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In Business Groups We Trust

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Abstract

We investigate the impact of trust on the prevalence of business groups. Using firm-level information on group affiliation, we perform estimations on a large sample of 258,984 companies from twenty-five European countries. We find that higher trust is associated with a lower probability to be affiliated to a business group. Our findings accord with the hypothesis that higher trust diminishes the incentives for a firm to internalize transactions through the emergence of a business group. We also find limited evidence that the negative effect of trust on group affiliation is stronger for firms with higher information asymmetries. We furthermore conclude that trust is a substitute for the quality of formal institutions. Our work contributes to a better understanding of the reasons why business groups exist. It completes the institutional voids perspective by showing that informal institutions must be taken into account to understand the prevalence of business groups.

Keywords: business groups, trust.

JEL codes: G34, P16

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1. Introduction

“Trust is good, control is better”

– Lenin.

Business groups are prevalent around the world (Carney et al., 2017). They are very common in almost every country with the notable exception of the US where the conglomerate form is the norm (Khanna and Yafeh, 2007). A business group is a set of legally independent firms that share a central controlling and coordination mechanism. In practice, centralization of control can take multiple forms like formal equity ties between firms in a holding company or the fact that different business owners belong to the same family.

However, despite the prevalence of business groups all around the world, the explanations for their existence remain highly debated. The most popular explanation in the literature is the institutional voids perspective, which considers business groups as a response to a lack of institutions or market imperfections (Leff, 1976, 1978; Khanna and Palepu, 2000; Khanna and Rivkin, 2001). In these contexts, business groups internalize functions for which transaction costs are too high. Market imperfections and related transaction costs leading to the formation of business groups can take different forms like inefficient capital markets (Gertner, Scharfstein, and Stein, 1994; Almeida and Wolfenzon, 2006; Belenzon, Berkovitz and Rios, 2013), or inefficient labor markets (Fisman and Khanna, 2004; Belenzon and Tsolmon, 2015).

Interestingly, while the role of formal institutions in the formation of business groups has been largely investigated, less is known about the role of informal institutions, which are “behavioral regularities based on socially-shared rules, usually unwritten, that are created, communicated, and enforced outside of officially-sanctioned channels” (Helmke and Levitsky, 2003). Our objective in this paper is to investigate the influence of trust, a key informal institution, on the prevalence of business groups.

Trust can be defined as the willingness to make oneself vulnerable to another person's actions, based on beliefs about his/her trustworthiness (Bohnet, 2008). It therefore refers to the expectation of good behavior by others. As observed by Arrow (1972), “virtually every commercial transaction has within itself an element of trust.” (p

357) Trust can therefore affect transaction costs and through this mechanism exert an influence on the prevalence of business groups. The hypothesis underlying the effect of trust on the formation of business groups is based on the following mechanism.

Business contracts are necessarily incomplete when it comes to describe the nature of the good to be delivered (Grossmann and Hart, 1986). The description of the nature of the good corresponds to specific rights over the good. However, the initial owner of the good has residual property rights over it and a transaction involves the transfer of these residual rights to the buyer of the good. Ownership thus corresponds to the purchase of residual rights. It gives the ability to decide and act within the gaps of contract incompleteness. Therefore, the choice of an organizational structure between business group or standalone firm depends on the existence of uncertainty that conditions how potential business partners will allocate residual rights.

Trust plays here a key role since a greater degree of trust contributes to lower transaction costs. Indeed, when trust is high, firm decision makers' fear less the opportunistic behavior of trade partners and are more motivated to engage in exchange. This context contributes to reduce transaction costs and makes the choice of a business group organizational mode less adequate. Conversely, when trust is low, uncertainty about the behavior of trade partners increases, thus people are more willing to build business groups to internalize transactions as much as possible to reduce the need to perform market transactions. As a consequence, a higher degree of trust should be associated with lower prevalence of business groups.

To test this hypothesis, we perform regressions of the group affiliation variable on a large set of variables including our key variable of interest, trust, on a large dataset of 258,984 companies from twenty-five European countries. The investigation on European countries presents two major advantages. First, we have all information on group affiliation and financial information for a large set of companies thanks to the use of Amadeus database. Second, trust considerably varies across European countries while these countries are relatively homogenous in terms of formal institutions like economic and political institutions. On a scale ranging from 0 (low trust) to 10 (high trust), trust ranges from 4.2 in Bulgaria to 8.3 in Denmark (source: Eurostat for 2013). They

consequently represent a relevant area to analyze how trust can affect the prevalence of business groups.

Our work contributes to two strands of literature. First, we improve our understanding of the reasons why business groups exist. We complement the literature on the prevalence of business groups by examining the influence of trust. Our contribution to this literature also goes through the implementation of a firm-level analysis which has been scarcely done (Belenzon, Berkovitz and Rios, 2013; Belenzon and Tzolmon, 2015) in spite of the fact it provides a better identification than that of a country-level analysis.

Second, we extend the literature on trust by analyzing how it can influence business organization. Literature on trust has exploded in the last decades with evidence of its role on economic outcomes (Knack and Keefer, 1997, for economic growth), in finance (van Bastelaer and Leathers, 2006, on lending decisions; Dowling et al., 2019, on attitudes toward equity financing), and in corporate governance (Child and Rodrigues, 2004; Puranam and Vanneste, 2009). However, to the best of our knowledge, no work has ever investigated whether trust can affect business organization and thus influences the prevalence of business groups.

The paper proceeds as follows. Section 2 presents the background of the research question. Section 3 reports the data and methodology. Section 4 discusses the results. Section 5 concludes.

2. Background

This section is devoted to the background of our research question. We first review the theories on the prevalence of business groups. We then develop the hypotheses on the relation between trust and group affiliation.

2.1 Theories on the prevalence of business groups

A fundamental characteristic of business organization is the fact that firms do not operate as isolated entities but are parts of larger entities. These entities have various forms and shapes, each of which defines the nature of the coordination mechanisms

between members of the organization. One of the most studied forms of business organization is business group. The nature of the relationship that ensures the cohesion of business groups largely differs from one country to another (Khanna and Yafeh, 2005), leading to the fact that an explicit definition of a business group is challenging. We adopt the relatively broad definition of Colpan and Hikino (2010) who characterize a business group as « an economic coordination mechanism in which legally independent companies utilize the collaborative arrangements to enhance their collective economic welfare » (p.17).

With the prevalence of business groups around the world (Carney et al., 2017), several theoretical explanations have been put forward for the existence of business groups.

First, the management and entrepreneurship literature adopts an endogenous approach and considers that business groups provide specific resources and capabilities that can be a competitive asset, particularly in emerging economies (Guillén, 2001; Colpan and Hikino, 2010). The idea is that business groups are active in various product categories, making their competitive resources and capabilities become non-industry-specific. Over time, business groups gradually establish trans-product or industry-transcending capabilities as they accumulate knowledge in administrative skills, financial capabilities, human resource management, and marketing expertise. Thus, the specific governance and management structure of business groups helps overcome some of the challenges associated with organizational adaptation to environmental change and resource reconfiguration (Manikandan and Ramachandran, 2015). According to this view, business groups should flourish in specific environment and particularly in environment characterized by uncertainty and lower development.

Second, the political economy approach emphasizes that business group prevalence is an outcome of complementarities between the state and corporate elites (Maman, 2002; Schneider, 2009). At early stages of economic development, the government supported selected entrepreneurs in order to promote industrialization, but subsequently these relationships become locked in (Kim, 2010). According to this view business groups are thus left over from economic development. Recent studies highlight that while business groups emerge during periods of economic turbulence, they persist over time (after

industrialization) and thus may well be the outcome of valid alternative socio-economical models (Zhang, Sjögren and Kishida, 2016).

