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# OWNER TYPE AND INVESTMENT OF PRIVATE FIRMS

## Abstract

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JEL Classification: G31, G32, D22

Keywords: Private firms, Europe

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# Owner type and investment of private firms

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## Abstract

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### *Keywords:*

Private firms; panel data; Europe; ownership types; investments; cash flow sensitivity; profitability; business opportunities.

*JEL Classification:* G31, G32, D22

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# 1 Introduction

It's well-established that both ownership structure and the identity of the owners are important for corporate performance and governance (Jensen and Meckling, 1976; Demsetz and Lehn, 1985; Thomsen and Pedersen, 2000). In particular, family ownership has received substantial attention in the literature (Villalonga and Amit, 2006; Miller et al., 2007; Xia and Walker, 2015; Amore and Minichilli, 2018) as well as institutional investors, with research driven by the rise of institutional ownership in the US and elsewhere (Appel, Gormley, and Keim, 2016; McCahery, Sautner, and Starks, 2016; Bebchuk et al, 2017; Kang, Luo, and Na, 2018; Lewellen and Lewellen, 2022). Existing studies generally focus on a single ownership type, typically drawing on information about public firms (Boyd and Solarino, 2016). At the same time, Mehran (1995) and Aguilera and Jackson (2003) call for distinction between types of controlling shareholders in the analysis of firm performance because different types of owners pursue different strategic objectives (Aguilera and Jackson, 2010).

This paper analyses how investment decisions vary across ownership types in a large sample of European private firms (Demsetz and Lehn, 1985; Schulze, Lubatkin, Dino, Bucholtz, 2001). We consider four categories of ownership type: family-owned firms; institutional investors; corporate owners; and firms with state ownership. Our focus on private firms yields a number of advantages, notably that private firms are less subject to the short-termist pressures that distort the investment decisions of public firms (Asker et al., 2015). Moreover, owners of private firms typically hold large stakes: in fact we restrict our attention to firms with a single owner holding a stake of at least 95%. This greatly reduces potential contamination of our analysis by agency problems, for example from different ownership types co-existing and with different views on investment strategy.

Family ownership is the most common ownership type in the world, including in Europe (La Porta, Lopez-de-Silanes, and Shleifer, 1999). Family owners are argued to have a long-term orientation (Bertrand and Schoar, 2006) and there is excellent information about the firm (Demsetz and Lehn, 1985) and a good understanding of the firm's wealth-creating processes (Raheja, 2005). Thus, family-owned firms are understood to have strong incentives to engage in investment activities that ensure firm viability and health in the long-term (Chen and Hsu, 2009; Aguilera and Crespi-Cladera, 2012). At the same time, they also tend to be relatively risk-averse because a large proportion of family owners' wealth is tied up in the firm; they tend to hold undiversified portfolios and may therefore follow more conservative strategies in their investment decisions compared to well-diversified shareholders.

In contrast, institutional investors represent a group of well-diversified investors. Institutional ownership is characterized by advantages in terms of finance, low risk aversion and a relatively long-term horizon (McCahery, Sautner, Starks, 2016). Since institutional investors invest on behalf of ultimate investors, transforming risks, they are likely to focus on financial returns and managing risks of investment projects. While institutional investors often display a limited impact on company performance because their ownership stake is low, in our sample, attention is restricted to owners with high stakes.

Corporate owners are also a relatively well-diversified ownership type. Corporations often invest for strategic reasons that are well-documented in the literature such as prospective mergers or branding (Hillier, Grinblatt, and Titman, 2011). Successful performance is therefore not necessarily indicated only by immediate financial returns for corporate owners. Finally, firms with state ownership are likely to exhibit nonprofit-maximizing behavior (Estrin, Hanousek, Kocenda and Svejnar, 2009), but such companies may also have a relative advantage in terms of credit, liquidity and cost of capital (Musacchio, Lazzarini, and Aguilera, 2015). The state is likely to pay special attention to political goals, including low output prices or maintaining employment (Estrin and Perotin, 1988). This behavior may result in investment in socially important projects with relatively low returns (Cuervo-Cazurra, Inkpen, Musacchio, and Ramaswamy, 2014).

For the analysis we construct a large sample of European privately-owned firms spanning over the period from 2001 to 2018. Using the owner type classification adopted by Amadeus database, we differentiate between family, corporate, state, and institutional supermajority owners. These owner types represent more than 99 percent of supermajority ownership in European private firms. We expect these owners to be characterized by a distinct set of goals and priorities, including risk preferences and investment horizons (Boyd and Solarino, 2016).

We estimate the impact of the four ownership types on firm investment levels as well as the sensitivities to investment opportunities, profitability, cash flow and value-added growth. Our basic results suggest that family-owned firms have substantially higher investment levels, and higher sensitivities to investment opportunities, profitability, cash flow and value-added growth compared to other owner types, including corporate and institutional owners. Moreover, state-owned firms consistently show even higher sensitivity to profitability, cash flows and business opportunities than family-owned firms. Further analyzing results obtained in matching samples and focusing on ownership transitions from family owners to either corporate or institutional owners, we confirm that this investment behavior could be attributed to owner preferences. While the literature often suggests that differences in investment

behavior are driven by the risk preferences of different owners, we demonstrate that family owners invest significantly more even when differences in risk avoidance are taken into account.

## **2 Data and Methodology**

### **2.1 Sample Construction**

We start by collecting the data from the Amadeus database maintained by Bureau van Dijk (BvD), a Moody's Analytics company. While this database is the most comprehensive source of financial and ownership information on public and private companies across Europe, it also has several limitations. Specifically, BvD eliminates firm financial information after ten years, or for firms which are inactive, merge, or change identification. More critically, each version of the Amadeus database contains only the latest available ownership structure. We therefore create our dataset using special historical queries and seven 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. We retain only those firms for which we have ownership information and exclude firms for which we are unable to identify at least 95% of the reported shareholders as well as micro firms.<sup>1</sup> We further focus our attention on firms controlled by a single owner. After excluding firms operating in financial services and insurance industries (NACE codes 64–66) due to their extensive oversight by government regulatory authorities and fundamental differences in financial data presentation, we have ownership information for 242,536 unique private firms. Our final sample consists of 672,016 firm-year observations representing firms from 24 European countries over the period 2001–2018.

To estimate a clean effect of ownership type on corporate investment, we require firms in our sample to be controlled by a single owner holding at least 95% of company shares. We refer to this control as supermajority control throughout the paper. We use a 95% cutoff rather than 100% to allow for a small portion of shares being used as a motivational tool for employees.

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<sup>1</sup> According to Eurostat, micro firms are firms with less than 10 employees. Following the literature, we also consider firms with total asset value lower than 4,000 USD to be micro firms. This filter comes from the requirement for the minimum capital in registering an Ltd. Company across EU.

## 2.2 Ownership Type Classification

When assigning owners in different type categories, we use the variable shareholder type (*SH\_TYPE*) in Amadeus as a starting point. We differentiate between the following types:<sup>2</sup>

- *Family*: (Type 1) Individual/ family owners that belong to category I (“Named individuals or families”) in Amadeus. This is our base category.
- *Corporate*: (Type 2) Corporate owners that are denoted by the letter C in Amadeus (“Trade & Industry organization”).
- *Active*: (Type 3) Active investors, which include private equity firms, labeled as P (“Private Equity firms”), and venture capitalists, labeled as V (“Venture Capital”) in Amadeus.
- *State*: (Type 4) Ownership by the state, labeled as S (“Public authority/ State/ Government”) in Amadeus.
- *Institutional*: (Type 5) Institutional owners category includes the following Amadeus shareholder types — B (“Bank”), F (“Financial Companies”), J (“Foundations”), Y (“Hedge funds”) and E (“Mutual/Pension fund/Nominee /Trust”).<sup>3</sup>
- *Anonymous corporate*: (Type 6) This category pools all corporate shareholders with missing identification, labeled by L (“Other named Shareholders”) in Amadeus.
- *Anonymous individual*: (Type 7) Anonymous private investors that are labeled by D (“Anonymous Private Stockholders”).

In addition to the type of the owner, we also differentiate between firms that are stand-alone and firms that belong to business groups (Khanna and Yafeh, 2007). The detailed sorting mechanism identifying stand-alone and business group firms can be found in the Appendix. Note that for business group firms, we again retain only those subsidiaries which are owned with at least a 95% majority.

## 2.3 Supermajority Ownership in Private European Firms

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<sup>2</sup> 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)

<sup>3</sup> Note that we do not differentiate between *independent* and *grey* institutional investors (see Ferreira and Matos (2008), Brickley, Lease, and Smith (1988), Almazan, Hartzell, and Starks (2005), and Chen, Harford, and Li (2007)) mainly because the majority of institutional investors, with few exceptions, fall into grey category and because they have a full shareholder control over the firms in our sample.



Over the sample period, we collect data for 242,536 European private firms. The majority of firms in our sample are family-owned (49.97%), 41.8% of firms are owned by corporates, 5.7% by institutional investors and 2.24% by the relevant State. Remaining firms are controlled by active (0.04%), anonymous corporate (0.16%) and anonymous individual (0.09%) owners. Table 1 summarizes supermajority owners by country. In nearly all countries, family firms and firms controlled by corporates are the most important category. The exceptions are Belgium, Finland, Netherlands and Sweden, where family firms with 95% control represent 1.05%, 0.20%, 0.00%, and 0.06% respectively. These countries instead display higher percentages of private firms controlled by corporates (85.78% in Belgium, 98.6% in Finland, 87.7% in Netherlands, 98.4% in Sweden). The highest percentages of family firms are in Serbia (87.9%), Romania (85.7%), Bulgaria (83.03%), and Slovenia (77.07%). Figures 1 and 2 visualize country distribution of sample firms with family and corporate ownership, respectively, using the map of Europe.

More than 10% of private firms are fully controlled by institutional investors in Belgium, Norway, Netherlands, France, and Austria (see Figure 3). At the same time, the state maintains considerable supermajority control in some former socialist economies like Ukraine (33.3%) and Poland (10.27%), while there are no firms fully controlled by state in Sweden and Finland. Active and anonymous ownership categories are unimportant across all countries, representing less than 1.5% of firms in each country.

Figure 4 presents industry distribution of sample firm by ownership type. Family-controlled firms are concentrated in wholesale and retail trade, repair of motor vehicles (25.8%), manufacturing (22.9%) and construction (17.8%). A similar distribution, except for construction, is observed for corporate and institutional owners. State ownership prevails in certain utilities – water supply, sewerage, waste management and remediation activities (14.6%) – as well as industries related to professional, scientific and technical activities (10.2%). Active investors (unreported) prevail in wholesale and retail trade, repair of motor vehicles, manufacturing, industries related to arts, entertainment and recreation and professional, scientific and technical activities. Going forward, we will not include Active, Anonymous Corporate, and Anonymous Individual ownership types in our regression analysis because we do not have enough observations to draw any meaningful conclusions.

## **2.4 Descriptive Statistics**

Table 2 presents summary statistics for the main variables we use in our analysis: these are selected based on the prior literature. Thus we report about financial constraints (Fazzari, Hubbard, and Petersen, 1988; Hadlock and Pierce, 2010), profitability (Blanchard, Rhee, and Summers, 1993; Asker, Farre-Mensa, & Ljungqvist, 2015; Erel, Jang, and Weisbach, 2015) and investment opportunities (Lehn and Poulsen, 1989; Shin and Stulz, 1998; Bloom, Bond, and van Reenen, 2007; Michaely and Roberts, 2012).

In Table 2, Panel A, we present basic descriptive statistics for all the firms in our sample. After trimming all the firm-level variables at the 1% and 99% levels, an average firm in our sample has USD 3.5 million of total assets, a gross investment of 0.051, an intangible investment of 0.043, a profitability ratio (ROA) of 0.063, a leverage ratio of 0.188 and about 37 years old.

Table 2, Panel B reports summary statistics by ownership type. Family ownership is associated with smaller firms (in terms of both total assets and the number of employees) with a higher cash flow ratio and higher ROA. Mean risk avoidance of the family-owned firms is comparable with that of corporate-owned enterprises. In terms of value-added growth, family-owned firms on average display higher values, being followed by the corporate owners, state, and institutional owners. Family-owned firms also exhibit highest gross investment levels, while state owners invests the least in tangible assets, but the most in intangible assets.

## 2.5 Regression analysis

To study the effect of ownership type on firm investment in our sample of private firms, we build on the work of Erel, Jang and Weisbach (2015).<sup>4</sup> Specifically, we augment Erel et al.'s (2015) model with a set of dummy variables that aim to capture the effect of the identity of different types of owners on firm investment as follows:

$$Investment_{it} = \alpha_0 + \beta X_{it} + \sum_{k=2}^K \gamma_k OwnershipType_{it} + \delta BGroup_{it} + \lambda_c Macro_{ct} + \tau_t + f_i + \varepsilon_{it}, \quad (1)$$

for all  $i = 1, \dots, N$  (firm index);  $t = 2001, \dots, 2018$  (time index, year);  $k = 2, \dots, K$  (ownership type,  $K = 4$ );  $c = 1, \dots, C$  (country index). *Investment* is either gross investment or intangible

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<sup>4</sup> Erel, Jang, and Weisbach (2015) analyze European private firms and their investment behavior around their acquisition. They employ the same database, Amadeus, to examine more than 5,000 acquisitions from 2001 to 2008 in Europe.

investment, *Ownership type* is a set of dummy variables for the firm’s super-majority owner (*Family* (omitted), *Corporate*, *State*, and *Institutional*), *BGroup* is the dummy variable that equals unity if the firm is part of a business group (the omitted category is a stand-alone firm). Vector  $X_{it}$  contains the firm-specific control variables, specifically firm size, tangibility, cash flow, number of employees, sales growth, leverage, profitability, cash, and firm age for firm  $i$  at time  $t$ .

