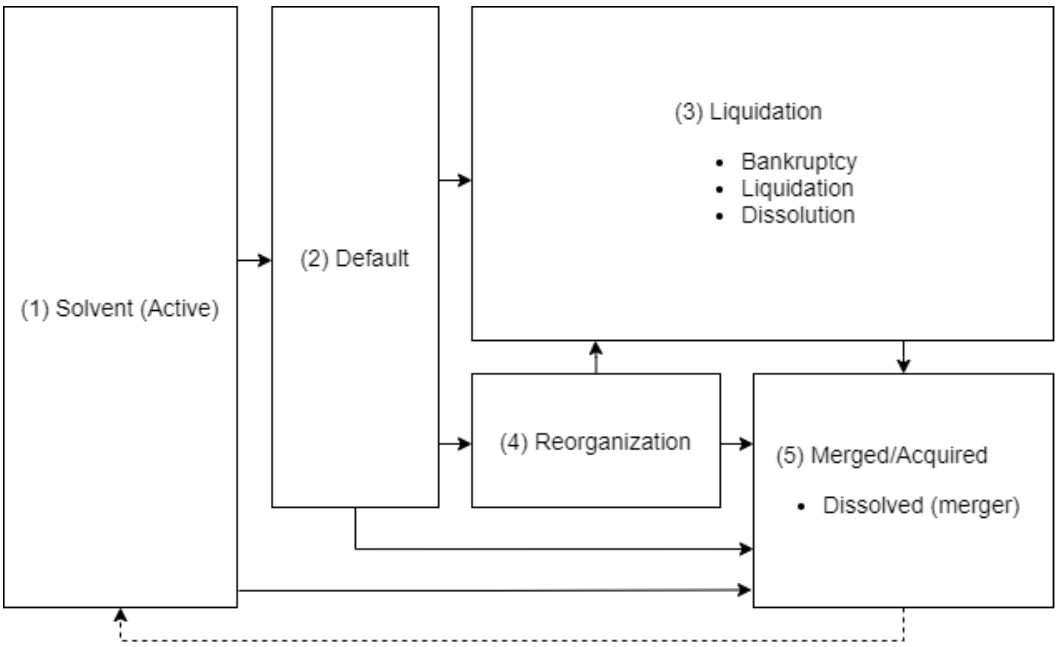
Figure 1: Corporate transitions across legal status



Notes: The figure shows firm legal status changes identified in sample of 11,572,925 firm-year observation of 2,263,395 unique European private firms from twenty-five European countries during the 2000-2018 period. The solid lines represent legal status changes after the firms get into financial distress. The dashed lines represent reorganization policies. The firm-year observations omit within-year legal status changes. Detailed definition of company legal status categories is provided in the Online Appendix.