Third, the corporate finance literature has mainly focused on the pyramidal aspect of business groups and the resulting economic entrenchment issues where business groups are seen as vehicles for unproductive rent-seeking behaviors (Morck, Wolfenzon and Yeung, 2005). Indeed, by exploiting the separation between cash-flow rights and control rights inherent to pyramidal structure, majority shareholders can expropriate minority shareholders through the tunneling process (Johnson et al., 2000). This view builds on the principal-principal perspective of agency theory which focuses on the conflict between minority and majority shareholders (Cuervo-Cazurra, 2006). According to this theory, business groups should thrive in developing economies where investor protection is weak and contract enforcement remains inadequate.

Finally, the most developed theory in the literature is the institutional voids perspective which considers business groups as a response to market imperfections. From this point of view, business groups are responses to imperfections in capital, product, labor and other markets and institutions (Leff, 1976, 1978; Khanna and Palepu, 2000; Khanna and Rivkin, 2001). For Leff (1978, p 667): « institution of the group is thus an intrafirm mechanism for dealing with deficiencies in the market for primary factors, risk, and intermediate products in the developing economies ». The central argument of the institutional voids perspective is that business groups internalize functions for which no external market or supporting institution exists. This large literature has focused on several market and institutional inefficiencies. From a theoretical perspective, when transactions are costly alternative modes (to the market) of organizing transactions might reduce those transaction costs (Williamson, 1975, 1985).

The literature on institutional voids perspective has examined several forms of market imperfections and related transaction costs that lead to the formation of business groups. First, business groups are viewed as relatively efficient internal capital markets (Gertner, Scharfstein, and Stein, 1994; Almeida and Wolfenzon, 2006) that remedy impediments to firm growth for their affiliates, such as illiquid equity markets, limited disclosure, and the absence of market intermediaries (Khanna and Palepu, 2000). This view is supported by studies documenting the reliance of affiliates on group-specific

financial institutions (Keister, 1998; Weinstein and Yafeh, 1998), those exploring how business groups transfer financial resources from cash-rich to financially distressed affiliates (Ferris et al., 2003; Dow and McGuire, 2009) and improve access to and lower the cost of raising finance (Belenzon, Berkovitz and Rios, 2013; Gorodnichenko et al., 2009).

Second, business groups can create internal labor markets (Fisman and Khanna, 2004; Belenzon and Tzolmon, 2015). Business groups invest in training and development (Khanna and Palepu, 2000) and facilitate the allocation of talents across affiliates (Lincoln and Gerlach, 2004). The flexibility granted by internal labor markets helps alleviate labor markets rigidities (Belenzon and Tzolmon, 2015).

It has to be stressed that most of the literature has examined business group prevalence in developing countries. However, business groups are also ubiquitous in developed economies particularly in Western Europe (Zhang, Sjögren and Kishida, 2016). The presence of business groups in developed countries challenges the institutional voids perspective and more generally the theoretical explanations commonly used in business group research. Indeed, if business groups answer the lack of institutions or market imperfections, we should observe a reduction of their prevalence when countries become more developed, institutions become stronger, and market imperfections diminish. The lower prevalence of business groups in more developed countries is however not observed empirically (Belenzon, Berkovitz and Rios, 2013).

However, even in developed economies, business groups can play “a gap-filling role”, being a second best (Langlois, 2010). Indeed, in developed economies the development of markets and market supporting institutions is high and makes possible to coordinate complementary activities in a decentralized fashion. However, there are still « gaps », in this paper we explore gaps in informal institutions.

2.2 The role of trust in business group prevalence

So far, the literature on business group emergence and prevalence has mostly built upon economics and management theories. It is however important to acknowledge that business groups are also social structures (Granovetter, 1995). For instance, Smangs (2006, p. 889) conceptualize business groups as “networks of interrelated firms”

characterized by “an institutionalized logic of reciprocity, and the intersubjective interpretation of actors inside as well as outside the group”. A major idea in Smangs (2006)’s view is that business groups represent systems of transactions based on reciprocity between the actors that compose the business group. Business group affiliates need to accept and comply with the rules set by the group. In other words, the creation of business groups answers a need to socially formalize business relations.

Since Williamson’s seminal work (1975, 1979), the literature has largely incorporated the idea that the form a business takes depends on the costs related to transactions. The general view is that market transactions are the preferred choice when the costs related to the existence of uncertainties surrounding a transaction are (or are perceived to be) low. Conversely, when transactions costs are high, internalizing transactions within a firm is a valid alternative to reduce transaction costs which leads to the formation of business groups (Granovetter, 1995). Williamson (1991) suggests that governance structure might induce different transaction costs depending on institutional contexts. Thus, the environmental context influences the choice of governance structure between a group and a standalone firm. However, while the role of formal institutions in the formation of business groups has been largely examined under the lens of transaction costs theory, less is known about the role of informal institutions including trust.

The incomplete contracts and property rights theories refine and extend transaction costs theory. Grossmann and Hart (1986) propose that business contracts are necessarily incomplete when it comes to describing the nature of the good to be delivered. It would indeed be extremely expensive to list all the possible states of nature in which the good would be delivered (Hart and Moore, 1999). The description of the nature of the good corresponds to specific rights over the good. However, the initial owner of the good has residual property rights over it and a transaction involves the transfer of these residual rights to the buyer of the good. Ownership thus corresponds to the “purchase of residual rights” (Grossmann and Hart, 1986, p.691). The allocation of residual rights (asset ownership) theoretically leads *ex post* to more efficiency¹ and likely influences organizational choices (whether to perform a transaction in the market or to internalize it) (Hart and Moore, 2007). Therefore, residual rights of control, which derive from

¹ The “hold-up” problem that results of non-contractible relationships is avoided.

ownership, accord to their holder the ability to decide and act within the gaps of contract incompleteness and thus to exercise entrepreneurial judgement (Langlois, 2010).

We then propose that the choice of an organizational structure between a business group or a standalone firm depends on the existence of uncertainty that conditions how potential business partners will allocate residual rights. Our point is that trust can reduce transaction costs. When trust between people is high, individuals, including firms' decision makers fear less the opportunistic behavior of trade partners, which reduces transaction costs and makes the choice of a business group organizational mode less adequate. Conversely, when uncertainty is high, people are more willing to build business groups to internalize transactions as much as possible to reduce the need to perform market transactions. Indeed, trust refers to the expectation of good behavior by others – it reduces the fear of opportunism and motivates people to engage in exchange (Arrow, 1974; Höhmann and Welter, 2005).

There are of course several forms of trust but our argument is built on interpersonal trust, which is a fundamental component of social transactions. This form of trust facilitates success for economic actors because trust networks enhance legitimacy and collaboration during transactions (Aldrich, 2000). Trust between economic actors ensures that information about business opportunities are shared freely and that resources are delivered and provided without the fear of being deceived (Brunetto and Farr-Wharton 2007; Molina-Morales and Martínez-Fernández 2010; Pathak and Muralidharan, 2016). Our key hypothesis is thus formulated as follows:

H1: Trust in a country reduces the likelihood of group prevalence.