*Macro* is a set of country-level variables that account for variation in external finance availability, country level income, and the development of the local markets: namely, total private credit to GDP, stock market capitalization to GDP, nominal GDP growth, GDP in constant 2010 USD, and GDP per capita. For the detailed definitions of all variables, see Table A.1 in Appendix.

In some specifications of the model, we further control for *risk-avoidance*, so as to assess whether this is associated with lower investment levels by firms. The risk-avoidance index is constructed by adding 1 when (1) a firm's leverage is in the bottom 20% of the distribution; (2) the volatility of firm-level profitability is in the bottom 20% of the distribution; and (3) if the firm survives at least 5 years. The index ranges from 0 to 3, with higher scores denoting greater risk-avoidance (Faccio et al., 2016).

We also include a set of time ( $\tau_t$ ) and firm ( $f_i$ ) fixed effects to control for changing macroeconomic conditions and (unobserved) time-invariant firm-level heterogeneity. Standard errors ( $\varepsilon_{it}$ ) are robust to arbitrary heteroskedasticity.

Note that the estimated coefficients  $\gamma$  in specification (1) capture the “transitory” effect of ownership type on firm investment (the effect in firms with changes in type of the owner). As the ownership structure of fully controlled firms is rather stable, we also estimate the “permanent” effect (the effect in firms with no changes in type of the owner) by regressing the estimated fixed effect ( $\hat{f}_i$ ) from (1) on ownership type categories.

$$\hat{f}_i = \sum_{k=1}^K \gamma_k^* \text{Ownership Type}_i + \delta^* \text{BGroup}_{it} + \kappa_c + \iota_p + \xi_i \quad (2)$$

for all  $i = 1, \dots, N$  (firm index);  $k = 1, \dots, K$  (ownership type);  $c = 1, \dots, C$  (country index); and  $p = 1, \dots, P$  (industry index). As previously, *BGroup* is the dummy variable that equals to unity if the firm is part of a business group. We also control for a set of industry ( $\iota_p$ ) and country ( $\kappa_c$ ) fixed effects to capture the time-invariant legal and financial environment. Standard errors ( $\xi_{it}$ )

are robust to arbitrary heteroscedasticity. The estimated coefficients  $\gamma^*$  in specification (2) captures the “permanent” effect of ownership type on firm investment.

Apart from the main effect of ownership type on firm investment, we also study whether different owners exhibit different investment sensitivity to profitability and cash flow. To estimate this, we define the following model.

$$\begin{aligned}
Investment_{it} = & \alpha_0 + \beta X_{it} + \mu InvOppr_{it} + \sum_{k=2}^K \gamma_k Ownership Type_{it} + \\
& + \sum_{k=2}^K \rho_k InvOppr_{it} \times Ownership Type_{it} + \\
& + \sum_{k=2}^K \varphi_k Z_{it} \times Ownership Type_{it} + \zeta Z_{it} + \lambda_c Macro_{ct} + \\
& + \tau_t + f_i + \varepsilon_{it},
\end{aligned} \tag{3}$$

As in all specifications above, the vector  $X_{it}$  contains firm-specific control variables. In this case proxies for size  $Ln(Employees)$  and  $Ln(Total Assets)$ , profitability ( $ROA$ ), *leverage*, *cash flows* (and *cash*), and *firm age* for firm  $i$  at time  $t$ . As before, we control for firm fixed effects ( $f_i$ ), as well as for standard macroeconomic variables ( $Macro_{ct}$ ) and year effects ( $\tau_t$ ).

Investment opportunities ( $InvOppr$ ) are measured by the sales growth, which is seen in the literature to be the best proxy of business opportunities for privately held firms (see e.g., Lehn and Poulsen, 1989; Shin and Stulz, 1998; Bloom, Bond, and van Reenen, 2007; Michaely and Roberts, 2012, among others).

$Z_{it}$  stands either for  $ROA$  or for *cash flow* (to total assets) depending on the specification. As a part of these effects, we also explore sensitivity of ownership type to firm profitability, interaction with  $ROA$  and/or interaction with firm *cash flow*. The interaction term of  $ROA$  (or cash flow) with the ownership type captures the effect of firm profitability on the size of the investment; to what extent different owners use their profits to finance their investments.

## 2.6 Matching samples

We also explore whether our initial results hold when we compare two firms that are identical on dimensions affecting their investment behavior but differ by the type of their majority ownership. Thus we compare investment levels in sub-samples representing pairs of ownership type (*Corporate*, *State*, *Institutional*) and a control group of *Family*-owned firms. To control for observable differences between firms with different ownership types, we follow the prior literature in using a matching procedure (Michaely and Roberts, 2012; Gao, Harford, and Li, 2013; Asker et al., 2015).

The literature suggests that firm investment behavior depends on firm size, specific industry, and the structure of assets. We therefore first use the exact matching on country, industry (NACE2 alphabet classification), time period (with 2000, 2005, 2008, 2010, 2013, and 2016 being the cut off point for similar time period), and firm structure (stand-alone and business groups). We further complement the exact matching with the nearest neighbor matching on  $\ln(\text{total assets})$ , *tangibility* and *leverage*. We keep only firms that satisfy the common support requirement and those for which we have similar caliper  $<0.005$ , i.e., probability of being classified as contrafactual. For each firm, we add up to five nearest neighbors; removing the duplicates results roughly in similar size of the control group.<sup>5</sup>

### 3 Empirical Results

#### 3.1 Owner type and level of investment

We start by exploring the effect of ownership type on the level of gross firm investment by estimating baseline regressions (1) and (2). Table 3 presents these regression estimation results. Columns 1, 3, 5, 7, and 9 show the effect of type of the owner for investment in firms with changes in type of the owner, or the “transitory” effects. Notably, we do not observe any significant “transitory” effect that could be attributed to the type of the owner in the full sample (columns 1 and 3). Similarly, no significant “transitory” effect is found in the matched samples (columns 5, 7, and 9). This result is to some extent expected as the changes in the ownership type are rather infrequent and therefore would be captured by firm fixed effects.

The ownership effects on gross firm investment are significantly more pronounced in the “permanent” effect specifications reported in Columns 2, 4, 6, 8, and 10. Decomposing firm fixed effects, as outlined in specification (2), yields a set of significant and negative coefficients for ownership controls. The results suggest that family owners invest significantly *more* than any other owner types in our sample. In addition, lower gross investment levels are observed in firms that belong to business groups compared to stand-alone firms. This latter result can potentially be explained by higher investment efficiency in business groups, which are argued have centralized capital management and therefore can perhaps reduce excessive investment by allocating limited funds to the most efficient subsidiaries (Khanna and Yafeh, 2007).

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<sup>5</sup> In the interest of the space, the technical results for matching samples are not presented here, but are included in the technical part of the On-line Appendix or available on request.

The differences in gross investment levels observed among firms controlled by different types of owners could also be driven by their risk preferences. We therefore control for risk-avoidance in columns 3, 4, and all estimations in the matched samples. While firms with the higher risk avoidance scores invest significantly less compared to firms with the lowest risk avoidance ( $score=0$ ), the estimated coefficients indicate that the higher investment levels associated with family ownership is almost entirely unaffected.

In addition to the gross firm investment levels, we also investigate whether specific ownership types have a different effect on intangible investment by firms. Table 4 presents the results. As before, Columns 1, 3, 5, 7, and 9 focus on the “transitory” effect and the estimated coefficients are not significant for firms with changes in type of the owner. The exception is the coefficient for institutional ownership type in the full sample of firms (columns 1 and 3). This coefficient for institutional ownership type however is not significant in the matched institutional sample (column 9).

At the same time, the effect estimated in the “permanent” specifications in Columns 2, 4, 6, 8, and 10 indicates that family owners invest in intangible assets significantly *less* than the other ownership types in our sample. Higher intangible asset investment is also observed in firms that belong to business groups. This result is consistent with Belenzon and Berkovitz (2010), who show that business groups foster the scale and novelty of corporate innovation. Firms with higher risk avoidance scores invest significantly less compared to firms with the lowest risk avoidance ( $score=0$ ), consistent with the view that intangible assets investment is more risky than firm gross investment. The exception is firms with risk-avoidance score=1 that invest more in intangible assets than firms with the lowest risk avoidance. Controlling for risk avoidance does not influence in a significant way our coefficients of interest.

### **3.2 Change in the Ownership Type as an Identification of Investment Behavior**

Despite careful analysis and the use of matched samples in all previous estimations, we cannot be fully confident that we have completely disentangled the influence of supermajority ownership type and unobserved firm-level characteristics. To alleviate these concerns, we focus on the supermajority ownership transitions from one ownership type to another. The shock introduced by the ownership type change helps us to observe any change in the level of investment while being reasonably confident that this change is not driven by firm unobservable characteristics.

While changes in ownership type are rather infrequent, we are able to identify a sufficient number of changes to conduct a meaningful analysis. We then compare firms with ownership type changes to matched firms where there were no changes in ownership over the sample period. As before, matched samples are constructed by identifying firms of similar size and asset structure, operating in the same industry (letter NACE2), country, and time period and with the same firm structure (stand-alone versus business group).

As a first step, we conduct a visual examination of changes in firm investment levels using two-way fixed effects event-study regressions. Specifically, we plot coefficients and the associated confidence intervals from the investment regressions. Figures 5A and 5B show the level of gross investment and the level of intangible investment, respectively, around the event of the ownership type change. Following the change, the level of gross investment decreases and the level of intangible investment slightly increases as the firm transitions from family to corporate ownership.

We go on to conduct the regression analysis reported in Table 5. A dummy variable *After* captures the change in investment levels associated with the transition from family ownership to corporate and institutional ownership against the subsample of family firms that did not change their ownership status. First, we compare firms transitioning from family to corporate ownership (see Columns 1–2 for gross investment and Columns 5–6 for intangible investment). We observe a significant decrease in the level of firm gross investment, but no significant increase in the level of intangible investment. These results suggest that transfer of ownership from family owners to corporate owners triggers the change in firm investment behavior, which becomes less family-like and more corporate-like.

Columns 3–4 and 7–8 focus on the transitions from family ownership to institutional ownership. We do not observe any significant changes in gross or intangible investment levels for transitioning firms. Lack of changes in investment levels could be attributed to the majority of institutional investors being passive in our sample.

Overall, the results obtained for firms with changes in ownership type are in line with our main results – firms with family ownership exhibit higher levels of gross investment than firms with corporate owners.

### **3.3 Investment Sensitivity to Growth Opportunities, Profitability and Cash Flow**

We observe clear differences in gross investment levels between ownership types in firms with no changes in type of the owner. Our analysis shows that family owners invest more than

other ownership types. This is somewhat counterintuitive because corporate and institutional owners could potentially have access to cheaper investment capital. However, these patterns are also consistent with a number of alternative explanations, such as family-owned firms overinvesting to maintain family image and reputation and a desire to protect family assets.

To disentangle these possibilities, we further explore how firms with different ownership types respond to changes in investment opportunities; in particular, we estimate investment sensitivity to profitability and cash flow.

Table 6 and Table 7 present results of investment sensitivity regressions to growth opportunities as well as to ROA and cash flow, respectively. Panels A focus on gross investment; Panels B show results for intangible investment.

The results of gross investment sensitivity regressions suggest that higher investment opportunities are associated with higher gross investment by firms – the estimated coefficients are positive and significant in all specifications in both the original and matched samples. The results in columns 1 and 2 of Panel A of Tables 6 and 7 also suggest that firms with corporate owners are less sensitive to changes in growth opportunities than firms owned by families (base category). This result though is only significant in the full sample of firms and does not hold in the matched sample. At the same time, state-owned firms display substantially greater (and more robust) sensitivity to growth opportunities compared to family-owned firms.

At the same time, the relationship between investment opportunities and the level of intangible investment is either insignificant (Panel B, Table 6) or significantly negative (Panel B, Table 7) in all specifications across samples. The results in Panel B of Tables 6 and 7 also show that firms with corporate, institutional and state owners are more sensitive to changes in growth opportunities than firms owned by families (base category). These results hold in all specifications in both original and matched samples.

In terms of investment sensitivity to profitability and cash flow, the results are remarkably similar for gross and intangible investment – firms with corporate and institutional owners are less sensitive to changes in profitability and cash flow, while state-owned firms have much larger sensitivity to profitability and cash flow than firms own by families. These results are somewhat expected due to an easier and likely cheaper access to external financing for the firms controlled by (financial) institutions, as well as the higher dividend payouts to institutional investors (Gugler, 2003; Gugler and Yurtoglu, 2003; Bena and Hanousek, 2008).

#### **4 Robustness**



We conducted a number of robustness checks to ensure that our results are not sensitive to unusual features of the dataset.