Figure 2: Algorithm of annual pyramid construction

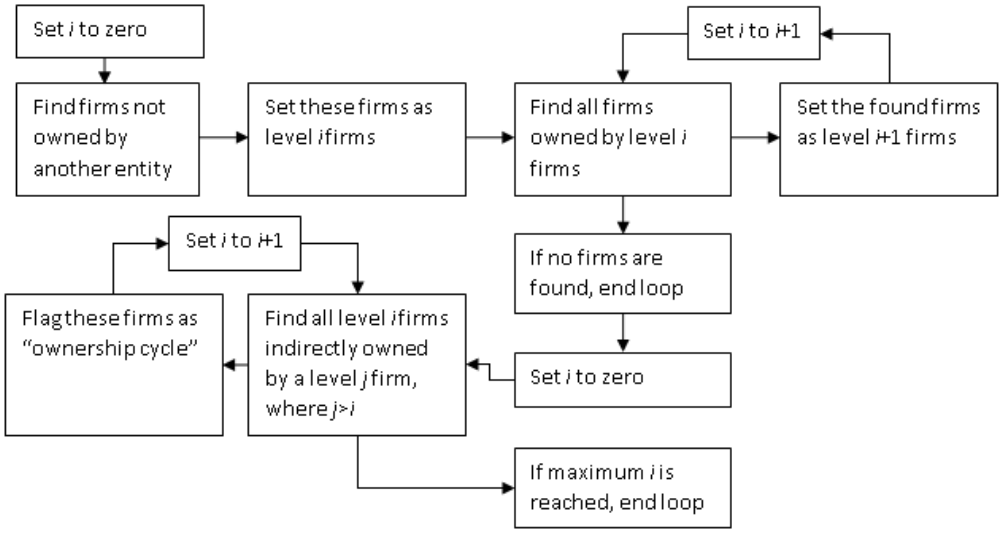


Table 1: Comparative analysis between business group and stand-alone firms

A. Legal status distribution

The first row contains the total number of observations (firm*year) while the second and third rows correspond to row and column percentages, respectively.

Financial Distress	Business Group	Standalone	Total
Active/Solvent	2,927,690	7,750,803	10,678,493
	27.42	72.58	100
	91.1	92.72	92.27
Default	38,886	91,866	130,752
	29.74	70.26	100
	1.21	1.1	1.13
Reorganization	21,888	85,963	107,851
	20.29	79.71	100
	0.68	1.03	0.93
Liquidation	187,593	398,852	586,445
	31.99	68.01	100
	5.84	4.77	5.07
M_A	37,696	31,688	69,384
	54.33	45.67	100
	1.17	0.38	0.6
Total	3,213,753	8,359,172	11,572,925
	27.77	72.23	100
	100	100	100

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B. Financial and accounting characteristics

For mean difference we apply classical t-test, unequal variances and for difference in medians, Mann-Whitney median test. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively

Variable	Business group			Stand alone			Median difference	Median difference
	N	mean	median	N	mean	median		
Log (Total assets)	3,213,753	14.1	14.13	8,359,172	13.659	13.659	0.441***	0.471***
Fixed assets/ total assets	3,124,839	0.313	0.232	8,216,626	0.313	0.248	0.001***	-0.016***
Asset tangibility	3,213,753	0.318	0.233	8,359,172	0.316	0.248	0.002***	-0.015***
Employees/ total assets+	3,102,111	15.939	6.942	8,239,354	19.297	9.104	-3.358***	-2.162***
Total debt/total assets	3,206,552	0.162	0.047	8,345,290	0.181	0.096	-0.019***	-0.049***
Zero dept dummy	3,213,753	0.362	0.000	8,359,172	0.289	0.000	0.073***	0.000***
Sales growth	2,944,690	1.224	0.026	7,889,863	0.983	0.02	0.241***	0.006***
Return on assets	3,212,807	0.048	0.042	8,357,628	0.054	0.045	-0.006***	-0.003***
Cash flow/total assets	3,213,753	0.065	0.055	8,359,172	0.072	0.06	-0.007***	-0.005***
Gross investment	2,721,431	0.045	0.017	7,074,025	0.047	0.019	-0.002***	-0.002***
Age	3,213,753	14.729	11	8,359,172	15.5	13	-0.771***	-2***
Cash /Total Assets	3,099,227	0.133	0.06	8,094,716	0.145	0.074	-0.012***	-0.014***

C. Defaults across industry classifications

For each category, the first column contains the total number of observations, the second column has the percentage of defaulting firms within the industry and the category. The last column in the table includes the distribution of (all) defaulting firms across the industries.

Industry Classification	*Business Group*		*Stand-alone*		*Default*
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 & 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%

D. Defaults across sample countries

The first column contains country ISO2 name/abbreviation. For each category, the first column contains the total number of observations, the second column has the percentage of defaulting firms within the country and the category.

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

E. Defaults across the sample period

For each category, the first column contains the total number of observations, the second column has the percentage of defaulting firms within the year and the category.