However, the influence of trust on the likelihood of group prevalence will be stronger in context where the fear of likelihood of opportunistic behavior is higher. This is the case when there are information asymmetries, which occurs when the agent has relevant information that the principal does not have. Information asymmetries affect how individuals assess the quality of goods and services available on the marketplace (Akerlof, 1970) and how individuals anticipate on others' intentions and agency (Spence, 1976). Such information asymmetries raise the probability that the agent can behave in ways that enhances opportunism (Eisenhardt, 1989). In presence of information

asymmetries, transaction costs can then arise from the need to protect against the likelihood of opportunistic behavior.

Nevertheless, trust reduces the fear that firms' managers and owners can have toward market transactions. Thus, when information asymmetries are high, the role of trust on business group prevalence should be higher. This leads us to formulate our second hypothesis H2:

H2: The influence of trust on group prevalence is higher when asymmetries of information are higher.

The use of the institutional voids perspective and the transaction costs theory in the business group literature has been limited to formal institutions. Specifically, studies have examined deficiencies in legal institutions, which make formal contracts difficult to enforce and the exchange of products and services prone to opportunism (Hoskisson et al., 2004). Indeed, weak contract enforcement may lead to the group's investing in several businesses rather than trusting external parties that might behave opportunistically. However, formal and informal institutions are largely intertwined and their imbrication should be carefully taken account when explaining organizational behavior (Zenger, Lazzarini and Poppo, 2000).

Here our hypothesis is of a substitution effect of business groups. Business group ties serve as second best solution in countries with weak legal structures, since trust between business group members can be a substitute for missing governance and contractual enforcement. Some researchers have underlined that transaction recurrence among business group affiliates provides rich information flows, reputation effects, and informal contract enforcement mechanisms that curb opportunism (Guillén, 2000; Khanna and Palepu, 2000). We assimilate trust to informal institutions which likely substitutes for formal institutions when formal institutions are lowly developed. In countries with strong legal structures and institutions, the role of trust on the formation of business group should be lower. Conversely, if legal structures and institutions are less developed, the role of trust will be higher in explaining why firms' owners and managers opt for the business group organizational form. This argument echoes Fisman and Khanna (1990) who indicated that "trust, by substituting for formal contracts

enforcement, may affect the types of organizational forms that emerge across different societies” (p.90).

H3: Formal institutions reduce the influence of trust on the prevalence of business groups.

3. Data and methodology

We use Bureau Van Dijk’s Amadeus database to collect our data. Amadeus is a high-quality source of information for both privately held and publicly traded European firms, that provides access to accounting, financial, and ownership data. It contains information to determine whether a firm is affiliated to a business group or not and has therefore been successfully used in previous research on business groups (Belenzon, Berkovitz and Rios, 2013; Belenzon and Tzolmon, 2015). We gather cross-sectional data for all European firms available in Amadeus in June 2020 that have at least 2M€ of sales. We exclude firms which are listed on public equity markets as well as firms from the financial industry defined as those with a three-digit standard industrial classification (SIC) code between 600 and 699.

To identify whether a firm is affiliated to a business group or not, we follow the approach of Belenzon, Berkovitz and Rios (2013) which is based on a minimum control level of 50% voting rights between two firms. A firm is considered as affiliated to a business group if either another firm has more than 50% voting rights, directly or ultimately, over the considered firm or the considered firm has at least one subsidiary over which it has at least 50% of voting rights. The final sample includes 258,984 firms.

The purpose of this study is to explore the role of trust on the probability firms have to belong to a business group. The dependent variable is *Group affiliation*, a dummy variable that is equal to one if a firm is affiliated to a business group according to the criteria defined in the previous section and zero otherwise.

The key independent variable is *Trust*. It refers to the expectation of good behavior by others. We measure this variable in accordance with the vast amount of literature devoted to trust (e.g., Knack and Keefer, 1997; Bjornskov, 2007). It is calculated as the

share of the population answering yes to the question “In general, do you think that most people can be trusted, or can’t you be too careful in dealing with people?” We obtain this variable from Eurostat for the year 2013. It has to be stressed that trust is very persistent over time: it evolves slowly and generally mainly through major changes like conflicts or major economic crises which did not take place for the countries of our sample over the last decade.

The set of control variables is chosen based on former literature on the drivers of business group affiliation (Belenzon, Berkovitz and Rios, 2013; Belenzon and Tsolmon, 2015). With respect to firm-level control variables, we include firm size, age, sales growth, profitability, and industry. Controlling for firm size and age is important because smaller and younger firms have fewer resources, especially financial ones, than larger firms because of a higher degree of informational opacity (Berger and Udell, 1998). Therefore, smaller and younger firms may be more inclined to join a business group. Moreover Belenzon, Berkovitz and Rios (2013) observe that group affiliated firms are larger than stand-alone firms while both types of firms are similar in terms of age. *Size* is measured as the natural logarithm of sales. *Age* is the natural logarithm of the number of years since firm’s inception. Sales growth and profitability are two aspects of performance that should be accounted for because business groups may grow by acquiring firms with higher performance. *Sales growth* is the annual percentage change in sales. *Profitability* is measured as the return on assets ratio calculated as operating income divided by total assets (*ROA*). We use three-digit standard industrial classification (SIC) codes to classify firms into industries and include dummy variables for each industry category.

For country-level control variables, we take into account the degree of economic development, the degree of financial development, the corporate income tax rate, and national formal governance. We measure economic development as the natural logarithm of GDP per capita (*GDP per capita*). *Financial development*, which measures the extent to which financial institutions are developed, is measured with the ratio of private credit by deposit money banks and other financial institutions to GDP extracted from the Global Financial Development Database from the World Bank. Business group affiliation can be motivated by willingness to smooth revenues across firms to minimize income tax, even

in purely domestic business groups (Newberry and Dhaliwal, 2001; Gramlich, Limpaphayom, and Rhee, 2004). We therefore include the corporate income tax rate as a control variable (*Tax rate*): we use the average of corporate income tax rates over the 2016-2018 period provided by Deloitte International Tax Source. Last, we capture quality of formal institutions with the indicator of rule of law (*Rule of law*) commonly adopted in the literature. It measures the quality of law enforcement as a whole in one country and comes from the Worldwide Governance Indicators from the World Bank.

Table 1 reports the descriptive statistics for all variables used in the estimations. We observe that 74.5% of firms are affiliated to a business group, confirming the prevalence of business groups in European countries. Table 2 displays the composition of the sample by country. The definitions of variables are provided in the Appendix.

[Insert tables 1 and 2 around here]

To analyze the effect of trust on group affiliation, we perform regressions of group affiliation on trust and a set of control variables:

$$Group\ affiliation_{ij} = \alpha + \beta Trust_j + \chi X_i + \gamma Y_j + \varepsilon_{ij} \quad (1)$$

where X is the set of firm-specific control variables (*Size*, *Age*, *Sales growth*, *ROA*); Y is the set of country-level control variables (*GDP per capita*, *Financial development*, *Tax rate*, *Rule of law*); i is for the firm, and j is for the country, and ε is a random error term. We also include industry fixed effects in the estimations to control for the influence of the industry on group affiliation. The equation is estimated with a logit model.

4. Results

4.1 Baseline estimation

Table 3 reports the results of the baseline estimation. We consider two specifications. Model 1 displays the results of the regression without the key independent variable, trust, while Model 2 includes trust.

[Insert table 3 around here]

We find that *Trust* is negatively related to group affiliation. Therefore, our main conclusion is that higher degree of trust is associated with lower group affiliation. We

consequently find evidence supporting the hypothesis H1 that trust reduces the likelihood of group prevalence. It corroborates the view that higher trust diminishes transaction costs and thus reduces the fear of opportunistic behavior in transaction, leading to lower incentives to choose the business group organizational mode.