### *Investment efficiency*

While differences in investment levels and investment sensitivities offer an insight into investment decisions by different types of owners, it is also important to understand whether invested capital is allocated efficiently. Efficient allocation is achieved by investing in growing industries, while investment in declining industries should be reduced (Wurgler, 2000). The quality of investment opportunities at the firm level could be proxied by value-added growth. To capture the sensitivity of investment to the growth in value added, we extend Faccio et al. (2016) by estimating an investment efficiency model augmented to account for ownership type.

$$\begin{aligned}
 \text{Gross Investment}_{it} = & \alpha_0 + \beta X_{it} + \sum_{k=2}^K \gamma_k \text{Ownership Type}_{it} + \\
 & + \sum_{k=2}^K \rho_k VA_{it} \times \text{Ownership Type}_{it} + \\
 & + \mu VA_{it} + \eta VA_{it} \times BGroup_{it} + \\
 & + \delta BGroup_{it} + \nu RA_{it} + \lambda_c Macro_{ct} + \tau_t + f_i + \varepsilon_{it},
 \end{aligned} \tag{4}$$

for all  $i = 1, \dots, N$  (firm index);  $t = 2001, \dots, 2018$  (time index, year);  $k = 2, \dots, K$  (ownership type,  $K = 7$ , omitted category ( $k = 1$ ) is *Family*);  $c = 1, \dots, C$  (country index). As previously, *BGroup* is the dummy variable that equals unity if the firm is part of a business group.

$VA_{it}$  is the growth in value added defined as  $\ln \frac{\text{Value Added}_{it}}{\text{Value Added}_{it-1}}$ , which reflects the quality of the firm's investment opportunities. Then,  $\mu$  represents the sensitivity of investments to growth opportunities and  $\rho$  indicates the impact of ownership type on investment efficiency. Similarly,  $VA$  is interacted with *BGroup* capturing the effect of business group affiliation on investment efficiency ( $\eta = 0$  if irrelevant). We also control for risk-avoidance ( $RA_{it}$ ) as defined earlier.

Vector  $X_{it}$  and vector  $Macro_{ct}$  contain sets of firm-specific and country-level control variables respectively, as discussed above.  $\tau_t$  and  $f_i$  are time and firm fixed effects.  $\varepsilon_{it}$  is the error term robust to arbitrary heteroskedasticity.

The results are presented in Table 8. We find a positive relationship between investment efficiency and firm gross investment (Panel A, Table 8). In terms of ownership type, we show that investments of state-owned firms have higher efficiency than investment of family-owned firms. For the corporate owners we observe a lower investment efficiency compared to family owners. Also, in general (in pooled data) the business group firms *ceteris paribus* show higher

contribution to the value-added growth. At the same time, we observe a negative relationship between investment efficiency and firm intangible investment (Panel B, Table 8). Similar to gross investment, intangible investment of state-owned firms have marginally higher efficiency than investment of family-owned firms.

#### *Redeployability of assets*

We also test the robustness of our results by analyzing to what extent the investment behavior of different owners is affected by asset redeployability.

The secondary markets for corporate assets can vary significantly across industries. A wide variation in trading activity would imply different search costs for potential buyers and sellers. Costly capital reversibility will affect firm investment decisions because disinvestment is more costly than investment. At the same time, asset redeployability costs could vary for the different ownership types as well.

To test this conjecture, we follow Kim and Kung (2016) and control for industry-specific asset redeployability. The redeployability score is grouped into three categories – High (top 25% of the asset redeployability distribution), Medium, and Low (bottom 25%). We then re-estimate the main regression specifications (1) and (2) in Tables 3 and 4 in subsamples with different asset redeployability.

Table 9 presents the results. Panel A focuses on gross investment, while Panel B shows intangible investment. The estimation results for all three subsets and different investment types closely resemble those in Table 3 and 4. We conclude that our findings are not driven by differences in asset redeployability.

#### *Firm age*

Investment patterns could vary substantially depending on firm age. Firm age has been shown to be related to investment opportunities because investment opportunities of mature firms may be different to those of young firms (Anderson and Reeb, 2003). In addition, family-owned younger firms could potentially be more credit constrained than younger firms owned by corporate or institutional owners. To determine if firms of certain age are generating our results, we test the robustness of our findings by re-estimating our main specifications (1) and (2) for the subsamples of young firms (0-5 years), older firms (6-30 years old) and well-established firms (30+ years old). The results in Table IA-1 of the Supplementary Material are consistent with our main results reported in Table 3 and 4. Family owners invest significantly more in tangible assets and significantly less in intangible assets than other owner types in all three firm age categories. The differences in gross investment behavior are most pronounced

for firms that are at more than 30 years old. In terms of intangible investment, firms in the youngest age group (0-5 years) exhibit the largest differences. As firms get older, the level of their intangible investment drops significantly compared to the youngest firms in our sample and remains stable (the estimated coefficients within owner type groups are not statistically different from each other).

#### *Firm size*

Literature often considers firm size and financial constraints together. It is argued that larger firms can finance their investment either from internal sources or via issuing debt or even equity and, as a result, liquidity constraints tend to have a greater impact on smaller firms. To ensure that our results are not driven by one size firm category, we differentiate between firms with 10-50 employees, firms with 50 to 100 employees and firms with at least 100 employees. We then replicated Table 3 and Table 4 for each firm size subsample and report the results in Table IA-2 of the Supplementary Material. We continue to find that firms owned by families invest significantly more in tangible assets and significantly less in intangible assets than the other ownership types in each firm size category. Within ownership type categories, the estimated coefficients are statistically different from each other across different firm sizes. The effect of ownership type on gross investment is the strongest in the largest firm category. For firm intangible investments, we do not observe any clear pattern when analyzing the estimated coefficients across different size categories for the same type of owner.

#### *Market development*

If firms operating in more developed countries tend to have better capital market access, we might expect differences in investment behavior. We therefore assess whether country development affects our results. We re-estimate equations (1) and (2) separately for firms operating in EU 15 (initial member countries), EU10 (new member countries that joined the union in 2004), and non-EU countries. The results in Table IA-3 of the Supplementary Material closely resemble our main results in all three subsamples – family-owned firms have the highest gross investment level and the lowest level of intangible investment among all considered ownership types. Within ownership type categories, the largest differences among gross investment behavior are observed for firms operating in non-EU countries, the smallest differences are observed in EU15 countries. In terms of intangible investment, ignoring state-owned firms, the estimated differences between ownership types are the smallest in non-EU countries and the largest in EU10 countries. Overall, the estimated ownership type effects differ significantly across different country groups.

## 5 Conclusion

We explore how corporate investment choices are influenced by ownership type, focusing, to address potential agency problems, solely on supermajority firms where the share of largest owner is above 95 percent. We investigate how ownership type affects firm investment levels and whether different types of owners have different sensitivities to business opportunities, profitability, cash flows and value-added growth. We also control for firm structure and include identification of stand-alone firms and business groups, respectively.

For the analysis we construct a large sample of European privately owned firms covering the period from 2001 to 2018. The advantage of our sample is that the identified ownership types are the major decision-makers. We focus on four ownership types: family, corporate, institutional, and state owners. Our methodology is designed to overcome methodological shortcomings of previous studies. To this end, we capture the effect of the change in the ownership type (“transitory” effect) as well as the effect of ownership type in firms with no change of ownership (“permanent” effect) in the sample. Prior studies (See e.g., Thomsen and Pedersen, 2000) focus only the so-called transitory effect. We also address potential endogeneity by using matching samples and examining transitions from one owner type to another.

Our findings contradict the bulk of the literature in that we find substantially higher sensitivity of the family-owned firms to investment opportunities, profitability, cash flows and value-added growth compared to corporate and institutional owners. The previous literature usually argues that family-owned will be risk-averse because the owner’s wealth is often relatively undiversified and tied up in the business. Our findings support the view that family-owned firms actually take a long-term strategic perspective ((Bertrand and Schoar, 2006; Aguilera and Crespi-Cladera, 2012), invest significantly more than for example institutional and corporate owners and are more sensitive to external factors via cash flows. We interpret our findings as likely to have arisen because our focus on supermajority owners allows us in the empirical work to disentangle agency effects from the impact of ownership.

Even so, the positive effects of family ownership on investment are found only to apply to tangible investments; in fact, when we consider investment in intangibles, the traditional findings in the literature are found to hold. This distinction between tangible and intangible investment because it is the latter which is usually linked to R&D, and therefore to innovation and productivity growth (Corrado, Haskel, Jona-Lasinio and Iommi, 2013). This suggests that

a more fine-grained analysis of the impact of family ownership might focus on R&D, innovation, and productivity.

Our analysis leads to several important lines of policy analysis. First, the negative view of family ownership in the growth literature may need to be revised, or at a minimum, become more nuanced. Our findings suggest that the problems with family ownership are concentrated on intangible investment, and that policy-makers may wish to focus their attention on encouraging R&D and innovation through intangible assets in such firms. Our results also bring into question the concerns about investment behavior in state owned firms often noted in the literature (see Estrin et al., 2009); when the supermajority criterion of ownership is applied, state owned firms consistently display higher sensitivity to profitability, cash flows and business opportunities than even family-owned firms. The study also opens several promising lines of future research, developing the use of the supermajority criterion in the analysis of the impact of different governance mechanisms. It would also be valuable to delve deeper into why family-owned firms invest less in intangible assets. One approach might be to consider the limitations that they face in terms of collateral when funding new investment because their assets are tied up in the operation of firm already.

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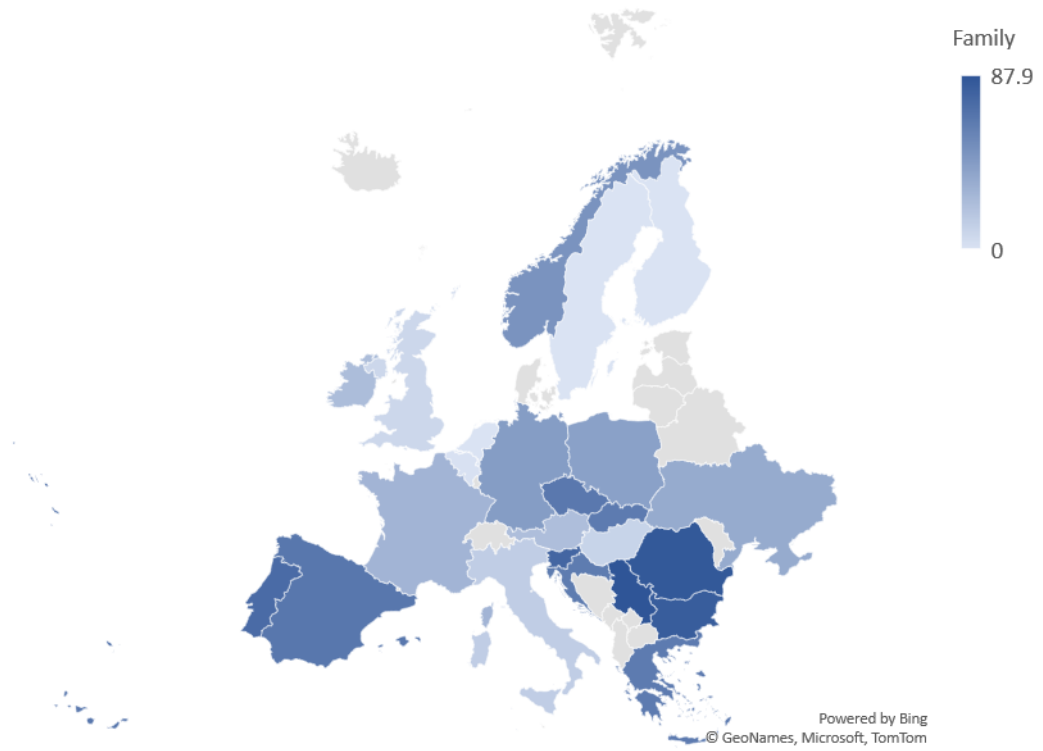
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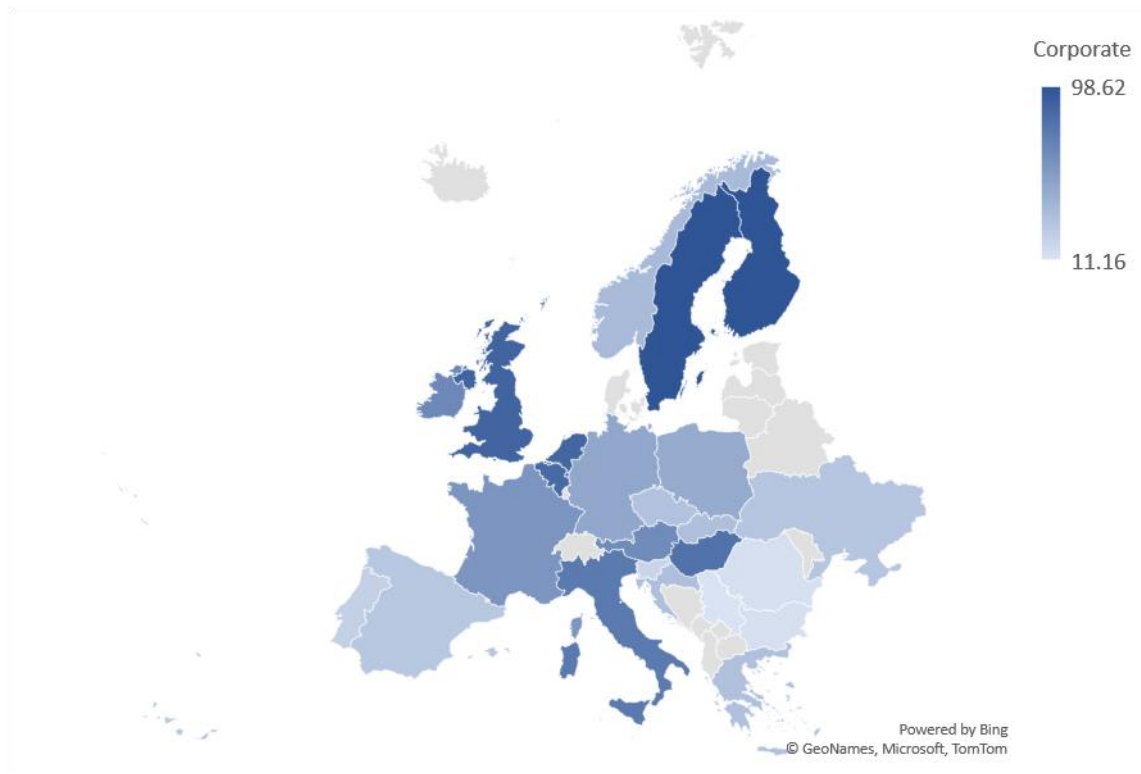
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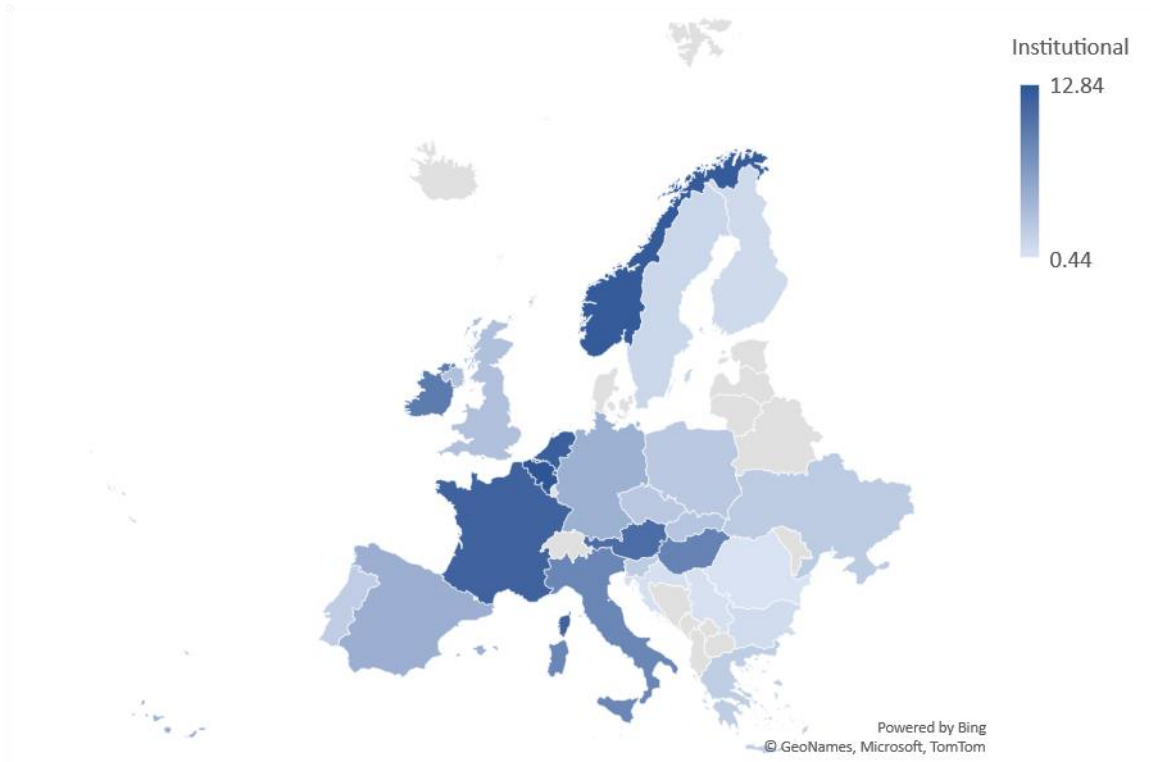
**Figure 1**  
**Country distribution of sample firms with family ownership**