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

Table 2: Pyramid Affiliation and Financial Distress: Entering the Default of payments

This table examines the effect of pyramid affiliation on the likelihood of a solvent firm becoming financially distressed. The dependent variable is a dummy variable that assumes one if the firm defaults and is zero if Solvent. The table contains marginal effect for each variable, for continuous variables computed by delta method. Base (omitted) category for the ownership structure is a stand-alone firm, omitted (base) category for the ownership type is Family/individual owned firm. All unscaled control variables are denominated in U.S. dollars. Because of very low incidence of Default (1.21%) in the main sample, the estimation employs balanced subsample constructed using nearest neighbor matching. In this matched sample, default and solvent firms should not be very different in terms of their size measured by total assets and number of employees, and asset structure. Firms should operate in exactly the same industry (letter classification of NACE2 system), country, during the same time period, and having the same business structure (stand-alone versus business group). Detailed estimation results, and matching are provided in the in the Online Appendix Table A.2. See Appendix for variable definitions and group control variable definitions. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Explanatory variable *(Default=1, Solvent=0)*	
Variables	(1)	(2)
Business Group (=1)	0.032***	0.035***
	(0.002)	(0.003)
Positive Cash flow		-0.057***
		(0.010)
Positive Cash flow *		-0.004
Business Group (=1)		(0.017)
Negative Cash flow		-0.004
		(0.013)
Negative Cash flow *		0.054**
Business Group (=1)		(0.023)
Corporate owner	0.016***	0.017***
	(0.002)	(0.002)
Active private	0.001	-0.001
	(0.025)	(0.025)
State ownership	-0.036***	-0.031***
	(0.010)	(0.010)
Institutional	0.007**	0.007*
	(0.004)	(0.004)
Anonymous private	0.012	0.018
	(0.017)	(0.018)
Anonymous Corporate	0.000	0.001
	(0.019)	(0.020)
Managerial ownership	-0.028*	-0.030**
	(0.015)	(0.015)
Unknown owners' type	0.005**	0.005**
	(0.002)	(0.002)
Firm controls	Partial	Partial
Macro control, governance	yes	yes
Time period dummies	yes	yes
Industry dummies	yes	yes
Pseudo R^2	0.451	0.451
Observations (N)	201,349	201,349
Percent of defaulting firms	44.8	44.8

Table 3: Pyramid Affiliation and the Resolution of Default of Payments

This table examines the effect of pyramid affiliation on the resolution of financial distress, the question on future of default firms: Restructure or liquidate? Starting legal status is default of payment and we analyze the subsequent actions.

Panel A. Restructure or liquidate?

The dependent variable is a dummy variable that assumes a value of 1 if the firm is reorganized and zero if liquidated. All unscaled firm control variables are denominated in U.S. dollars. See Appendix for variable definitions and group control variable definitions. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Explanatory variable *(Restructuring =1, Liquidation=0)*	
Variables	(1)	(2)
Business Group (=1)	-0.058***	-0.056***
	(0.005)	(0.008)
Positive Cash flow		-0.089***
		(0.029)
Positive Cash flow *		0.001
Business Group (=1)		(0.061)
Negative Cash flow		0.030
		(0.025)
Negative Cash flow *		0.051
Business Group (=1)		(0.058)
Corporate owner	-0.071***	-0.070***
	(0.006)	(0.006)
Active private	-0.021	-0.022
	(0.069)	(0.069)
State ownership	-0.230***	-0.232***
	(0.063)	(0.063)
Institutional	-0.001	-0.001
	(0.009)	(0.009)
Anonymous private	-0.078	-0.079
	(0.060)	(0.060)
Anonymous Corporate	-0.029	-0.030
	(0.076)	(0.076)
Managerial ownership	-0.050	-0.050
	(0.052)	(0.052)
Unknown owners' type	-0.018***	-0.017***
	(0.005)	(0.005)
All controls same as Table 2	yes	yes
Pseudo R^2	0.074	0.075
Observations (N)	34,577	34,577
Percent of restructured firms	19.2	19.2

Panel B. Returning to Solvent status without formal Restructuring?