For the control variables, we observe that both models provide similar findings, supporting the view that the inclusion of trust does not modify the results for these variables. We point out that most control variables are significant.

At the firm level, we find that *Size* is significantly positive while *Age* is not significant. In other words, larger firms are more likely to be part of business groups while age does not matter. These results accord with the findings from Belenzon, Berkovitz and Rios (2013) that group affiliated firms are larger than stand-alone firms while both types of firms tend to be similar in terms of age. *Sales growth* is significantly positive while *ROA* is significantly negative. Thus, firms with higher growth and lower profitability are more likely to belong to a business group. Both these findings show ambiguous evidence on the assumption that business groups would grow by acquiring firms with higher performance. This observation is also consistent with the contrasted results of the vast empirical literature on the performance effect of business group affiliation (Carney et al., 2011).

At the country level, we observe that *GDP per capita* and *Rule of law* are significantly positive, meaning that greater economic development and better quality of formal institutions are associated with greater business affiliation. Furthermore, *Financial development* and *Tax rate* are significantly negative, supporting the view that higher degree of financial development and stronger taxation diminish the likelihood of group affiliation.

4.2 The influence of information asymmetries

The baseline estimation indicates that trust reduces the likelihood of group affiliation in line with our hypothesis H1, which says that greater degree of trust reduces the prevalence of business groups. The effect of trust on group affiliation comes from the fact that higher trust diminishes the fear of opportunistic behavior in transactions and thus reduces the incentives to adopt the business group organizational mode.

Opportunistic behavior should be more prevalent in presence of information asymmetries. As a consequence, the negative effect of trust on group affiliation should apply predominantly to firms with higher information asymmetries. Following this hypothesis, we further investigate whether the relation between trust and group affiliation differs with the degree of information asymmetries.

We re-estimate our regressions by considering separately groups of firms by degree of information asymmetries. Following the literature, we adopt four criteria to assess information asymmetries: size, age, industry proximity, and geographic proximity. The results of the estimations are presented in Table 4.

[Insert table 4 around here]

First, we perform the regressions for small firms and large firms in columns 1 and 2. Small firms are supposed to have higher information asymmetries than large firms because of informational opacity. To define both types of firms, we use the definition of the European Commission for SMEs. Small firms have less than 250 employees and either less than 50M euros of sales or less than 43M euros of total assets. Firms that do not meet this criterion are defined as large firms.

We find that *Trust* is significantly negative for small firms but not significant for large firms. Therefore, the negative impact of trust on the likelihood to belong to a business group is only observed for small firms. This finding accords with the view that higher information asymmetries contribute to strengthen the effect of trust to reduce group affiliation.

Second, we estimate the regressions for young firms and old firms in columns 3 and 4. Young firms are considered in the literature to be associated with higher information asymmetries than older firms, since a greater age provides more possibilities to gain information about the firm. We define a young firm as a firm which is less than 10 years old and an old firm as firm which is more than 10 years old. The threshold of 10 years is quite arbitrary in the absence of widely accepted definition of young firms. However, we find similar finding when we alternatively use the threshold of 7 years.

We observe that *Trust* is significantly negative for young firms and for old firms. The coefficients of *Trust* are very similar for each type of firms (-0.965 and -0.984

respectively for young and old firms). We therefore do not find evidence that the effect of trust on group affiliation would differ with the age of the firm.

Third, we consider industry proximity. The rationale is that the proximity of a given firm's industry and the business group head firm's industry is an inverse indicator of the level of information asymmetries. Industry proximity is defined with NACE classification: a firm operates in the same industry than the business group head firm if they both belong to the same NACE² first level, otherwise they are considered as belonging to different industries.

To check whether industry proximity influences the effect of trust on group affiliation, we report in column 5 the results of the regression when we include only standalone firms and firms affiliated to a business group head firm that operates in the same industry, while column 6 displays the results of the regression when we include only standalone firms and firms affiliated to a business group head firm that operates in different industries.

Trust is significantly negative for both types of firms. We nonetheless observe that the coefficient of *Trust* is lower for firms not belonging to the same industry than the business group head (-0.391) than for firms belonging to the same industry than the business group head (-0.309). These estimations provide some limited evidence in accordance with the view that trust would contribute more to reduce group affiliation when information asymmetries are higher.

Fourth, we take geographic proximity into account. Geographic proximity has been commonly used as a measure of information asymmetries (Degryse and Ongena, 2005). It is therefore relevant to consider this criterion in our investigation. Geographic proximity is captured by one-digit NUTS code: a firm operates in the same geographic area than the business group head firm if they are both located in the same region based on the one-digit NUTS code, otherwise they are considered as located in two different geographic areas.

To do so, we estimate the regression with the subsample including standalone firms and group affiliated firms that operate in the same geographic area as the business group

² The NACE classification is very similar to the SIC classification. In Amadeus, only the NACE code is available when matching a given firm and its business group head firm.

head firm in column 7, and the regression with the subsample including standalone firms and group affiliated firms that operate in different geographic areas in column 8.

We find that *Trust* is significantly negative for both groups of firms. However, the coefficient of *Trust* is much lower for firms with a different location (-3.264) than for firms with the same location (-0.805). This conclusion accords with the view that higher degree of information asymmetries strengthens the negative effect of trust on group affiliation.

In a nutshell, we find limited support that the negative effect of trust on group affiliation is stronger for firms with higher information asymmetries. We obtain such conclusion when considering firm size and at a lower degree geographic proximity and industry proximity, but not when defining the degree of information asymmetries through age. We thus obtain limited support for the hypothesis H2.

4.3 The effect of formal institutions

The key finding that trust reduces the likelihood of group affiliation can be influenced by the quality of formal institutions. Formal institutions contribute to affect transaction costs and through that influence the prevalence of business groups. By reducing transaction costs associated with low quality of formal institutions, trust can play the role of substitute for quality of formal institutions. We can then check whether the effect of trust is stronger in countries with poorer quality of formal institutions.

To investigate that question, we redo our estimations for two sub-groups of countries based on their level of quality of formal institutions. High rule of law countries are defined as countries with rule of law indicator higher than the median of the sample of countries, while low rule of law countries are those with rule of law indicator lower than the median. We report the estimations in Table 5.

[Insert table 5 around here]

We note that *Trust* has a different sign for both sub-groups of countries: it is significantly positive for high rule of law countries but significantly negative for low rule of law countries. These findings mean that the effect of trust on the likelihood of group affiliation is only negative when quality of formal institutions is low. When quality of

formal institutions is high, trust does not contribute to hamper group affiliation but even tends to favor it.

We therefore support the hypothesis H3 according to which trust is a substitute for the quality of formal institutions. This conclusion is important. It suggests that the institutional voids perspective has to take into account informal institutions when investigating the effects of formal institutions on business group affiliation. Since trust is a substitute for the quality of formal institutions, it can affect how formal institutions affect group affiliation.

4.4. Robustness tests

We check the robustness of our main findings in several different ways.

First, we perform estimations by industry. We want to check if our finding of a negative impact of trust on group affiliation is conditional to the industry. To this end, we run the regressions on subsamples made of firms that operate in the same industry. We then consider the eight industries based on the one-digit SIC industry and redo the regression. The results are reported in Table 6. We observe that *Trust* is significantly negative in all estimations. Hence the negative effect of trust on group affiliation is observed for all industries.

[Insert table 6 around here]

Second, we exclude Italy from the sample. Even if our sample includes firms from twenty-five countries, it is rather unbalanced since Italian firms represent about 36% of the observations in the sample. To ensure that our results are not driven by Italian firms, we then exclude Italy and re-estimate the baseline estimation in column 1 in Table 7. We still find a significantly negative coefficient for *Trust*, showing that Italian firms do not drive the key finding.