**Figure 2**  
**Country distribution of sample firms with corporate ownership**



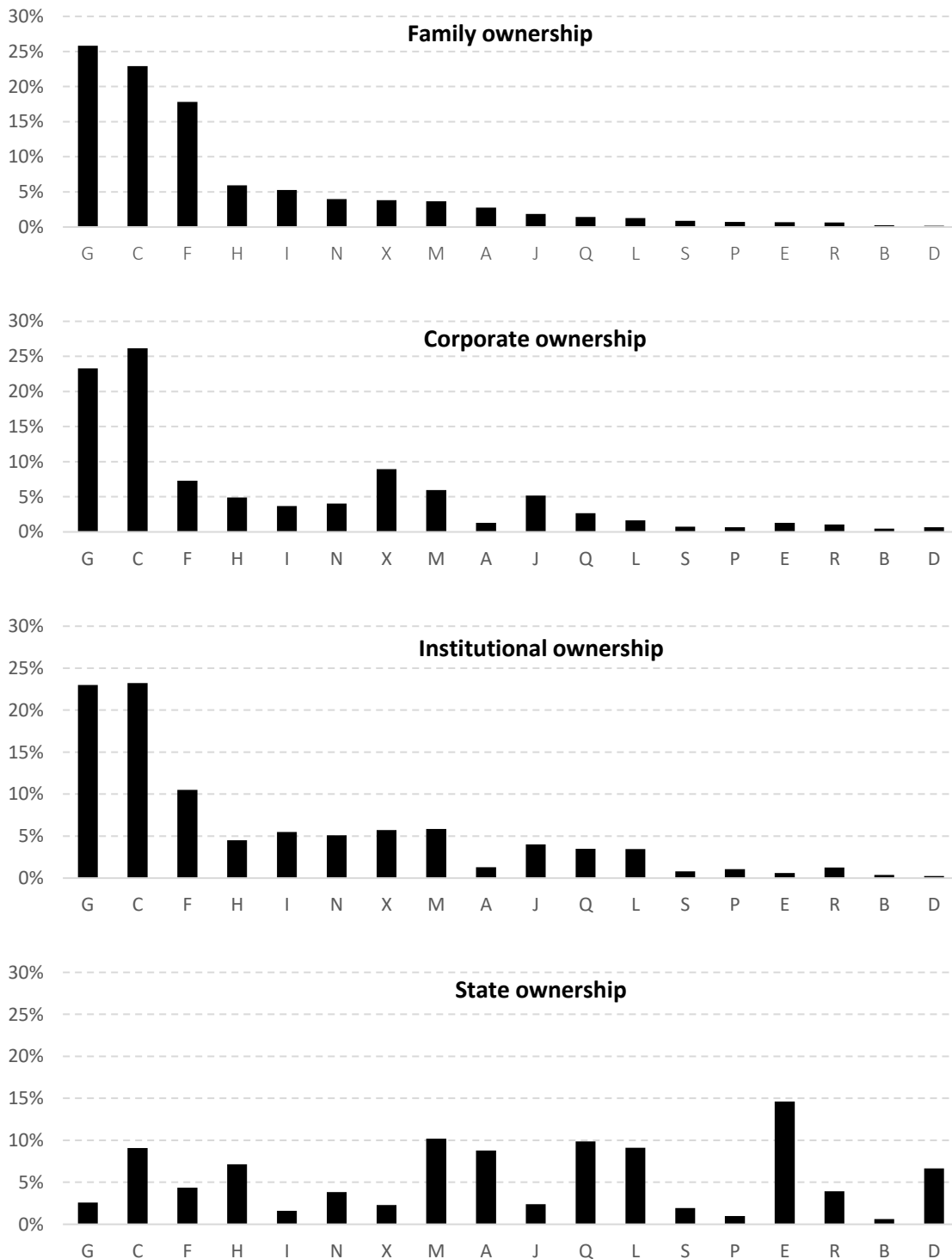
**Figure 3**  
**Country distribution of sample firms with institutional ownership**



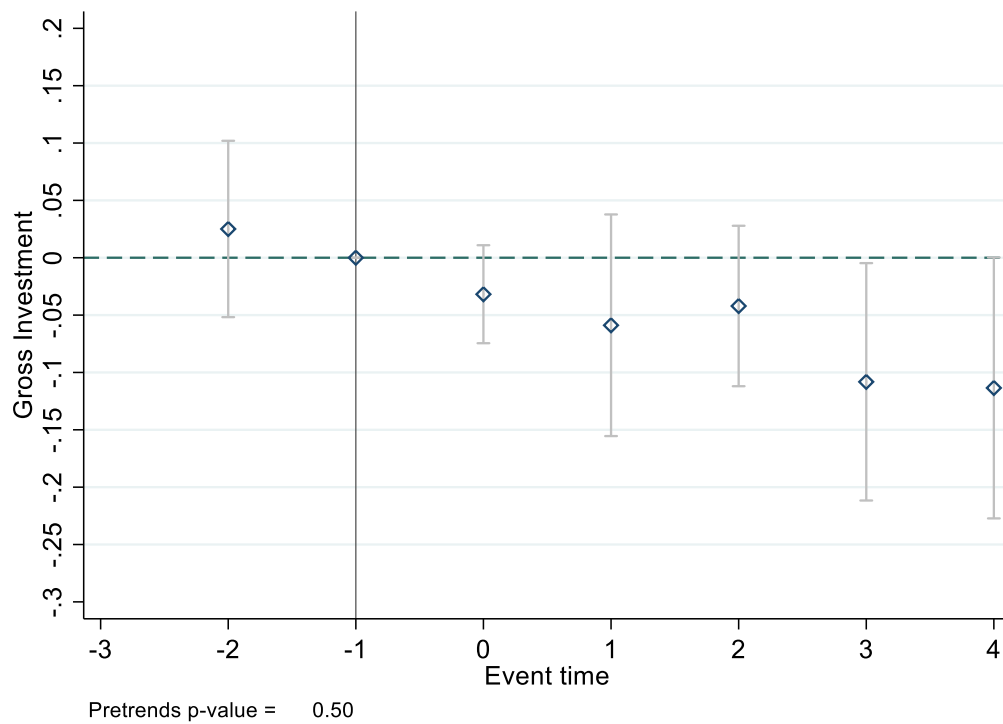
**Figure 4**

**Industry distribution of sample firms by owner type**

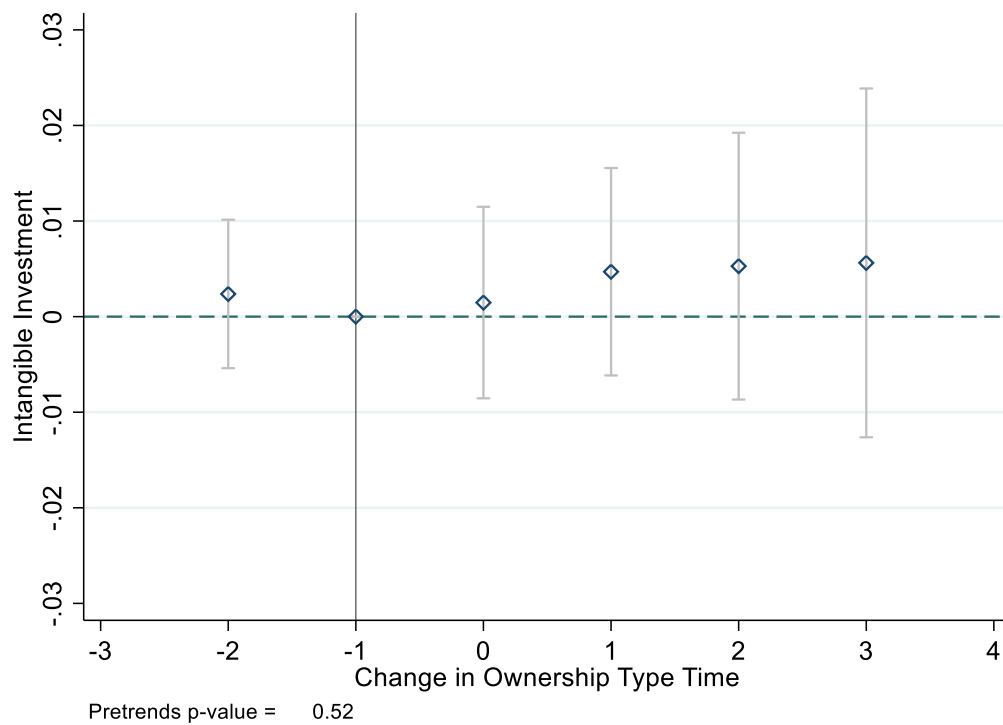
The graphs show the industry distribution of firms by owner type. We use NACE2 alphabet industry definitions. Specifically, A. Agriculture, Forestry and Fishing; B. Mining and Quarrying; C. Manufacturing; D. Electricity, Gas, Steam and Air Conditioning Supply; E. Water Supply; Sewerage, Waste Management and Remediation Activities; F. Construction; G. Wholesale and Retail Trade; Repair of Motor Vehicles; H. Transportation and Storage; I. Accommodation and Food Service Activities; J. Information and Communication; L. Real Estate Activities; M. Professional, Scientific and Technical Activities; N. Administrative and Support Service Activities; P. Human Health and Social Work Activities; Q. Arts, Entertainment and Recreation; R. Other Service Activities; S. Activities of Households; X. Other.



**Figure 5A. TWFE – Gross Investment Change from Family to Corporate Ownership**



**Figure 5B. TWFE – Intangible Investment Change from Family to Corporate Ownership**



**Table 1**  
**Country distribution of sample firms by owner type**

The table presents the percentage of firms controlled by different controlling owners at the 95% threshold. Controlling shareholders are classified into seven types following BvD Amadeus classification – Family, Corporate, Active, State, Institutional, Anonymous Individual and Anonymous Corporate. See section 2.2 of the paper for details.