The dependent variable is a dummy variable that assumes a value of 1 if the firm is reorganized and zero if returned to the Active/solvent stage. All unscaled firm control variables are denominated in U.S. dollars. Because of lower number of observations, incidence rate and increased perfect predictability, we cannot use the full set of control variables and FE. When including type of the owner, we can fully control only for firm level characteristics and time period dummies. See Appendix for variable definitions and group control variable definitions. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

	Explanatory variable *(Restructuring =1, Solvent=0)*	
Variables	(1)	(2)
Business Group (=1)	0.006	0.015***
	(0.004)	(0.005)
Positive Cash flow		0.117***
		(0.036)
Positive Cash flow *		-0.153***
Business Group (=1)		(0.053)
Negative Cash flow		0.032
		(0.027)
Negative Cash flow *		-0.045
Business Group (=1)		(0.042)
Corporate owner	0.002	0.001
	(0.005)	(0.005)
Active private	n.a.	n.a.
State ownership	-0.025	-0.024
	(0.022)	(0.022)
Institutional	0.004	0.003
	(0.008)	(0.008)
Anonymous private	n.a.	n.a.
Anonymous Corporate	n.a.	n.a.
Managerial ownership	-0.035	-0.034
	(0.025)	(0.026)
Unknown owners' type	-0.037***	-0.037***
	(0.004)	(0.004)
Firm controls	Partial	Partial
Macro control, governance	Yes	Yes
Time period dummies	Yes	Yes
Industry dummies	No	No
Pseudo R^2	0.734	0.739
Observations (N)	6,500	6,500
Percent of restructured firms	87.9	87.9

Table 4: Pyramid Affiliation and Long-term Resolution of Financial Distress

This table examines the effect of pyramid affiliation on the long-term resolution of financial distress. We analyze exits of the restructuring, based on business group membership. The dependent variable is a dummy variable depending upon the exit from restructuring. All unscaled firm control variables are denominated in U.S. dollars. In some specifications because of lower number of observations, and perfect predictability, we cannot use the full set of control variables and FE. See Appendix for variable definitions and group control variable definitions. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	Logit comparisons of different exits from the Restructuring stage					
	1=M&A 0=Liquidation		1= Liquidation 0= Solvent		1= Liquidation 0= Restructuring	
Business Group (=1)	0.014**	0.019**	0.029*	0.009	0.004**	0.006**
	(0.006)	(0.008)	(0.016)	(0.022)	(0.002)	(0.002)
Positive Cash flow		0.094***		-0.134		0.009
		(0.029)		(0.082)		(0.008)
Positive Cash flow *		-0.024		0.083		-0.033*
Business Group (=1)		(0.049)		(0.192)		(0.020)
Negative Cash flow		-0.087		0.167**		-0.056***
		(0.063)		(0.065)		(0.006)
Negative Cash flow *		-0.025		0.304*		0.002
Business Group (=1)		(0.113)		(0.164)		(0.012)
Corporate owner						0.008***
						(0.002)
Institutional						0.012***
						(0.004)
Unknown owners' type						0.004**
						(0.002)
Firm controls	Partial	Partial	Partial	Partial	Partial	Partial
Macro control, governance	No	No	Yes	Yes	Yes	Yes
Time period dummies	Yes	Yes	Yes	Yes	Yes	Yes
Industry dummies	No	No	No	No	Yes	Yes
Pseudo R^2	0.111	0.111	0.154	0.154	0.087	0.087
Observations (N)	3,119	3,119	5,737	5,737	77,354	77,354
Percent of 1	1.99	1.99	53.3	53.3	3.67	3.67