[Insert table 7 around here]

Third, we control for a potential sample selection bias by adopting an alternative definition of firm size. Until now, firm size has been defined as the natural logarithm of total sales. The consequence of this choice is that firms that do not disclose sales, deliberately or because they do not perform sales, are excluded from our dataset. We then define firm size as the natural logarithm of total assets. In accordance with this new

definition, we also define *Sales growth* as the annual growth rate in total assets instead of the annual growth rate in sales. We re-estimate the baseline estimation in column 2 in Table 7. We observe that the finding on the negative relation between trust and group affiliation is valid. We still find that the coefficient of *Trust* is significant and negative. Interestingly, firm size and growth are still significantly positive in line with the results obtained for these variables defined with total assets.

Our findings have thus survived several robustness checks, leading to the strong support of our key hypothesis that greater trust contributes to diminish the prevalence of business groups.

5. Conclusion

In this paper we examine the impact of trust on group affiliation. We use firm-level data so that we can identify which firms belong to a business group and we can control for the firm-level financial characteristics. We then perform estimations on a large sample of 258,984 companies from twenty-five European countries.

Our key finding is that higher trust is associated with lower group affiliation. Therefore, we support the view that trust reduces the likelihood of group prevalence. We explain this finding by the fact that higher trust between people contributes to diminish transaction costs and thus reduces the fear of firm decision makers of the opportunistic behavior of trade partners. As a consequence, the choice of a business group to internalize transactions is less attractive.

We also find limited evidence that the negative effect of trust on group affiliation is stronger for firms with higher information asymmetries. Trust especially diminishes the probability to belong to a business group for smaller firms and to a less degree for firms with lower geographic proximity and industry proximity with the head of the business group. However no significant difference is observed when comparing young and old firms.

Finally, we find evidence that trust is a substitute for the quality of formal institutions: the impact of trust on the likelihood of group affiliation is only negative when quality of formal institutions is low.

Our work has thus major implications. It contributes to a better understanding of the reasons why business groups exist. It completes the institutional voids perspective by showing that informal institutions must be taken into account to understand the prevalence of business groups. It therefore helps solving the puzzle of high business group prevalence in countries with developed institutions. Developed countries can have developed formal institutions but can still be associated with low degrees of trust.

In addition to these implications, our results are of importance for researchers, since they support the view that informal institutions should not be ignored when considering the influence of institutions on the prevalence of business groups. Further research should then be done to investigate the influence of alternative key informal institutions like social norms.

References

- Akerlof, G. (1970). The Market for “Lemons”: Quality Uncertainty and the Market Mechanism. *Quarterly Journal of Economics*, 84(3), 488-500. DOI: 10.2307/1879431
- Aldrich, H. (2000). Entrepreneurial Strategies in New Organizational Populations. In *Entrepreneurship: The Social Science View*. Ed. R. Swedberg. Oxford: Oxford University Press, 211–228.
- Almeida, H.V., Wolfenzon, D. (2006). A Theory of Pyramidal Ownership and Family Business Groups. *Journal of Finance*, 61(6), 2637–2680. <https://doi.org/10.1111/j.1540-6261.2006.01001.x>
- Arrow, K. (1972). Gifts and exchanges. *Philosophy and Public Affairs* 1, 4, 343-362.
- Arrow, K. (1974). *The Limits of Organization*, New York, Norton.
- Belenzon, S., Tsolmon, U. (2015). Market Frictions and the Competitive Advantage of Internal Labor Markets. *Strategic Management Journal*, 37(7), 1280–1303. Available at: <https://doi.org/10.1002/smj.2395>
- Belenzon, S., Berkovitz, T., Rios, L. (2013). Capital Markets and Firm Organization: How Financial Development Shapes European Corporate Groups. *Management Science*, 59(6), 1326–1343. Available at: DOI 10.1287/mnsc.1120.1655
- Berger, A., Udell, G. (1998). The Economics of Small Business Finance: The Roles of Private Equity and Debt Markets in the Financial Growth Cycle. *Journal of Banking and Finance*, 22, 613-673. Available at: [https://doi.org/10.1016/S0378-4266\(98\)00038-7](https://doi.org/10.1016/S0378-4266(98)00038-7)
- Bjornskov, C. (2007). Determinants of Generalized Trust: A Cross-Country Comparison, *Public Choice* 130(1–2), 1–21. Available at: <https://doi.org/10.1007/s11127-006-9069-1>
- Bohnet, I. (2008). Trust in Experiments. In S.N. Durlauf and L.E. Blume (Eds) *The New Palgrave Dictionary of Economics Online*, Palgrave Macmillan,
- Brunetto, Y., and T. Farr-Wharton (2007). The Moderating Role of Trust in SME Owner/Managers' Decision-Making about Collaboration. *Journal of Small Business Management* 45(3), 362–387. Available at: DOI:10.1111/j.1540-627X.2007.00218.x
- Carney, M., Gedajlovic, E.R., Heugens, P., Van Essen, M., Van Oosterhout, J. (2011). Business Group Affiliation, Performance, Context, and Strategy : A Meta-analysis. *Academy of Management Journal* 54 (3), 437-460. Available at: <https://doi.org/10.5465/amj.2011.61967812>
- Carney, M., Van Essen, M., Estrin, S., Shapiro, D. (2017). Business Group Prevalence and Impact Across Countries and over Time. *Multinational Business Review* 25(1), 52-76. Available at: <https://doi.org/10.1108/MBR-10-2016-0037>
- Child, J., Rodrigues, S. (2004). Repairing the Breach of Trust in Corporate Governance. *Corporate Governance: An International Review* 12, 143-152. Available at: <https://doi.org/10.1111/j.1467-8683.2004.00353.x>
- Colpan, A. M., Hikino, T. (2010). Foundations of Business Groups: Towards an Integrated Framework. *Oxford Handbooks Online*. Available at: doi:10.1093/oxfordhb/9780199552863.003.0002