Country	Number of Firms	Family	Corporate	Active	State	Institutional	Anonymous Individual	Anonymous Corporate
Austria	2,039	22.76	65.08	0.00	1.42	10.74	0.00	0.00
Belgium	6,879	1.05	85.78	0.22	0.06	12.84	0.03	0.03
Bulgaria	10,429	83.04	13.17	0.01	2.74	1.03	0.00	0.01
Czech Republic	8,512	66.00	31.19	0.01	0.02	2.77	0.00	0.00
Germany	14,857	43.56	48.09	0.06	3.33	4.83	0.02	0.11
Spain	50,284	66.61	27.84	0.03	0.58	4.94	0.01	0.00
Finland	506	0.20	98.62	0.00	0.00	1.19	0.00	0.00
France	42,012	28.88	59.00	0.05	0.02	11.59	0.43	0.03
UK	12,210	7.38	88.73	0.04	0.04	3.41	0.00	0.40
Greece	3,997	64.45	32.22	0.00	0.70	2.38	0.25	0.00
Croatia	11,505	63.72	33.15	0.02	2.31	0.72	0.03	0.04
Hungary	763	9.57	81.00	0.26	0.26	8.78	0.00	0.13
Ireland	795	23.52	66.29	0.13	0.38	9.56	0.00	0.13
Italy	7,859	13.60	75.96	0.09	1.85	8.47	0.00	0.03
Netherlands	797	0.00	87.70	0.00	0.38	11.92	0.00	0.00
Norway	14,744	49.52	35.49	0.01	1.34	12.34	0.00	1.30
Poland	10,280	41.11	45.63	0.21	10.27	2.77	0.00	0.00
Portugal	11,470	73.98	23.09	0.02	0.49	2.35	0.04	0.03
Romania	13,742	85.73	12.78	0.00	0.19	0.44	0.10	0.76
Serbia	4,778	87.90	11.16	0.00	0.33	0.61	0.00	0.00
Sweden	1,774	0.06	98.42	0.00	0.00	1.52	0.00	0.00
Slovenia	3,302	77.07	19.75	0.03	0.64	2.48	0.00	0.03
Slovakia	1,536	64.13	32.75	0.00	0.07	2.99	0.07	0.00
Ukraine	7,466	34.96	29.17	0.01	33.30	2.56	0.00	0.00
Total	242,536	49.97	41.80	0.04	2.24	5.70	0.09	0.16

**Table 2**  
**Summary statistics**

This table reports summary statistics for our sample. Firm-level data were retrieved from eight biannual updates of Amadeus (Bureau van Dijk) database. Macroeconomic indicators are collected from the WDI (World Bank) data. Firms operating in financial industries are excluded (NACE codes 64 – 66). Panel A reports the summary statistics for the variables used in the analysis. All firm level variables are measured in the USD. GDP is in constant 2010 USD and expressed here in trillions. GDP per capita is also in constant 2010 USD. Panel B reports the number of observations by industry and owner type; Panel C by country; Panel D by year. Finally, Panel E provides selective descriptive statistics by the type of the owner. Definitions of variables are available in Table A.1 in the Appendix.

Panel A: Descriptive statistics

	<i>N</i>	<i>Mean</i>	<i>St Dev</i>	<i>Distribution</i>				
				<i>p5</i>	<i>p25</i>	<i>p50</i>	<i>p75</i>	<i>p95</i>
<i>Firm-level variables</i>								
Gross Investment	670,281	0.051	1.011	-0.072	0.001	0.030	0.094	0.288
Intangible Investment	398,254	0.043	0.041	0.003	0.015	0.031	0.058	0.127
Ln (Total Assets)	670,281	15.076	1.557	12.455	13.999	15.090	16.221	17.600
Ln (Employees)	670,281	3.610	0.986	2.398	2.773	3.401	4.290	5.517
Cash Flow	670,281	0.084	0.130	-0.085	0.030	0.073	0.136	0.285
Sales Growth	670,281	0.116	0.468	-0.322	-0.091	0.043	0.218	0.707
Value Added growth	367,573	0.055	0.321	-0.422	-0.099	0.044	0.206	0.567
ROA	670,046	0.063	0.143	-0.131	0.012	0.051	0.116	0.286
Leverage	670,281	0.188	0.222	0.000	0.002	0.109	0.302	0.625
Age	669,703	37.847	17.524	6.000	19.000	50.000	50.000	50.000
Tangibility	670,281	0.259	0.239	0.009	0.062	0.184	0.400	0.757
Risk Avoidance	670,281	1.172	0.637	0.000	1.000	1.000	2.000	2.000
<i>Macro variables</i>								
GDP (in trillions)	670,281	1.365	1.085	0.052	0.247	1.418	2.505	3.191
GDP per Capita	670,281	33,021	18,015	6,625	22,444	32,283	41,249	86,820
GDP Growth	670,281	1.729	2.628	-3.439	0.623	1.706	2.917	6.247
Private Credit/GDP	670,281	97.225	40.574	31.203	67.728	96.020	119.835	171.188
Market Cap/GDP	670,281	59.681	30.838	14.624	34.148	58.352	81.858	116.683

Panel B: Selective Descriptive Statistics by Ownership Type

	<i>N</i>	<i>Mean</i>	<i>St Dev</i>	<i>p5</i>	<i>p25</i>	<i>p50</i>	<i>p75</i>	<i>p95</i>
<i>Family</i>								
Gross Investment	315,696	0.064	1.044	-0.071	0.000	0.035	0.110	0.324
Intangible Investment	186,767	0.046	0.043	0.004	0.016	0.033	0.061	0.135
Ln (Total Assets)	315,696	14.278	1.364	12.018	13.398	14.271	15.160	16.568
Ln (Employees)	315,696	3.214	0.792	2.303	2.639	2.996	3.638	4.875
Cash Flow	315,696	0.094	0.129	-0.055	0.035	0.077	0.143	0.303
Sales growth	315,696	0.127	0.491	-0.350	-0.101	0.042	0.238	0.807
Value Added growth	167,528	0.068	0.329	-0.412	-0.095	0.051	0.223	0.614
ROA	315,635	0.073	0.139	-0.098	0.020	0.056	0.119	0.297
Risk Avoidance	315,696	1.162	0.620	0.000	1.000	1.000	2.000	2.000
<i>Corporate</i>								
Gross Investment	298,490	0.045	0.525	-0.071	0.002	0.027	0.081	0.247
Intangible Investment	176,880	0.041	0.040	0.002	0.013	0.029	0.056	0.119
Ln (Total Assets)	298,490	15.846	1.333	13.514	14.978	15.945	16.835	17.864
Ln (Employees)	298,490	3.970	1.002	2.485	3.178	3.871	4.718	5.743
Cash Flow	298,490	0.076	0.130	-0.109	0.026	0.071	0.131	0.269
Sales growth	298,490	0.108	0.448	-0.297	-0.082	0.045	0.207	0.619
Value Added growth	169,732	0.046	0.317	-0.432	-0.101	0.042	0.198	0.529
ROA	298,343	0.057	0.146	-0.154	0.006	0.049	0.115	0.279
Risk Avoidance	298,490	1.162	0.642	0.000	1.000	1.000	2.000	2.000
<i>State</i>								
Gross Investment	14,726	-0.090	4.176	-0.103	-0.004	0.044	0.131	0.316
Intangible Investment	10,161	0.052	0.042	0.002	0.024	0.045	0.070	0.135
Ln (Total Assets)	14,726	15.144	1.810	12.061	13.860	15.231	16.575	17.890
Ln (Employees)	14,726	4.434	1.046	2.639	3.638	4.511	5.273	6.038
Cash Flow	14,726	0.054	0.124	-0.119	0.016	0.054	0.101	0.217
Sales growth	14,726	0.130	0.492	-0.297	-0.060	0.070	0.226	0.638
Value Added growth	5,163	0.046	0.282	-0.367	-0.079	0.045	0.181	0.448
ROA	14,710	0.004	0.134	-0.198	-0.016	0.011	0.047	0.163
Risk Avoidance	14,726	1.672	0.679	1.000	1.000	2.000	2.000	3.000
<i>Institutions</i>								
Gross Investment	41,369	0.038	0.232	-0.080	0.000	0.022	0.069	0.228
Intangible Investment	23,540	0.038	0.038	0.001	0.012	0.027	0.051	0.114
Ln (Total Assets)	41,369	15.586	1.301	13.421	14.671	15.606	16.545	17.703
Ln (Employees)	41,369	3.747	0.962	2.398	2.944	3.611	4.394	5.561
Cash Flow	41,369	0.078	0.131	-0.104	0.027	0.072	0.134	0.273
Sales growth	41,369	0.079	0.417	-0.290	-0.094	0.019	0.169	0.539
Value Added growth	25,150	0.021	0.299	-0.414	-0.114	0.014	0.160	0.474
ROA	41,358	0.061	0.150	-0.153	0.008	0.051	0.120	0.290
Risk Avoidance	41,369	1.144	0.643	0.000	1.000	1.000	2.000	2.000

Panel c: Correlation matrices for selected variables

Variables	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
(1) Gross Investment	1.000							
(2) Cash Flow	0.017***	1.000						
(3) Ln (Employees)	0.001	-0.002	1.000					
(4) Ln (Total Assets)	0.004***	-0.082***	0.592***	1.000				
(5) Sales Growth	0.031***	0.137***	0.028***	-0.019***	1.000			
(6) Ln (Age)	0.009***	-0.013***	0.105***	0.114***	0.029***	1.000		
(7) ROA	0.020***	0.798***	-0.016***	-0.034***	0.146***	-0.008***	1.000	
(8) Risk Avoidance	-0.004***	0.043***	0.030***	0.013***	0.000	-0.005***	0.047***	1.000



**Table 3**  
**Owner type and firm gross investment**

This table presents regression results of the augmented investment equation. Firm specific control variables are ln(Total Assets) and its square, cash flow, ln(number of employees), sales growth, leverage, and firm age. Macro-variables consist of private credit to GDP, stock market capitalization to GDP, GDP growth, GDP in constant USD, and GDP per capita (constant USD). \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity consistent standard errors are in brackets.

	Dependent Variable = <i>Gross Investment</i>									
	Pooled				Corporate		State		Institutional	
	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>Ownership Type (vs Family)</i>										
<i>Corporate</i>	0.004 (0.013)	-0.188*** (0.003)	0.004 (0.013)	-0.188*** (0.003)	0.002 (0.005)	-0.053*** (0.001)				
<i>State</i>	-0.034 (0.031)	-0.272*** (0.009)	-0.034 (0.031)	-0.258*** (0.009)			-0.056 (0.132)	-0.230*** (0.013)		
<i>Institutional</i>	0.010 (0.017)	-0.182*** (0.005)	0.010 (0.017)	-0.182*** (0.005)					0.014 (0.008)	-0.049*** (0.001)
<i>Structure Type (vs Stand-alone)</i>										
<i>Business Group</i>	-0.002 (0.004)	-0.084*** (0.002)	-0.002 (0.004)	-0.083*** (0.002)	-0.004** (0.002)	-0.021*** (0.001)	-0.003 (0.009)	-0.159*** (0.005)	-0.002 (0.002)	-0.020*** (0.001)
<i>Risk-avoidance score vs 0 (=lowest risk avoidance)</i>										
Risk-avoidance score =1			0.005 (0.017)	-0.074*** (0.004)	-0.011 (0.007)	-0.012*** (0.002)	0.033 (0.041)	-0.181*** (0.007)	-0.023* (0.013)	-0.004*** (0.001)
Risk-avoidance score =2			0.026 (0.018)	-0.103*** (0.004)	0.000 (0.007)	-0.032*** (0.002)	0.059 (0.043)	-0.221*** (0.008)	-0.017 (0.013)	-0.021*** (0.001)
Risk-avoidance score =3			0.049* (0.025)	-0.260*** (0.010)	0.003 (0.011)	-0.063*** (0.005)	0.106* (0.060)	-0.536*** (0.020)	-0.015 (0.017)	-0.041*** (0.004)
Constant	-12.227*** (0.276)	0.053 (0.034)	-12.264*** (0.277)	0.120*** (0.034)	-1.151*** (0.137)	0.014 (0.016)	-16.040*** (0.560)	-0.128 (0.125)	-0.244 (0.210)	-0.031 (0.024)
Macro Variables	Yes		Yes		Yes		Yes		Yes	
Firm-level controls	Yes		Yes		Yes		Yes		Yes	
Firm & Time FE	Yes		Yes		Yes		Yes		Yes	
Country & Industry FE		Yes		Yes		Yes		Yes		Yes
R-squared	0.019	0.182	0.019	0.181	0.038	0.142	0.023	0.271	0.075	0.608
<i>N</i>	670,281	670,281	670,281	670,281	473,997	473,997	145,132	145,132	162,467	162,467

**Table 4**  
**Owner type and firm intangible investment**

This table presents the regression results of the augmented investment equation using investment into intangible assets. Firm-specific control variables are ln(Total Assets) and its square, cash flow, ln(number of employees), sales growth, leverage, and firm age. Macro-variables consist of private credit to GDP, stock market capitalization to GDP, GDP growth, GDP in constant USD, and GDP per capita (constant USD). \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity consistent standard errors are in brackets.