Table 5: Pyramid Complexity and Financial Distress

This table further examines how the nature of the pyramid and the location of the firm within the pyramid affects both the likelihood of financial distress and the resolution of that distress. Specifically, we introduce the following pyramid structural variables: Set of *complexity* dummies based on the pyramidal depth which captures the number of organizational levels within the pyramid. *Number of the firms in pyramids* represent the size of the business group. *Production firm ratio* is the proportion of the firms at the end of the pyramid (e.g., only production firms) to the total number of the business group firms. *Public* is a dummy variable that equals 1 if the ultimate owner is a public firm and zero otherwise. *Level* refers to the specific depth within the pyramid where the sample firm resides. The table contains marginal effect for each variable, for continuous variables computation was done by delta method. Base (omitted) category for the complexity is the subsidiary structure (Pyramidal depth=1), for the ownership type is Family/individual owned firm. All unscaled firm control variables are denominated in U.S. dollars. Full estimation results are provided in the in the Online Appendix Table A.5. See Appendix for variable definitions and group control variable definitions. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Variables	Explanatory variable (Financial status=1, 0=Active/solvent)			
	(1) Default	(2) Restructuring	(3) Liquidation	(4) M&A
Complexity=2 (2 ≤ Pyramidal depth ≤ 3)	0.123***	0.095***	0.007	0.032***
	(0.008)	(0.006)	(0.005)	(0.009)
Complexity=3 (4 ≤ Pyramidal depth ≤ 5)	0.104***	0.109***	0.010	0.055***
	(0.012)	(0.010)	(0.007)	(0.012)
Complexity=4 (Pyramidal depth > 5)	0.071***	0.008	-0.000	0.007
	(0.015)	(0.014)	(0.009)	(0.015)
Number of firms in the pyramid	-0.000***	-0.000***	-0.000***	-0.000***
	(0.000)	(0.000)	(0.000)	(0.000)
Production firm ratio	-0.011	0.040***	-0.011	-0.032***
	(0.012)	(0.009)	(0.007)	(0.012)
Public pyramid=1	0.010	-0.002	0.002	0.044***
	(0.014)	(0.012)	(0.008)	(0.013)
Level	0.017***	0.011***	0.015***	0.014***
	(0.003)	(0.003)	(0.002)	(0.002)
Corporate owner	-0.023***	-0.061***	-0.030***	0.093***
	(0.005)	(0.004)	(0.003)	(0.007)
Active private	-0.022	0.031	0.031	0.030
	(0.048)	(0.034)	(0.037)	(0.049)
State ownership	-0.043***	-0.183***	-0.029***	0.071***
	(0.015)	(0.018)	(0.010)	(0.018)
Institutional	-0.032***	-0.063***	-0.027***	0.089***
	(0.007)	(0.006)	(0.004)	(0.008)
Anonymous private		0.083	-0.077	0.411***
		(0.086)	(0.054)	(0.147)
Anonymous Corporate	0.124*	-0.077	0.069**	-0.189*
	(0.067)	(0.053)	(0.034)	(0.103)
Managerial ownership	0.112	0.008	0.021	
	(0.104)	(0.065)	(0.047)	
Unknown owners' type	0.027**	-0.062***	-0.033***	0.081***
	(0.010)	(0.006)	(0.005)	(0.011)

Firm controls	Partial	Partial	Partial	Partial
Macro control, governance	yes	yes	yes	yes
Time period dummies	yes	yes	yes	yes
Industry dummies	yes	yes	yes	yes
Pseudo R^2	0.413	0.534	0.322	0.434
Observations (N)	42,411	45,009	135,171	31,560
Percent of 1	39.6	28.5	35.8	32.7

Table 6: Pyramid structure and the channels of financial distress

Note: focus is on the accounting ratios and measures in an attempt to identify the channels by which pyramid membership creates financial distress. Base (omitted) category for the complexity is the subsidiary structure (Pyramidal depth=1), for the ownership type is Family/individual owned firm. All unscaled firm control variables are denominated in U.S. dollars. See Appendix for variable definitions and group control variable definitions. ***, **, and * indicate statistical significance at the 1%, 5%, and 10% levels, respectively.