- Cuervo-Cazurra, A. (2006). Business Groups and their Types. *Asia Pacific Journal of Management*, 23(4), 419–437. Available at: DOI: 10.1007/s10490-006-9012-5
- Degryse, H., Ongena, S. (2005). Distance, Lending Relationships, and Competition. *Journal of Finance* 60(1), 231-266. Available at: <https://doi.org/10.1111/j.1540-6261.2005.00729.x>
- Dow, S., McGuire, J. (2009). Propping and Tunneling: Empirical Evidence from Japanese Keiretsu. *Journal of Banking and Finance* 33, 1817-1828. Available at: <https://doi.org/10.1016/j.jbankfin.2009.05.012>
- Dowling, M., O’Gorman, C., Puncheva, P., Vanwalleghem, D. (2019). Trust and SME Attitudes towards Equity Financing across Europe. *Journal of World Business* 54, 6, 101003. Available at: DOI: 10.1016/j.jwb.2019.101003
- Eisenhardt, K.M. (1989). Agency Theory: An Assessment and Review. *Academy of Management Review*, 14(1), 57–74. Available at: <https://doi.org/10.5465/amr.1989.4279003>
- Ferris, S., Kim, K., Kitsabunnarat, P. (2003). The Costs (and Benefits?) of Diversified Business Groups: The Case of Korean Chaebols. *Journal of Banking and Finance* 27, 251-273. Available at: DOI: 10.1016/S0378-4266(01)00248-5
- Fisman, R., Khanna, T. (1999). Is Trust a Historical Residue? Information Flows and Trust levels. *Journal of Economic Behavior & Organization*, 38(1), 79–92. Available at: [http://dx.doi.org/10.1016/s0167-2681\(98\)00123-1](http://dx.doi.org/10.1016/s0167-2681(98)00123-1).
- Fisman, R., Khanna, T. (2004). Facilitating Development: The Role of Business Groups. *World Development*, 32(4), 609–628.
- Gertner, R., Scharfstein, D., Stein, J. (1994). Internal versus External Capital Markets. *The Quarterly Journal of Economics*, 109(4), 1211–1230. Available at: <http://dx.doi.org/10.2307/2118361>.
- Gorodnichenko, Y., Shaefer, D., Talavera, O. (2009). Financial Constraints and Continental Business Groups: Evidence from German Konzerns. *Research in International Business and Finance* 23, 233-242. Available at: <https://doi.org/10.1016/j.ribaf.2008.09.002>
- Gramlich, J., Limpaphayom, P., Rhee, S. (2004). Taxes, Keiretsu Affiliation, and Income Shifting. *Journal of Accounting and Economics*, 37, 203-228. Available at: <https://doi.org/10.1016/j.jacceco.2003.10.001>
- Granovetter, M. (1995). Coase Revisited: Business Groups in the Modern Economy. *Industrial and Corporate Change*, 4(1), 93–130. Available at: doi:10.1093/icc/4.1.93
- Grossmann, S.J., Hart, O. (1986). The Costs and Benefits of Ownership: A Theory of Vertical and Lateral Integration. *Journal of Political Economy*, 94(4), 691-719. Available at: <http://dx.doi.org/10.1086/261404>
- Guillén, M.F., 2000. Business Groups in Emerging Economies: A Resource-Based View. *Academy of Management Journal*, 43(3), 362–380. Available at: <http://dx.doi.org/10.5465/1556400>.
- Guillén, M. (2001) *The Limits of Convergence : Globalization and Organizational Change in Argentina, South Korea, and Spain*. Princeton University Press, Princeton.
- Hart, O., Moore, J. (1999). Foundations of Incomplete Contracts. *Review of Economic Studies*, 66, 115-138. Available at: <https://doi.org/10.1111/1467-937X.00080>

- Hart, O., Moore, J. (2007). Incomplete Contracts and Ownership: Some New Thoughts. *American Economic Review*, 97(2), 182-186. Available at: doi: 10.1257/aer.97.2.182
- Helmke, G., Levitsky, S. (2003). *Informal Institutions and Comparative Politics: A Research Agenda*. South Bend, IN: Kellogg Institute for International Studies, Notre Dame University.
- Höhmnn, H., Welter, F. (Eds.). (2005). *Trust and Entrepreneurship: A West-East Perspective*. Edward Elgar Publishing.
- Hoskisson, R., Cannella, A., Tihanyi, L., Faraci, R. (2004). Asset Restructuring and Business Group Affiliation in French Civil Law Countries. *Strategic Management Journal*, 25(6), 525–539. Available at: doi:10.1002/smj.394
- Johnson, S., La Porta, R., Lopez-de-Silanes, F., Shleifer, A. (2000). Tunneling. *American Economic Review*, 90(2), 22–27. Available at: doi:10.1257/aer.90.2.22
- Keister, L. (1998). Engineering Growth: Business Group Structure and Firm Performance in China's Transition Economy. *American Journal of Sociology*, 104(2), 404-440. Available at: <https://doi.org/10.1086/210043>.
- Khanna, T., Palepu, K. (2000). Is Group Membership Profitable in Emerging Markets? An Analysis of Diversified Indian Business Groups. *Journal of Finance* 55, 867-891. Available at: <https://doi.org/10.1111/0022-1082.00229>
- Khanna, T., Rivkin, J. (2001). Estimating the Performance Effects of Business Groups in Emerging Markets. *Strategic Management Journal* 22, 45-74. Available at: [https://doi.org/10.1002/1097-0266\(200101\)22:1<45::AID-SMJ147>3.0.CO;2-F](https://doi.org/10.1002/1097-0266(200101)22:1<45::AID-SMJ147>3.0.CO;2-F)
- Khanna, T., Yafeh, Y., 2005. Business Groups and Risk Sharing around the World. *The Journal of Business*, 78(1), 301–340. Available at: <http://dx.doi.org/10.1086/426527>
- Khanna, T., Yafeh, Y., 2007. Business Groups in Emerging Markets: Paragons or Parasites? *Journal of Economic Literature*, 45(2), 331–372. Available at: DOI: 10.1257/jel.45.2.331
- Kim, H., 2010. Business Groups in South Korea. *Oxford Handbooks Online*. Available at: <http://dx.doi.org/10.1093/oxfordhb/9780199552863.003.0006>.
- Knack, S., Keefer, P., 1997. Does Social Capital have an Economic Pay-Off? A Cross-Country Investigation. *Quarterly Journal of Economics* vol. 112(4), 1251–1288. Available at: <https://doi.org/10.1162/003355300555475>
- Langlois, R.N., 2010. *Economic Institutions and the Boundaries of Business Groups*. Oxford Handbooks Online.
- Leff, N. (1976). Capital Markets in Less Developed Countries: The Group Principle. In R. McKinnon (ed.). *Money and Finance in Economic Growth and Development*. Decker Press, New York.
- Leff, N. (1978). Industrial Organization and Entrepreneurship in the Developing Countries: The Economic Groups. *Economic Development and Cultural Change* 26, 661-675. Available at: <http://dx.doi.org/10.1086/451052>
- Lincoln, J., Gerlach, M. (2004). *Japan's Network Economy*. Cambridge University Press, Cambridge.
- Maman, D. (2002). The Emergence of Business Groups: Israel and South Korea Compared. *Organization Studies*, 23(5), 737–758. Available at: <https://doi.org/10.1177/0170840602235003>