	Dependent Variable = <i>Intangible Assets Investment</i>									
	Pooled				Corporate		State		Institutional	
	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
<i>Ownership Type (vs Family)</i>										
<i>Corporate</i>	0.000 (0.001)	0.006*** (0.000)	0.000 (0.001)	0.006*** (0.000)	0.000 (0.001)	0.004*** (0.000)				
<i>State</i>	0.001 (0.001)	-0.002*** (0.000)	0.001 (0.001)	-0.001* (0.000)			-0.004 (0.004)	0.004*** (0.001)		
<i>Institutional</i>	0.002** (0.001)	0.005*** (0.000)	0.002** (0.001)	0.005*** (0.000)					0.001 (0.001)	0.002*** (0.000)
<i>Structure Type (vs Stand-alone)</i>										
<i>Business Group</i>	-0.000** (0.000)	0.003*** (0.000)	-0.000** (0.000)	0.003*** (0.000)	-0.000* (0.000)	0.002*** (0.000)	0.003 (0.003)	-0.006*** (0.001)	0.000 (0.000)	0.000 (0.000)
<i>Risk-avoidance score vs 0 (=lowest risk avoidance)</i>										
Risk-avoidance score =1			-0.002 (0.001)	0.003*** (0.000)	-0.002 (0.001)	0.002*** (0.000)	-0.001 (0.004)	0.003*** (0.001)	-0.003 (0.003)	0.006*** (0.000)
Risk-avoidance score =2			-0.003*** (0.001)	-0.000 (0.000)	-0.004*** (0.001)	-0.000* (0.000)	-0.003 (0.005)	0.001 (0.001)	-0.005* (0.003)	0.003*** (0.000)
Risk-avoidance score =3			-0.002* (0.001)	-0.004*** (0.000)	-0.003* (0.002)	-0.003*** (0.001)	-0.002 (0.005)	-0.005*** (0.001)	-0.005 (0.004)	0.002 (0.001)
Constant	0.462*** (0.012)	-0.007*** (0.001)	0.466*** (0.012)	-0.008*** (0.001)	0.411*** (0.018)	-0.003*** (0.001)	0.378*** (0.040)	0.014*** (0.005)	0.432*** (0.037)	-0.010*** (0.002)
Macro Variables	Yes		Yes		Yes		Yes		Yes	
Firm-level controls	Yes		Yes		Yes		Yes		Yes	
Firm & Time FE	Yes		Yes		Yes		Yes		Yes	
Country & Industry FE		Yes		Yes		Yes		Yes		Yes
R-squared	0.086	0.324	0.086	0.323	0.084	0.258	0.076	0.404	0.080	0.430
N	397,348	397,348	397,348	397,348	278,822	278,822	39,331	39,331	97,684	97,684

**Table 5**  
**Owner type changes and firm investment**

The table explores whether the owner type change leads to changes in the firm level of investment. A firm's behavior transitioning from one owner type to another is assessed against the family-owned firms, never changing their ownership status. As in Table 3, in all specifications, the firm-specific control variables are ln(Total Assets) and its square, cash flow, ln(number of employees), sales growth, leverage, and firm age. Macro-variables consist of private credit to GDP, stock market capitalization to GDP, GDP growth, GDP in constant USD, and GDP per capita (constant USD). \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity consistent standard errors are in brackets.

	Dependent variable: <i>Gross Investment</i>				Dependent variable: <i>Intangible Assets Investment</i>			
	Corporate		Institutional		Corporate		Institutional	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
<i>After (=1)</i>	-0.011*** (0.002)	-0.010*** (0.002)	-0.004 (0.003)	-0.003 (0.003)	0.000 (0.001)	0.000 (0.001)	0.002 (0.001)	0.002 (0.001)
<i>Business Group</i>	-0.003** (0.001)	-0.003** (0.001)	-0.001 (0.002)	-0.001 (0.002)	0.001 (0.001)	0.001 (0.001)	0.002 (0.001)	0.002 (0.001)
Risk-avoidance score =1		-0.005*** (0.002)		-0.006* (0.004)		0.001 (0.001)		0.002 (0.003)
Risk-avoidance score =2		-0.012*** (0.002)		-0.009** (0.004)		-0.002* (0.001)		0.002 (0.003)
Risk-avoidance score =3		-0.026*** (0.004)		-0.016* (0.009)		-0.005** (0.002)		-0.004 (0.008)
Constant	-0.042 (0.073)	-0.028 (0.073)	-0.121 (0.205)	-0.114 (0.204)	0.095*** (0.036)	0.102*** (0.036)	0.153* (0.082)	0.150* (0.082)
Macro Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm & Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.154	0.155	0.147	0.147	0.278	0.279	0.283	0.283
<i>N</i>	60,767	60,767	16,034	16,034	15,810	15,810	3,351	3,351

**Table 6**

**Investment sensitivity to Investment Opportunities and Profitability**

This table presents results of investment sensitivity regression to investment opportunities and profitability. We control for a standard set of firm-level control variables and macro-variables used in previous tables. Base categories are family-owned firms, the stand-alone firms, and firms with the lowest risk-avoidance score. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity consistent standard errors are in brackets.

*Panel A. Gross Investment*

	Dependent Variable = <i>Gross Investment</i>							
	Original sample		Matched samples					
	Pooled		Corporate		State		Institutional	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Inv. Opportunities	0.029*** (0.004)	0.029*** (0.004)	0.025*** (0.002)	0.025*** (0.002)	0.019*** (0.006)	0.019*** (0.006)	0.018*** (0.002)	0.018*** (0.002)
<i>Interactions with Ownership Type (vs Family)</i>								
Inv. Opportunities × <i>Corporate</i>	-0.016*** (0.006)	-0.016*** (0.006)	-0.003 (0.002)	-0.003 (0.002)				
Inv. Opportunities × <i>State</i>	0.293*** (0.016)	0.293*** (0.016)			0.291*** (0.023)	0.291*** (0.023)		
Inv. Opportunities × <i>Institutional</i>	-0.016 (0.013)	-0.016 (0.013)					-0.002 (0.003)	-0.002 (0.003)
<i>Structure Type (vs Stand-alone)</i>								
Inv. Opportunities × <i>Business Group</i>	-0.003 (0.004)	-0.003 (0.004)	-0.004** (0.002)	-0.004** (0.002)	-0.004 (0.009)	-0.004 (0.009)	-0.001 (0.002)	-0.001 (0.002)
Profitability (ROA)	-0.090*** (0.024)	-0.090*** (0.024)	-0.095*** (0.011)	-0.095*** (0.011)	-0.039 (0.046)	-0.040 (0.046)	-0.072*** (0.014)	-0.072*** (0.014)
<i>Interactions with Ownership Type (vs Family)</i>								
Profitability × <i>Corporate</i>	0.026 (0.024)	0.025 (0.024)	-0.027** (0.011)	-0.027** (0.011)				
Profitability × <i>State</i>	3.152*** (0.084)	3.152*** (0.084)			3.336*** (0.121)	3.336*** (0.121)		
Profitability × <i>Institutional</i>	-0.008 (0.047)	-0.009 (0.047)					-0.050*** (0.014)	-0.050*** (0.014)

<i>Risk-avoidance score vs 0 (=lowest risk avoidance)</i>								
Risk-avoidance score =1	0.004 (0.017)		-0.014** (0.007)		0.032 (0.041)		-0.029** (0.013)	
Risk-avoidance score =2	0.018 (0.018)		-0.010 (0.008)		0.051 (0.043)		-0.031** (0.013)	
Risk-avoidance score =3	0.034 (0.025)		-0.013 (0.011)		0.090 (0.060)		-0.039** (0.017)	
Constant	-12.186*** (0.277)	-12.212*** (0.277)	-1.310*** (0.138)	-1.303*** (0.138)	-15.96*** (0.557)	-16.03*** (0.560)	-0.566*** (0.212)	-0.534** (0.212)
Macro Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm & Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.019	0.019	0.029	0.029	0.023	0.023	0.055	0.055
N	670,046	670,046	473,824	473,824	145,083	145,083	162,430	162,430

Panel B. Intangible Assets Investment

	Dependent Variable = <i>Intangible Assets Investment</i>							
	Original sample		Matched samples					
	Pooled		Corporate		State		Institutional	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Inv. Opportunities	-0.0001 (0.0002)	-0.0000 (0.0002)	-0.0003 (0.0002)	-0.0003 (0.0002)	-0.0000 (0.0005)	-0.0000 (0.0005)	0.018*** (0.002)	0.018*** (0.002)
<i>Interactions with Ownership Type (vs. Family)</i>								
Inv. Opportunities × <i>Corporate</i>	0.001*** (0.000)	0.001*** (0.000)	0.002*** (0.000)	0.002*** (0.000)				
Inv. Opportunities × <i>State</i>	0.002*** (0.001)	0.002*** (0.001)			0.002** (0.001)	0.002** (0.001)		
Inv. Opportunities × <i>Institutional</i>	0.003*** (0.001)	0.003*** (0.001)					0.002*** (0.001)	0.002*** (0.001)
<i>Structure Type (vs. Stand-alone)</i>								
Business Group	-0.0005** (0.0002)	-0.0005** (0.0002)	-0.001** (0.000)	-0.001** (0.000)	0.001 (0.002)	0.001 (0.002)	-0.001 (0.002)	-0.001 (0.002)
Profitability (ROA)	-0.125*** (0.001)	-0.125*** (0.001)	-0.100*** (0.001)	-0.099*** (0.001)	-0.194*** (0.004)	-0.194*** (0.004)	-0.117*** (0.002)	-0.116*** (0.002)
<i>Interactions with Ownership Type (vs. Family)</i>								
Profitability × <i>Corporate</i>	0.001 (0.001)	0.001 (0.001)	-0.006*** (0.001)	-0.006*** (0.001)				
Profitability × <i>State</i>	-0.002 (0.003)	-0.002 (0.003)			0.010** (0.004)	0.010** (0.004)		
Profitability × <i>Institutional</i>	-0.001 (0.002)	-0.001 (0.002)					-0.003 (0.002)	-0.003 (0.002)
<i>Risk-avoidance score vs. 0 (=lowest risk avoidance)</i>								
Risk-avoidance score =1		-0.003** (0.001)		-0.003** (0.001)		-0.002 (0.004)		-0.004 (0.003)
Risk-avoidance score =2		-0.005*** (0.001)		-0.005*** (0.001)		-0.005 (0.004)		-0.007** (0.003)

Risk-avoidance score =3		-0.006*** (0.001)		-0.006*** (0.002)		-0.006 (0.005)		-0.009** (0.004)
Constant	0.394*** (0.012)	0.401*** (0.012)	0.344*** (0.018)	0.352*** (0.018)	0.208*** (0.038)	0.213*** (0.038)	0.339*** (0.036)	0.347*** (0.036)
Macro Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm & Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.131	0.131	0.109	0.110	0.185	0.186	0.122	0.123
<i>N</i>	397,255	397,255	278,752	278,752	39,316	39,316	97,673	97,673

**Table 7**  
**Investment sensitivity to Investment Opportunities and Cash Flow**

This table presents the results of investment sensitivity regression to investment opportunities and cash flow. We control for a standard set of firm-level control variables and macro-variables used in previous tables. Base categories are family-owned firms, the stand-alone firms, and firms with the lowest risk-avoidance score. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity consistent standard errors are in brackets.

*Panel A. Gross Investment*

	Dependent Variable = <i>Gross Investment</i>							
	Original sample		Matched samples					
	Pooled		Corporate		State		Institutional	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Inv. Opportunities	0.026*** (0.004)	0.026*** (0.004)	0.022*** (0.002)	0.022*** (0.002)	0.014** (0.006)	0.014** (0.006)	0.017*** (0.002)	0.017*** (0.002)
<i>Interactions with Ownership Type (vs Family)</i>								
Inv. Opportunities × <i>Corporate</i>	-0.014*** (0.006)	-0.014** (0.006)	-0.002 (0.002)	-0.002 (0.002)				
Inv. Opportunities × <i>State</i>	0.390*** (0.016)	0.390*** (0.016)			0.393*** (0.023)	0.393*** (0.023)		
Inv. Opportunities × <i>Institutional</i>	-0.014 (0.012)	-0.015 (0.012)					-0.003 (0.003)	-0.003 (0.003)
<i>Structure Type (vs Stand-alone)</i>								
Inv. Opportunities × <i>Business Group</i>	-0.003 (0.004)	-0.003 (0.004)	-0.004** (0.002)	-0.004** (0.002)	-0.004 (0.009)	-0.004 (0.009)	-0.001 (0.002)	-0.001 (0.002)
Cash flow	-0.069*** (0.018)	-0.070*** (0.018)	0.018* (0.010)	0.018* (0.010)	-0.096*** (0.026)	-0.098*** (0.026)	0.023** (0.011)	0.023** (0.011)
<i>Interactions with Ownership Type (vs Family)</i>								
Cash flow × <i>Corporate</i>	-0.012 (0.025)	-0.011 (0.025)	-0.048*** (0.012)	-0.048*** (0.012)				
Cash flow × <i>State</i>	0.318*** (0.090)	0.318*** (0.090)			0.341*** (0.129)	0.341*** (0.129)		
Cash flow × <i>Institutional</i>	-0.030 (0.051)	-0.030 (0.051)					-0.062*** (0.015)	-0.062*** (0.015)