Panel A: Pyramid firms that default

Regressor	**Dependent Variables**					
	Tangibility	Leverage	Cash flow to total assets	Cash to total assets	Sales Growth	Operating margin
Complexity=2	0.032***	-0.014	-0.011	-0.007	-0.070	-0.028***
(2 ≤ Pyramidal depth ≤ 3)	(0.010)	(0.009)	(0.007)	(0.006)	(0.097)	(0.011)
Complexity=3	0.032**	-0.038***	-0.011	-0.015	-0.042	-0.045***
(4 ≤ Pyramidal depth ≤ 5)	(0.015)	(0.014)	(0.010)	(0.009)	(0.188)	(0.015)
Complexity=4	0.056***	-0.055***	-0.000	-0.014	-0.276	-0.035*
(Pyramidal depth > 5)	(0.018)	(0.016)	(0.013)	(0.012)	(0.191)	(0.018)
Production firm ratio	0.031**	-0.002	-0.004	0.008	-0.061	-0.008
	(0.013)	(0.013)	(0.009)	(0.008)	(0.121)	(0.014)
Public pyramid=1	-0.028	-0.024	-0.003	-0.022*	0.048	-0.048**
	(0.020)	(0.017)	(0.012)	(0.012)	(0.246)	(0.023)
Pyramid level	-0.008***	-0.002	-0.005**	0.004*	0.020	0.006*
	(0.003)	(0.003)	(0.002)	(0.002)	(0.040)	(0.003)
Corporate owner	-0.060***	-0.018***	-0.007	-0.026***	-0.123	-0.033***
	(0.006)	(0.006)	(0.005)	(0.004)	(0.102)	(0.008)
Active private	-0.064	0.132*	0.012	-0.099***	0.144	-0.089*
	(0.054)	(0.071)	(0.048)	(0.036)	(0.398)	(0.052)
State ownership	0.140***	-0.011	0.020	-0.053***	0.212	-0.052*
	(0.034)	(0.032)	(0.023)	(0.018)	(0.642)	(0.027)
Institutional	-0.048***	0.001	-0.002	-0.029***	0.003	-0.027**
	(0.009)	(0.009)	(0.007)	(0.006)	(0.134)	(0.011)
Anonymous private	0.036	0.035	0.023	-0.086**	-0.244	-0.040**
	(0.073)	(0.063)	(0.068)	(0.037)	(0.243)	(0.020)
Anonymous Corporate	0.081	0.249	-0.021	0.013	-0.832***	0.090*
	(0.114)	(0.214)	(0.019)	(0.052)	(0.270)	(0.049)
Managerial ownership	-0.098	0.056	0.078*	-0.027	-0.355**	-0.036
	(0.060)	(0.068)	(0.047)	(0.040)	(0.164)	(0.059)
Unknown owners' type	-0.021*	0.007	-0.005	-0.017**	-0.148	-0.016
	(0.012)	(0.012)	(0.008)	(0.008)	(0.106)	(0.012)
All other controls as Table 2	Yes	Yes	Yes	Yes	Yes	Yes
R^2 adjusted	0.190	0.100	0.091	0.037	0.013	0.022
Observations (N)	13,575	13,516	12,958	13,575	12,289	12,313