- Manikandan, K.S., Ramachandran, J. (2014). Beyond Institutional Voids: Business Groups, Incomplete Markets, and Organizational Form. *Strategic Management Journal*, 36(4), 598–617. Available at: <https://doi.org/10.1002/smj.2226>
- Masulis, R. W., Pham, P. K., Zein, J. (2011). Family Business Groups around the World: Costs and Benefits of Pyramids. *Review of Financial Studies*, 24(11), 3556–3600. Available at: <https://doi.org/10.1093/rfs/hhr052>
- Molina-Morales, F., Martínez-Fernández, M. (2010). Social Networks: Effects of Social Capital on Firm Innovation. *Journal of Small Business Management* 48(2), 258–279. Available at: <https://doi.org/10.1111/j.1540-627X.2010.00294.x>
- Morck, R., Wolfenzon, D., Yeung, B. (2005). Corporate Governance, Economic Entrenchment, and Growth. *Journal of Economic Literature*, 43(3), 655–720. Available at: <http://dx.doi.org/10.1257/002205105774431252>.
- Newberry, K. J., Dhaliwal, D. S. (2001). Cross-jurisdictional Income Shifting by U.S. Multinationals: Evidence from International Bond Offerings. *Journal of Accounting Research*, 39(3), 643–662. Available at: <https://doi.org/10.1111/1475-679X.00032>
- Pathak, S., Muralidharan, E., (2016). Informal Institutions and their Comparative Influences on Social and Commercial Entrepreneurship: The Role of In-group Collectivism and Interpersonal Trust. *Journal of Small Business Management*, 54(51), 168–188. Available at: <https://doi.org/10.1111/jsbm.12289>.
- Puranam, P., Vanneste, S. (2009). Trust and Governance: Untangling a Tangled Web. *Academy of Management Review* 34, 11–31. Available at: <https://doi.org/10.5465/amr.2009.35713271>
- Schneider, B. R. (2009). A Comparative Political Economy of Diversified Business Groups, or How States Organize Big Business. *Review of International Political Economy*, 16(2), 178–201. Available at: <https://doi.org/10.1080/09692290802453713>
- Smångs, M. (2006). The Nature of the Business Group: A Social Network Perspective. *Organization*, 13(6), 889–909. Available at: <https://doi.org/10.1177/1350508406068816>
- Spence, M. (1976). Informational Aspects of Market Structure: An Introduction. *Quarterly Journal of Economics*, 90(4), pages 591–97. Available at: <https://doi.org/10.2307/1885323>
- Van Bastelaer, T., Leather, H. (2006). Trust in Lending: Social Capital and Joint Liability Seed Loans in Southern Zambia. *World Development* 34, 10, 1788–1807. Available at: <https://doi.org/10.1016/j.worlddev.2006.02.007>
- Weinstein, D.E., Yafeh, Y. (1998). On the Costs of a Bank-Centered Financial System: Evidence from the Changing Main Bank Relations in Japan. *Journal of Finance*, 53(2), 635–672. Available at: <http://dx.doi.org/10.1111/0022-1082.254893>.
- Williamson, O. (1975). *Markets and Hierarchies: Analysis and Antitrust Implications*. The Free Press, New York, 1975.
- Williamson, O. (1979). Transaction Cost Economics: The Governance of Contractual Relations. *Journal of Law and Economics*, October 1979, 22, 233–261.
- Williamson, O. (1985). *The Economic Institutions of Capitalism: Firms, Markets, Relational Contracting*, The Free Press, New York.
- Williamson, O. (1991). Comparative Economic Organization: The Analysis of Discrete Structural Alternatives. *Administrative Science Quarterly* 36, 269–296.

- Zenger, T., Lazzarini, S., Poppo, L. (2000). Informal and Formal Organization in New Institutional Economics. In Ingram, P. and Silverman, B.S. (Ed.) *The New Institutionalism in Strategic Management* (Advances in Strategic Management, Vol. 19), Emerald Group Publishing Limited, Bingley, 277-305. Available at: [https://doi.org/10.1016/S0742-3322\(02\)19009-7](https://doi.org/10.1016/S0742-3322(02)19009-7)
- Zhang, L., Sjögren, H., Kishida, M. (2016). The Emergence and Organizational Persistence of Business Groups in China, Japan, and Sweden. *Industrial and Corporate Change* 25(6), 885-902. Available at: <http://dx.doi.org/10.1093/icc/dtw006>.

Table 1.
Descriptive statistics

This table provides descriptive statistics for the variables used in the estimations. Definitions of all variables are provided in the Appendix. N=258,984

	Mean	Std. Dev.	25th percentile	Median	75th percentile
Group affiliation	0.745	0.436	0.000	1.000	1.000
Trust	5.818	0.689	5.500	5.700	6.100
Size	6,889.56	2.87	3,023.42	5,215.14	11,914.44
Age	21.64	2.77	12.00	23.00	38.00
Sales growth	0.239	0.898	-0.021	0.062	0.195
ROA	0.082	0.124	0.021	0.057	0.124
GDP per capita	10.229	9.530	9.912	10.194	10.399
Financial development	0.829	0.258	0.755	0.820	0.968
Tax rate	0.242	0.055	0.200	0.255	0.255
Rule of law	0.807	0.625	0.247	0.428	1.440

Table 2.
Composition of the sample

This table shows the number of firms in the sample by country.

Country	Firms	Country	Firms
Austria	1,919	Latvia	2,046
Belgium	5,045	Lithuania	2,567
Bulgaria	6,321	Luxemburg	338
Czech Rep.	10,292	Malta	405
Denmark	1,270	Netherlands	569
Estonia	1,372	Norway	16,991
Finland	6,638	Poland	17,892
France	35,567	Portugal	4,364
Germany	7,063	Romania	10,250
Greece	4,251	Slovakia	3,345
Hungary	419	Slovenia	3,136
Ireland	1,586	Spain	23,179
Italy	92,159		
		Total	258,984

Table 3.
Main estimations

This table presents the results of logit regressions examining the relation between trust and group affiliation. Definitions of variables are provided in the Appendix. Standard errors (in brackets) are robust to arbitrary heteroskedasticity. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)
Trust		-0.893*** (0.055)
Size	0.459*** (0.006)	0.456*** (0.006)
Age	-0.005 (0.006)	0.006 (0.006)
Sales growth	0.039*** (0.006)	0.041*** (0.006)
ROA	-0.932*** (0.038)	-0.909*** (0.038)
GDP per capita	0.549*** (0.023)	0.722*** (0.027)
Financial development	-0.450*** (0.035)	-0.448*** (0.035)
Tax rate	-2.991*** (0.117)	-4.371*** (0.151)
Rule of law	0.032*** (0.010)	0.039*** (0.010)
Intercept	-6.936*** (0.213)	-6.797*** (0.217)
Industry dummies	Yes	Yes
Number of observations	258,984	258,984
Wald Chi ²	12,725.82***	12,537.53***
Pseudo R ²	0.052	0.053

Table 4.
Additional estimations

This table presents the results of logit regressions examining the relation between trust and group affiliation. Definitions of variables are provided in the Appendix. Standard errors (in brackets) are robust to arbitrary heteroskedasticity. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	Size		Age		Industry		Location	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	SME	Large firms	Young	Old	Same industry for group head	Different industry for group head	Same location for group head	Different location for group head
Trust	-1.243*** (0.061)	-0.098 (0.143)	-0.965*** (0.197)	-0.984*** (0.059)	-0.309** (0.144)	-0.391*** (0.121)	-0.805*** (0.115)	-3.264*** (0.555)
Size	0.414*** (-0.007)	0.529*** (0.011)	0.347*** (0.013)	0.485*** (0.006)	0.810*** (0.012)	0.878*** (0.010)	0.666*** (0.010)	0.501*** (0.034)
Age	0.000 (0.006)	0.052*** (0.014)	-0.089*** (0.019)	0.121*** (0.010)	0.043*** (0.014)	-0.074*** (0.011)	0.121*** (0.011)	-0.027 (0.047)
Sales growth	0.052*** (0.007)	0.012 (0.011)	-0.003 (0.008)	0.056*** (0.008)	-0.030** (0.015)	-0.020 (0.013)	-0.009 (0.012)	-0.050 (0.053)
ROA	-0.945*** (0.042)	-0.730*** (0.085)	-0.756*** (0.072)	-1.006*** (0.045)	-2.266*** (0.095)	-1.770*** (0.077)	-1.927*** (0.083)	-1.564*** (0.366)
GDP per capita	0.785*** (0.029)	0.540*** (0.078)	1.363*** (0.065)	0.721*** (0.031)	0.044 (0.052)	-0.777*** (0.043)	0.693*** (0.045)	-0.133 (0.200)
Financial development	-0.592*** (0.038)	0.256*** (0.111)	-0.637*** (0.092)	-0.462*** (0.039)	0.179** (0.080)	0.131** (0.054)	-0.095 (0.067)	-0.656** (0.262)
Tax rate	-4.350*** (0.174)	-2.901*** (0.339)	-3.846*** (0.475)	-4.418*** (0.169)	2.289*** (0.345)	8.175*** (0.302)	-2.818*** (0.299)	8.970*** (1.260)
Rule of law	0.122*** (0.012)	-0.340*** (0.038)	-0.210*** (0.021)	0.130*** (0.012)	0.883*** (0.024)	1.374*** (0.019)	0.019 (0.019)	0.481*** (0.076)
Intercept	-6.392*** (0.239)	-7.662*** (0.683)	-11.908*** (0.566)	-7.306*** (0.256)	-9.020*** (0.526)	-2.855*** (0.388)	-11.517*** (0.409)	-3.231* (1.659)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Number of observations	209,998	48,810	55,375	203,506	80,502	95,889	85,042	62,414
Wald Chi ²	8,838.12***	4207.21***	2045.45***	11423.04***	13504.47***	19,446.74***	7,396.88***	1,544.68***
Pseudo R ²	0.042	0.110	0.039	0.062	0.268	0.272	0.104	0.135