<i>Risk-avoidance score vs 0 (=lowest risk avoidance)</i>										
Risk-avoidance score =1		0.002 (0.017)			-0.015** (0.007)			0.030 (0.041)	-0.029** (0.013)	
Risk-avoidance score =2		0.017 (0.018)			-0.011 (0.008)			0.050 (0.043)	-0.032** (0.013)	
Risk-avoidance score =3		0.033 (0.025)			-0.015 (0.011)			0.090 (0.060)	-0.039** (0.017)	
Constant		-12.274*** (0.276)	-12.297*** (0.277)		-1.267*** (0.137)	-1.258*** (0.138)	-16.068*** (0.557)	-16.135*** (0.560)	-0.512** (0.212)	-0.479** (0.212)
Macro Variables	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	
Firm-level controls	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	
Firm & Time FE	Yes	Yes		Yes	Yes	Yes	Yes	Yes	Yes	
R-squared		0.016	0.016		0.028	0.028	0.02	0.02	0.054	0.054
N		670,281	670,281		473,997	473,997	145,127	145,127	162,467	162,467

Panel B. Intangible Assets Investment

	Dependent Variable = <i>Intangible Assets Investment</i>							
	Original sample		Matched samples					
	Pooled		Corporate		State		Institutional	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Inv. Opportunities	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.003*** (0.000)	-0.002*** (0.001)	-0.002*** (0.001)	-0.002*** (0.000)	-0.002*** (0.000)
<i>Interactions with Ownership Type (vs Family)</i>								
Inv. Opportunities × <i>Corporate</i>	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)	0.003*** (0.000)				
Inv. Opportunities × <i>State</i>	0.003*** (0.001)	0.003*** (0.001)			0.003*** (0.001)	0.003*** (0.001)		
Inv. Opportunities × <i>Institutional</i>	0.003*** (0.001)	0.003*** (0.001)					0.002*** (0.001)	0.002*** (0.001)
<i>Structure Type (vs Stand-alone)</i>								
Business Group	-0.0005** (0.0002)	-0.0005** (0.0002)	-0.0004* (0.0002)	-0.0004* (0.0002)	0.0007 (0.0026)	0.0008 (0.0026)	0.0006 (0.0004)	0.0006 (0.0004)
Cash flow	0.040*** (0.001)	0.040*** (0.001)	0.047*** (0.001)	0.048*** (0.001)	0.033*** (0.003)	0.033*** (0.003)	0.041*** (0.002)	0.042*** (0.002)
<i>Interactions with Ownership Type (vs Family)</i>								
Cash flow × <i>Corporate</i>	-0.027*** (0.001)	-0.027*** (0.001)	-0.036*** (0.002)	-0.036*** (0.002)				
Cash flow × <i>State</i>	0.007* (0.004)	0.007* (0.004)			0.009** (0.004)	0.009** (0.004)		
Cash flow × <i>Institutional</i>	-0.027*** (0.002)	-0.027*** (0.002)					-0.027*** (0.003)	-0.027*** (0.003)
<i>Risk-avoidance score vs 0 (=lowest risk avoidance)</i>								
Risk-avoidance score =1		-0.003*** (0.001)		-0.003** (0.001)		-0.002 (0.004)		-0.004 (0.003)
Risk-avoidance score =2		-0.006*** (0.001)		-0.006*** (0.001)		-0.004 (0.005)		-0.007** (0.003)

Risk-avoidance score =3		-0.007*** (0.001)		-0.007*** (0.002)		-0.005 (0.005)		-0.009** (0.004)
Constant	0.454*** (0.013)	0.462*** (0.013)	0.387*** (0.018)	0.395*** (0.018)	0.359*** (0.040)	0.363*** (0.041)	0.405*** (0.037)	0.414*** (0.037)
Macro Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm & Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.067	0.067	0.062	0.063	0.061	0.061	0.066	0.067
<i>N</i>	397,348	397,348	278,822	278,822	39,331	39,331	97,684	97,684

**Table 8**  
**Investment Efficiency and Owner Type**

This table presents regression results for investment efficiency using value-added growth. We include a standard set of firm-level control variables and macro-variables used in previous tables. Base categories are family-owned firms, the stand-alone firms, and firms with the lowest risk-avoidance score. \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity consistent standard errors are in brackets.

*Panel A: Gross Investment*

	Dependent Variable = <i>Gross Investment</i>							
	Original sample		Matched samples					
	Pooled		Corporate		State		Institutional	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Investment Efficiency (proxied by Value added)	0.047*** (0.003)	0.034*** (0.007)	0.046*** (0.002)	0.032*** (0.005)	0.044*** (0.004)	0.036*** (0.013)	0.033*** (0.006)	0.016 (0.014)
<i>Interactions with Ownership Type (vs Family)</i>								
Value added × <i>Corporate</i>	-0.019*** (0.003)	-0.019*** (0.003)	-0.024*** (0.002)	-0.024*** (0.002)				
Value added × <i>State</i>	0.179*** (0.015)	0.179*** (0.015)			0.178*** (0.019)	0.177*** (0.019)		
Value added × <i>Institutional</i>	-0.009 (0.007)	-0.009 (0.007)					-0.002 (0.006)	-0.002 (0.006)
<i>Interactions with Structure Type (vs Stand-alone)</i>								
Value added × <i>Business Group</i>	0.007** (0.003)	0.007** (0.003)	0.002 (0.002)	0.002 (0.002)	0.006 (0.006)	0.005 (0.006)	0.004 (0.006)	0.004 (0.006)
<i>Interactions with Risk-avoidance score vs 0 (=lowest risk avoidance)</i>								
Risk-avoidance score =1		0.013* (0.007)		0.013*** (0.004)		0.009 (0.013)		0.017 (0.013)
Risk-avoidance score =2		0.013* (0.007)		0.020*** (0.005)		0.009 (0.014)		0.019 (0.014)
Risk-avoidance score =3		0.007 (0.019)		0.009 (0.012)		0.005 (0.040)		0.094** (0.042)

Constant	-2.587*** (0.149)	-2.578*** (0.150)	-1.936*** (0.112)	-1.927*** (0.112)		-3.004*** (0.269)	-2.976*** (0.271)	-0.445 (0.370)
Macro Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ownership and Structure & Risk avoidance dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm & Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.038	0.038	0.097	0.097	0.039	0.039	0.040	0.040
<i>N</i>	367,573	367,573	261,826	261,826	80,181	80,181	95,959	95,959

Panel B: Intangible Assets Investment

	Dependent Variable = <i>Intangible Assets Investment</i>							
	Original sample		Matched samples					
	Pooled		Corporate		State		Institutional	
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Investment Efficiency (proxied by Value added)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.002*** (0.000)	-0.004*** (0.001)	-0.004*** (0.001)	-0.002*** (0.001)	-0.002*** (0.001)
<i>Interactions with Ownership Type (vs. Family)</i>								
Value added × <i>Corporate</i>	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)	-0.000 (0.000)				
Value added × <i>State</i>	0.001 (0.002)	0.001 (0.002)			0.003* (0.002)	0.003* (0.002)		
Value added × <i>Institutional</i>	0.000 (0.001)	0.000 (0.001)					-0.001 (0.001)	-0.001 (0.001)
<i>Interactions with Structure Type (vs. Stand-alone)</i>								
Business Group	-0.0002 (0.0002)	-0.0001 (0.0002)	-0.0004 (0.0003)	-0.0004 (0.0003)	-0.0026 (0.0035)	-0.0022 (0.0035)	0.0008* (0.0005)	0.0008* (0.0005)
<i>Interactions with Risk-avoidance score vs. 0 (=lowest risk avoidance)</i>								
Risk-avoidance score =1		-0.002* (0.001)		-0.004** (0.002)		-0.010 (0.008)		-0.000 (0.004)
Risk-avoidance score =2		-0.006*** (0.002)		-0.007*** (0.002)		-0.014* (0.008)		-0.004 (0.004)
Risk-avoidance score =3		-0.006*** (0.002)		-0.008*** (0.002)		-0.016* (0.009)		-0.005 (0.005)
Constant	0.520*** (0.017)	0.526*** (0.017)	0.475*** (0.024)	0.482*** (0.024)	0.698*** (0.075)	0.720*** (0.076)	0.389*** (0.047)	0.394*** (0.047)
Macro Variables	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Ownership, Structure & Risk avoidance dummies	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
Firm-level controls	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes

Firm & Time FE	Yes	Yes	Yes	Yes	Yes	Yes	Yes	Yes
R-squared	0.071	0.071	0.064	0.064	0.091	0.092	0.072	0.073
<i>N</i>	281,819	281,819	201,512	201,512	22,640	22,640	72,928	72,928

**Table 9**  
**Redeployability of Assets**

This table presents the regression results of the augmented investment equation using gross investment. Asset Redeployability is grouped into three categories: High (top quartile), Medium, and Low (bottom quartile). Firm-specific control variables are ln(Total Assets) and its square, cash flow, ln(number of employees), sales growth, leverage, and firm age. Macro-variables consist of private credit to GDP, stock market capitalization to GDP, GDP growth, GDP in constant USD, and GDP per capita (constant USD). \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity consistent standard errors are in brackets.

Panel A: Gross Investment

Dependent Variable = <i>Gross Assets Investment</i>						
Asset Redeployability	High		Medium		Low	
	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Corporate</i>	0.014 (0.013)	-0.072 *** (0.014)	0.005 (0.021)	-0.228 *** (0.004)	-0.009 (0.018)	-0.146 *** (0.002)
<i>State</i>	-0.030 (0.032)	-0.105 *** (0.035)	-0.013 (0.065)	-0.601 *** (0.013)	-0.036 (0.035)	-0.085 *** (0.007)
<i>Institutional</i>	0.004 (0.018)	-0.060 *** (0.022)	0.026 (0.029)	-0.245 *** (0.007)	-0.011 (0.024)	-0.127 *** (0.004)
<i>Business Group</i>	-0.006 (0.005)	-0.022 * (0.012)	0.004 (0.007)	-0.122 *** (0.003)	-0.005 (0.006)	-0.050 *** (0.002)
Risk-avoidance score =1	-0.002 (0.015)	0.020 (0.017)	0.023 (0.028)	-0.137 *** (0.005)	-0.020 (0.028)	-0.024 *** (0.003)
Risk-avoidance score =2	0.006 (0.016)	0.012 (0.019)	0.044 (0.030)	-0.168 *** (0.005)	0.007 (0.029)	-0.061 *** (0.003)
Risk-avoidance score =3	0.030 (0.025)	-0.110 ** (0.045)	0.076 * (0.042)	-0.374 *** (0.014)	0.013 (0.038)	-0.106 *** (0.008)
Constant	-0.845 *** (0.247)	-0.047 (0.165)	-22.862 *** (0.484)	0.472 *** (0.044)	-4.370 *** (0.400)	0.097 *** (0.029)
Macro Variables	Yes		Yes		Yes	
Firm-level controls	Yes		Yes		Yes	
Firm & Time FE	Yes		Yes		Yes	
Country & Industry FE		Yes		Yes		Yes
R-squared	0.039	0.012	0.026	0.336	0.014	0.255
<i>N</i>	93,237	93,237	346,510	346,510	230,534	230,534



Panel B: Intangible Assets Investment

Dependent Variable = <i>Intangible Assets Investment</i>						
Asset Redeployability	High		Medium		Low	
	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Corporate</i>	-0.001 (0.002)	0.012 *** (0.000)	0.001 (0.001)	0.003 *** (0.000)	-0.000 (0.001)	0.010 *** (0.000)
<i>State</i>	0.000 (0.004)	-0.000 (0.001)	0.006 ** (0.002)	-0.006 *** (0.001)	-0.001 (0.002)	0.000 (0.001)
<i>Institutional</i>	0.006 ** (0.003)	0.006 *** (0.001)	0.002 ** (0.001)	0.002 *** (0.000)	-0.001 (0.001)	0.008 *** (0.000)
<i>Business Group</i>	0.000 (0.001)	0.003 *** (0.000)	0.000 (0.000)	0.002 *** (0.000)	-0.001 *** (0.000)	0.004 *** (0.000)
Risk-avoidance score =1	-0.002 (0.003)	0.002 *** (0.001)	-0.002 (0.001)	0.003 *** (0.000)	-0.000 (0.002)	0.002 *** (0.000)
Risk-avoidance score =2	-0.003 (0.003)	-0.002 ** (0.001)	-0.004 ** (0.002)	0.001 ** (0.000)	-0.003 (0.002)	-0.001 *** (0.000)
Risk-avoidance score =3	-0.004 (0.004)	-0.002 (0.001)	-0.002 (0.002)	-0.005 *** (0.001)	-0.002 (0.002)	-0.004 *** (0.001)
Constant	0.476 *** (0.036)	0.007 * (0.003)	0.479 *** (0.018)	-0.015 *** (0.001)	0.452 *** (0.020)	-0.027 *** (0.002)
Macro Variables	Yes		Yes		Yes	
Firm-level controls	Yes		Yes		Yes	
Firm & Time FE	Yes		Yes		Yes	
Country & Industry FE		Yes		Yes		Yes
R-squared	0.079	0.105	0.084	0.341	0.097	0.444
<i>N</i>	47,596	47,596	198,828	198,828	150,924	150,924

**Table IA-1**

**Owner type and firm investment by firm age**

This table presents the regression results of the augmented investment equation. Firms are grouped by their age into three categories: 0-5, 6-30, 30+ years old. Firm-specific control variables are ln(Total Assets) and its square, cash flow, ln(number of employees), sales growth, leverage, and firm age. Macro-variables consist of private credit to GDP, stock market capitalization to GDP, GDP growth, GDP in constant USD, and GDP per capita (constant USD). \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity consistent standard errors are in brackets.