Panel B: Pyramid firms that reorganize

Regressor	**Dependent Variables**					
	Tangibility	Leverage	Cash flow to total assets	Cash to total assets	Sales Growth	Operating margin
Complexity=2	0.058***	0.019*	-0.000	-0.019***	-0.153	-0.026**
(2 ≤ Pyramidal depth ≤ 3)	(0.010)	(0.011)	(0.004)	(0.006)	(0.269)	(0.012)
Complexity=3	0.103***	0.071***	-0.029***	-0.035***	0.354	-0.051**
(4 ≤ Pyramidal depth ≤ 5)	(0.017)	(0.019)	(0.008)	(0.011)	(0.612)	(0.021)
Complexity=4	0.123***	-0.036	-0.030***	-0.039**	-0.277	-0.044
(Pyramidal depth > 5)	(0.027)	(0.026)	(0.010)	(0.017)	(0.670)	(0.028)
Production firm ratio	0.034**	0.034**	-0.006	-0.004	-0.240	0.010
	(0.014)	(0.016)	(0.006)	(0.009)	(0.363)	(0.016)
Public pyramid=1	-0.079**	-0.055*	0.031**	-0.013	0.910	0.070*
	(0.036)	(0.030)	(0.015)	(0.023)	(1.218)	(0.036)
Pyramid level	-0.031***	-0.020***	0.001	0.005	-0.012	0.009
	(0.005)	(0.005)	(0.002)	(0.003)	(0.182)	(0.006)
Corporate owner	-0.049***	-0.041***	0.000	-0.015***	-0.073	0.001
	(0.006)	(0.007)	(0.003)	(0.004)	(0.185)	(0.008)
Active private	-0.136***	-0.128**	0.016	-0.009	-0.050	0.036
	(0.045)	(0.050)	(0.021)	(0.043)	(0.349)	(0.027)
State ownership	0.122**	0.005	-0.001	-0.040	0.252	0.134**
	(0.052)	(0.051)	(0.028)	(0.028)	(1.318)	(0.062)
Institutional	-0.063***	-0.034***	0.009*	-0.022***	0.360	0.003
	(0.009)	(0.010)	(0.005)	(0.006)	(0.294)	(0.012)
Anonymous private	0.014	-0.093	0.089	-0.036	-1.713***	-0.128
	(0.152)	(0.086)	(0.072)	(0.039)	(0.486)	(0.116)
Anonymous Corporate	0.327***	-0.318**	0.038	-0.090***	-4.101***	-0.126***
	(0.051)	(0.150)	(0.051)	(0.018)	(1.053)	(0.036)
Managerial ownership	-0.095	0.016	0.065	-0.098	-1.131	-0.035
	(0.070)	(0.094)	(0.043)	(0.076)	(1.371)	(0.051)
Unknown owners' type	-0.036***	-0.012	-0.000	-0.014**	0.067	-0.001
	(0.009)	(0.010)	(0.004)	(0.006)	(0.283)	(0.010)
All other controls as Table 2	Yes	Yes	Yes	Yes	Yes	Yes
R^2 adjusted	0.217	0.173	0.110	0.056	0.041	0.034
Observations (N)	12,286	12,237	11,692	12,286	10,991	11,258

Panel C: Pyramid firms that liquidate

Regressor	Dependent Variables					
	Tangibility	Leverage	Cash flow to total assets	Cash to total assets	Sales Growth	Operating margin
Complexity=2	0.014***	0.003	-0.001	-0.015***	-0.109	-0.025***
(2 ≤ Pyramidal depth ≤ 3)	(0.005)	(0.005)	(0.003)	(0.003)	(0.131)	(0.005)
Complexity=3	0.003	-0.010	0.006	-0.024***	-0.168	-0.047***
(4 ≤ Pyramidal depth ≤ 5)	(0.007)	(0.007)	(0.005)	(0.005)	(0.189)	(0.007)
Complexity=4	0.021**	-0.008	0.007	-0.040***	-0.038	-0.057***
(Pyramidal depth > 5)	(0.008)	(0.009)	(0.006)	(0.006)	(0.231)	(0.009)
Production firm ratio	0.014**	0.021***	-0.006	-0.006	-0.048	-0.013**
	(0.006)	(0.007)	(0.004)	(0.005)	(0.179)	(0.006)
Public pyramid=1	0.000	-0.004	-0.024***	-0.002	-0.460**	-0.009
	(0.009)	(0.008)	(0.006)	(0.006)	(0.202)	(0.008)
Pyramid level	-0.003*	-0.003*	-0.003***	0.001	0.100**	0.009***
	(0.002)	(0.002)	(0.001)	(0.001)	(0.044)	(0.002)
Corporate owner	-0.060***	-0.031***	-0.004*	-0.025***	-0.011	-0.030***
	(0.003)	(0.003)	(0.002)	(0.002)	(0.093)	(0.004)
Active private	0.011	0.044	0.007	-0.122***	0.597	-0.123*
	(0.031)	(0.054)	(0.018)	(0.034)	(0.962)	(0.067)
State ownership	0.100***	-0.040***	0.071***	-0.051***	0.235	-0.110***
	(0.019)	(0.015)	(0.014)	(0.012)	(0.541)	(0.024)
Institutional	-0.050***	-0.012***	-0.009***	-0.029***	-0.062	-0.030***
	(0.004)	(0.005)	(0.003)	(0.003)	(0.117)	(0.005)
Anonymous private	0.056	0.054	0.112**	-0.128***	-0.777*	-0.072
	(0.047)	(0.048)	(0.047)	(0.049)	(0.458)	(0.066)
Anonymous Corporate	-0.032	-0.032	0.110*	-0.003	-0.491***	-0.019
	(0.060)	(0.042)	(0.061)	(0.053)	(0.171)	(0.021)
Managerial ownership	-0.130***	-0.085***	0.080**	-0.021	-0.187	-0.013
	(0.031)	(0.026)	(0.039)	(0.042)	(0.490)	(0.036)
Unknown owners' type	-0.034***	-0.001	-0.006*	-0.022***	0.091	-0.030***
	(0.005)	(0.005)	(0.003)	(0.003)	(0.101)	(0.005)
All other controls as Table 2	Yes	Yes	Yes	Yes	Yes	Yes
R^2 adjusted	0.151	0.129	0.079	0.045	0.043	0.032
Observations (N)	53,764	53,313	50,454	53,764	49,147	50,006