Table 5
Estimations in high and low rule of law countries

This table presents the results of logit regressions examining the relation between trust and group affiliation. Definitions of variables are provided in the Appendix. Standard errors (in brackets) are robust to arbitrary heteroskedasticity. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	High rule of law	Low rule of law
Trust	1.377*** (0.137)	-0.579*** (0.093)
Size	0.588*** (0.011)	0.440*** (0.007)
Age	0.044*** (0.012)	-0.127*** (0.007)
Sales growth	-0.053*** (0.012)	0.042*** (0.007)
ROA	-1.103*** (0.066)	-1.034*** (0.048)
GDP per capita	2.012*** (0.059)	0.211*** (0.043)
Financial development	-0.405*** (0.056)	-0.221*** (0.057)
Tax rate	0.099 (0.273)	-5.174*** (0.451)
Rule of law	-1.555*** (0.070)	-0.226*** (0.025)
Intercept	-24.344*** (0.489)	-1.522*** (0.400)
Industry dummies	Yes	Yes
Number of observations	84,169	174,700
Wald Chi ²	6,941.94***	7,623.38***
Pseudo R ²	0.106	0.042

Table 6.
Impact of trust on group affiliation: estimations by industry

This table presents the results of logit regressions examining the relation between trust and group affiliation. Definitions of variables are provided in the Appendix. Standard errors (in brackets) are robust to arbitrary heteroskedasticity. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Agriculture, forestry, and fishing	Mining	Construction	Manufacturing	Transportation	Wholesale trade	Retail trade	Services
Trust	-1.997*** (0.405)	-3.188*** (0.947)	-1.185*** (0.184)	-1.167*** (0.120)	-0.440*** (0.161)	-0.919*** (0.100)	-0.881*** (0.166)	-0.785*** (0.143)
Size	0.448*** (0.049)	0.691*** (0.098)	0.580*** (0.020)	0.565*** (0.011)	0.362*** (0.017)	0.370*** (0.010)	0.386*** (0.018)	0.524*** (0.017)
Age	0.197*** (0.050)	0.087 (0.099)	0.068*** (0.017)	-0.091*** (0.012)	0.071*** (0.018)	0.007 (0.011)	0.079*** (0.016)	0.002 (0.015)
Sales growth	0.057 (0.052)	-0.038 (0.101)	-0.005 (0.011)	0.052*** (0.016)	0.016 (0.018)	0.081*** (0.012)	0.065*** (0.019)	0.038*** (0.013)
ROA	-0.573 (0.357)	-0.780 (0.586)	-1.118*** (0.112)	-1.155*** (0.083)	-1.100*** (0.129)	-0.242*** (0.083)	-0.950*** (0.104)	-1.100*** (0.078)
GDP per capita	1.482*** (0.233)	0.746* (0.428)	1.066*** (0.092)	0.548*** (0.054)	0.451*** (0.078)	0.930*** (0.051)	0.926*** (0.090)	0.493*** (0.066)
Financial development	-1.464*** (0.301)	-0.031 (0.617)	0.017 (0.116)	-0.718*** (0.072)	-0.302*** (0.106)	-0.618*** (0.063)	-0.494*** (0.123)	-0.216** (0.093)
Tax rate	-11.279*** (1.307)	-4.270* (2.484)	-7.839*** (0.500)	-2.148*** (0.340)	-1.323*** (0.434)	-5.630*** (0.296)	-5.975*** (0.460)	-3.172*** (0.356)
Rule of law	0.141 (0.100)	0.146 (0.192)	-0.318*** (0.033)	0.191*** (0.020)	0.035 (0.034)	0.021 (0.021)	0.153*** (0.032)	-0.035 (0.027)
Intercept	-10.844*** (2.342)	-5.658 (3.740)	-10.598*** (0.729)	-6.167*** (0.449)	-5.095*** (0.680)	-8.461*** (0.415)	-8.545*** (0.695)	-5.636*** (0.577)
Industry dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Number of observations	4,195	1,189	27,531	66,662	28,762	60,928	27,254	42,463

Wald Chi ²	324,23***	86,35***	1364.16***	4030.15***	1211.43***	2283.13***	1176.47***	1364.46***
Pseudo R ²	0,081	0,088	0.054	0.062	0.053	0.035	0.044	0.042

Table 7.
Robustness checks

This table presents the results of logit regressions examining the relation between trust and group affiliation. Definitions of variables are provided in the Appendix. Standard errors (in brackets) are robust to arbitrary heteroskedasticity. *, **, and *** indicate statistical significance at the 10%, 5% and 1% level, respectively.

	Without Italy	Total assets instead of sales
	(1)	(2)
Trust	-1.166*** (0.059)	-0.249*** (0.055)
Size	0.437*** (0.007)	0.496*** (0.006)
Age	0.113*** (0.007)	-0.031*** (0.006)
Sales growth	0.038*** (0.007)	0.034*** (0.008)
ROA	-0.900*** (0.044)	-0.778*** (0.047)
GDP per capita	1.405*** (0.053)	0.183*** (0.025)
Financial development	-0.762*** (0.043)	-0.121*** (0.033)
Tax rate	-5.337*** (0.175)	-1.593*** (0.137)
Rule of law	-0.335*** (0.035)	0.238*** (0.011)
Intercept	-12.473*** (0.416)	-3.666*** (0.220)
Industry dummies	Yes	Yes
Number of observations	166,753	246,222
Wald Chi ²	8.826.45***	11,584.67***
Pseudo R ²	0.064	0.058

Appendix: Definitions of variables

Variable	Description	Source
Group affiliation	Dummy variable that equals one if a firm has subsidiaries or is the subsidiary of another firm and zero otherwise	Amadeus
Trust	Trust measured by the share of the population answering yes to the question “In general, do you think that most people can be trusted, or can’t you be too careful in dealing with people?” in 2013	Eurostat
Size	Natural logarithm of sales	Amadeus
Age	Natural logarithm of number of years since firm creation	Amadeus
Sales growth	Annual percentage change in sales	Amadeus
ROA	Operating income divided by total assets	Amadeus
GDP per capita	Natural logarithm of GDP per capita in 2018	Eurostat
Financial development	Ratio of private credit by deposit money banks and other financial institutions to GDP	Global Financial Development Database, World Bank
Tax rate	Average of corporate income tax rates over the 2016-2018 period	Deloitte International Tax Source
Rule of law	Rule of law in 2018. It “captures perceptions of the extent to which agents have confidence in and abide by the rules of society, and in particular the quality of contract enforcement, property rights, the police, and the courts, as well as the likelihood of crime and violence.” It ranges from -2.5 (low value) to 2.5 (high value)	Worldwide Governance Indicators, World Bank

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