Panel D: Pyramid firms that are acquired

Regressor	**Dependent Variables**					
	Tangibility	Leverage	Cash flow to total assets	Cash to total assets	Sales Growth	Operating margin
Complexity=2	0.013	0.012	-0.020***	-0.009	-0.257	0.007
(2 ≤ Pyramidal depth ≤ 3)	(0.011)	(0.010)	(0.007)	(0.007)	(0.230)	(0.012)
Complexity=3	0.003	0.004	-0.020**	-0.024**	-0.292	-0.014
(4 ≤ Pyramidal depth ≤ 5)	(0.016)	(0.015)	(0.010)	(0.010)	(0.286)	(0.017)
Complexity=4	-0.036*	-0.045**	-0.014	-0.022	-0.482	-0.002
(Pyramidal depth > 5)	(0.020)	(0.018)	(0.014)	(0.013)	(0.431)	(0.025)
Production firm ratio	0.010	0.016	-0.006	-0.002	-0.242	0.011
	(0.015)	(0.014)	(0.010)	(0.009)	(0.273)	(0.015)
Public pyramid=1	0.011	-0.015	0.014	0.006	-0.231	-0.023
	(0.022)	(0.017)	(0.015)	(0.012)	(0.273)	(0.026)
Pyramid level	-0.001	0.003	-0.007***	0.001	0.082	-0.001
	(0.003)	(0.003)	(0.002)	(0.002)	(0.079)	(0.005)
Corporate owner	-0.073***	-0.031***	-0.009	-0.041***	0.052	-0.075***
	(0.009)	(0.009)	(0.006)	(0.006)	(0.164)	(0.010)
Active private	0.047	-0.030	-0.055	-0.159***	-0.371	-0.149***
	(0.083)	(0.057)	(0.043)	(0.050)	(0.290)	(0.034)
State ownership	-0.087*	-0.115***	0.171***	-0.086***	-0.302	-0.148***
	(0.044)	(0.025)	(0.039)	(0.016)	(0.240)	(0.051)
Institutional	-0.062***	-0.020*	-0.015**	-0.051***	0.015	-0.106***
	(0.011)	(0.011)	(0.007)	(0.007)	(0.172)	(0.012)
Anonymous private	-0.097***	-0.121***	-0.013	0.032	-0.035	-0.178***
	(0.027)	(0.021)	(0.013)	(0.020)	(0.502)	(0.029)
Anonymous Corporate	0.257***	0.010	-0.027	-0.099***	0.299	-0.246***
	(0.064)	(0.072)	(0.060)	(0.019)	(0.298)	(0.087)
Managerial ownership	-0.035	-0.069***	-0.112***	0.011	0.000	0.000
	(0.022)	(0.021)	(0.017)	(0.015)	(.)	(.)
Unknown owners' type	-0.037***	-0.021	-0.020**	-0.038***	0.255	-0.082***
	(0.014)	(0.015)	(0.009)	(0.008)	(0.376)	(0.014)
All other controls as Table 2	Yes	Yes	Yes	Yes	Yes	Yes
R^2 adjusted	0.288	0.097	0.138	0.056	0.028	0.057
Observations (N)	10,561	10,531	10,185	10,561	8,959	9,160