*Panel A. Gross Investment*

Dependent Variable = <i>Gross Assets Investment</i>						
Firm's Age (years)	0-5		6-30		30+	
	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Corporate</i>	0.033 (0.028)	-0.191*** (0.004)	-0.011 (0.025)	-0.096*** (0.003)	0.010 (0.018)	-0.253*** (0.004)
<i>State</i>	-0.126* (0.072)	-0.097*** (0.020)	-0.027 (0.060)	-0.263*** (0.013)	-0.037 (0.043)	-0.282*** (0.011)
<i>Institutional</i>	0.000 (0.047)	-0.140*** (0.009)	-0.017 (0.035)	-0.078*** (0.006)	0.017 (0.025)	-0.247*** (0.007)
<i>Business Group</i>	0.006 (0.008)	-0.057*** (0.004)	0.003 (0.007)	-0.052*** (0.003)	-0.005 (0.007)	-0.117*** (0.003)
Risk-avoidance score =1	-0.003 (0.020)	-0.002 (0.005)	-0.005 (0.031)	-0.018*** (0.004)	0.014 (0.026)	-0.112*** (0.005)
Risk-avoidance score =2	0.004 (0.023)	-0.011* (0.006)	0.002 (0.032)	-0.024*** (0.005)	0.042 (0.027)	-0.149*** (0.006)
Risk-avoidance score =3	0.012 (0.042)	-0.102*** (0.016)	-0.010 (0.044)	-0.104*** (0.011)	0.076** (0.038)	-0.347*** (0.014)
Constant	-1.571*** (0.382)	0.025 (0.041)	-4.821*** (0.469)	0.025 (0.038)	-18.858*** (0.464)	0.092* (0.053)
Macro Variables	Yes		Yes		Yes	
Firm-level controls	Yes		Yes		Yes	
Firm & Time FE	Yes		Yes		Yes	
Country & Industry FE		Yes		Yes		Yes
R-squared	0.121	0.431	0.020	0.199	0.022	0.201
<i>N</i>	43,658	43,658	169,203	169,203	457,420	457,420

Panel B: Intangible Assets Investment

Dependent Variable = Intangible Assets Investment						
Firm's Age (years)	0-5		6-30		30+	
	Transitory	Permanent	Transitory	Permanent	Transitory	Permanent
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Corporate</i>	-0.012* (0.006)	0.027*** (0.001)	0.003* (0.002)	0.005*** (0.000)	-0.000 (0.001)	0.006*** (0.000)
<i>State</i>	-0.019 (0.016)	0.029*** (0.004)	0.007* (0.004)	0.000 (0.001)	-0.001 (0.001)	-0.001* (0.000)
<i>Institutional</i>	-0.017* (0.010)	0.032*** (0.002)	0.004* (0.003)	0.004*** (0.001)	0.001 (0.001)	0.005*** (0.000)
<i>Business Group</i>	-0.000 (0.002)	0.004*** (0.001)	-0.000 (0.000)	0.003*** (0.000)	-0.000 (0.000)	0.003*** (0.000)
Risk-avoidance score =1	0.003 (0.006)	-0.004*** (0.001)	-0.008** (0.003)	0.009*** (0.000)	-0.000 (0.001)	0.001*** (0.000)
Risk-avoidance score =2	0.002 (0.006)	-0.007*** (0.001)	-0.009*** (0.003)	0.006*** (0.001)	-0.002* (0.001)	-0.001*** (0.000)
Risk-avoidance score =3	0.008 (0.009)	-0.008*** (0.003)	-0.010*** (0.004)	0.005*** (0.001)	-0.001 (0.002)	-0.006*** (0.001)
Constant	0.527*** (0.085)	-0.099*** (0.008)	0.554*** (0.034)	-0.050*** (0.003)	0.419*** (0.016)	0.008*** (0.001)
Macro Variables	Yes		Yes		Yes	
Firm-level controls	Yes		Yes		Yes	
Firm & Time FE	Yes		Yes		Yes	
Country & Industry FE			Yes		Yes	
R-squared	0.075	0.748	0.067	0.446	0.092	0.211
N	22,891	22,891	102,274	102,274	272,183	272,183

**Table IA-2**

**Owner type and firm investment by firm size**

This table presents the regression results of the augmented investment equation. Firms are grouped by their size into three categories – 10-50, 50-100, and 100+ by the number of employees. Firm-specific control variables are ln(Total Assets) and its square, cash flow, ln(number of employees), sales growth, leverage, and firm age. Macro-variables consist of private credit to GDP, stock market capitalization to GDP, GDP growth, GDP in constant USD, and GDP per capita (constant USD). \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity consistent standard errors are in brackets.

*Panel A. Gross Investment*

Asset Firm's Size (Employees)	Dependent Variable = <i>Gross Assets Investment</i>					
	10-50		50-100		100+	
	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Corporate</i>	0.002 (0.004)	-0.059*** (0.004)	0.005 (0.040)	-0.179*** (0.006)	-0.023 (0.055)	-0.266*** (0.011)
<i>State</i>	-0.028* (0.016)	-0.168*** (0.015)	-0.002 (0.080)	-0.171*** (0.015)	-0.099 (0.083)	-0.095*** (0.020)
<i>Institutional</i>	0.005 (0.006)	-0.055*** (0.007)	0.028 (0.050)	-0.190*** (0.010)	-0.046 (0.069)	-0.246*** (0.017)
<i>Business Group</i>	-0.003** (0.001)	-0.024*** (0.003)	-0.003 (0.012)	-0.065*** (0.005)	0.021 (0.017)	-0.101*** (0.009)
Risk-avoidance score =1	-0.015*** (0.005)	-0.005 (0.005)	-0.005 (0.052)	-0.055*** (0.008)	0.043 (0.070)	-0.079*** (0.012)
Risk-avoidance score =2	-0.012** (0.006)	-0.018*** (0.005)	0.018 (0.054)	-0.057*** (0.008)	0.138* (0.073)	-0.042*** (0.014)
Risk-avoidance score =3	-0.001 (0.008)	-0.051*** (0.014)	0.023 (0.070)	-0.301*** (0.018)	0.186* (0.095)	-0.609*** (0.030)
Constant	-1.314*** (0.092)	-0.058 (0.079)	-27.127*** (1.080)	0.058 (0.059)	-90.983*** (1.504)	1.939*** (0.070)
Macro Variables	Yes		Yes		Yes	
Firm-level controls	Yes		Yes		Yes	
Firm & Time FE	Yes		Yes		Yes	
Country & Industry FE		Yes		Yes		Yes
R-squared	0.084	0.026	0.030	0.293	0.065	0.511
N	449,049	449,049	101,595	101,595	119,637	119,637

Panel B: Intangible Assets Investment

Dependent Variable = <i>Intangible Assets Investment</i>						
Firm's Size (Employees)	10-50		50-100		100+	
	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Corporate</i>	0.000 (0.001)	0.005*** (0.000)	0.001 (0.002)	0.005*** (0.000)	-0.001 (0.001)	0.006*** (0.000)
<i>State</i>	0.000 (0.003)	-0.004*** (0.001)	0.002 (0.003)	-0.005*** (0.001)	-0.000 (0.002)	-0.000 (0.001)
<i>Institutional</i>	0.003*** (0.001)	0.003*** (0.000)	-0.003 (0.002)	0.008*** (0.001)	0.001 (0.002)	0.004*** (0.001)
<i>Business Group</i>	-0.000 (0.000)	0.003*** (0.000)	-0.000 (0.000)	0.002*** (0.000)	-0.001** (0.000)	0.002*** (0.000)
Risk-avoidance score =1	-0.000 (0.001)	0.001*** (0.000)	-0.007*** (0.003)	0.009*** (0.001)	-0.004 (0.003)	0.005*** (0.001)
Risk-avoidance score =2	-0.002 (0.001)	-0.001*** (0.000)	-0.009*** (0.003)	0.006*** (0.001)	-0.005 (0.003)	0.002*** (0.001)
Risk-avoidance score =3	-0.003 (0.002)	-0.002*** (0.001)	-0.007** (0.003)	0.002* (0.001)	-0.002 (0.003)	-0.004*** (0.001)
Constant	0.612*** (0.017)	-0.002 (0.002)	0.391*** (0.040)	-0.022*** (0.003)	0.249*** (0.038)	-0.013*** (0.002)
Macro Variables	Yes		Yes		Yes	
Firm-level controls	Yes		Yes		Yes	
Firm & Time FE	Yes		Yes		Yes	
Country & Industry FE		Yes		Yes		Yes
R-squared	0.089	0.394	0.083	0.234	0.088	0.209
N	260,483	260,483	63,808	63,808	73,057	73,057

**Table IA-3**

**Owner type and firm investment by EU membership**

This table presents the regression results of the augmented investment equation. The estimation is conducted for three sub-samples: EU15 countries, EU10 countries, and non-EU countries. Firm-specific control variables are ln(Total Assets) and its square, cash flow, ln(number of employees), sales growth, leverage, and firm age. Macro-variables consist of private credit to GDP, stock market capitalization to GDP, GDP growth, GDP in constant USD, and GDP per capita (constant USD). \*, \*\*, and \*\*\* indicate statistical significance at the 10%, 5%, and 1% levels, respectively. Heteroskedasticity consistent standard errors are in brackets.

*Panel A. Gross Investment*

Dependent Variable = <i>Gross Assets Investment</i>						
EU Membership	EU 15 (old members)		EU 10 (new members)		Non-EU countries	
	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>	<i>Transitory</i>	<i>Permanent</i>
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Corporate</i>	-0.000 (0.005)	-0.058*** (0.001)	0.039 (0.035)	-0.207*** (0.010)	-0.214 (0.166)	-1.111*** (0.027)
<i>State</i>	-0.008 (0.019)	-0.111*** (0.006)	-0.024 (0.059)	-0.188*** (0.024)	-0.602** (0.277)	-0.276*** (0.047)
<i>Institutional</i>	-0.002 (0.006)	-0.047*** (0.002)	0.081 (0.079)	-0.291*** (0.032)	-0.049 (0.193)	-0.989*** (0.040)
<i>Business Group</i>	-0.002 (0.002)	-0.025*** (0.001)	0.015 (0.013)	-0.118*** (0.009)	-0.092 (0.058)	-0.327*** (0.023)
Risk-avoidance score =1	-0.001 (0.007)	-0.016*** (0.002)	0.022 (0.045)	-0.113*** (0.014)	0.020 (0.160)	-0.221*** (0.037)
Risk-avoidance score =2	0.010 (0.008)	-0.042*** (0.002)	0.057 (0.048)	-0.093*** (0.015)	0.107 (0.173)	-0.047 (0.039)
Risk-avoidance score =3	0.018* (0.011)	-0.056*** (0.005)	0.058 (0.066)	-0.244*** (0.030)	0.204 (0.308)	-1.723*** (0.077)
Constant	-0.263** (0.130)	-0.031* (0.016)	-19.661*** (0.678)	-0.041 (0.096)	32.383** (14.677)	-46.732*** (0.792)
Macro Variables	Yes		Yes		Yes	
Firm-level controls	Yes		Yes		Yes	
Firm & Time FE	Yes		Yes		Yes	
Country & Industry FE		Yes		Yes		Yes
R-squared	0.033	0.080	0.026	0.119	0.061	0.997
<i>N</i>	476,913	476,913	139,930	139,930	53,438	53,438

Panel B: Intangible Assets Investment

Dependent Variable = Intangible Assets Investment						
EU Membership	EU 15 (old members)		EU 10 (new members)		Non-EU countries	
	Transitory	Permanent	Transitory	Permanent	Transitory	Permanent
	(1)	(2)	(3)	(4)	(5)	(6)
<i>Corporate</i>	0.000 (0.001)	0.006*** (0.000)	-0.001 (0.002)	0.010*** (0.000)	0.001 (0.002)	0.001*** (0.001)
<i>State</i>	0.000 (0.002)	0.004*** (0.001)	0.004 (0.002)	0.000 (0.001)	0.001 (0.004)	-0.008*** (0.001)
<i>Institutional</i>	0.002** (0.001)	0.004*** (0.000)	0.001 (0.003)	0.012*** (0.001)	0.003 (0.003)	-0.000 (0.001)
<i>Business Group</i>	0.000 (0.000)	0.002*** (0.000)	-0.001*** (0.000)	0.006*** (0.000)	-0.001 (0.001)	0.003*** (0.000)
Risk-avoidance score =1	-0.001 (0.001)	0.002*** (0.000)	-0.003 (0.002)	0.004*** (0.001)	-0.006 (0.004)	0.003*** (0.001)
Risk-avoidance score =2	-0.002 (0.001)	0.000 (0.000)	-0.006** (0.002)	-0.000 (0.001)	-0.007* (0.004)	0.001 (0.001)
Risk-avoidance score =3	-0.002 (0.002)	-0.000 (0.001)	-0.005* (0.003)	-0.002* (0.001)	-0.002 (0.005)	-0.020*** (0.001)
Constant	0.439*** (0.017)	0.007*** (0.001)	0.635*** (0.026)	-0.007*** (0.003)	-1.063** (0.443)	2.126*** (0.019)
Macro Variables	Yes		Yes		Yes	
Firm-level controls	Yes		Yes		Yes	
Firm & Time FE	Yes		Yes		Yes	
Country & Industry FE		Yes		Yes		Yes
R-squared	0.090	0.116	0.113	0.233	0.080	1.000
N	285,535	285,535	84,140	84,140	27,673	27,673

## Appendix I

Table A.1. Definitions of variables and sources of data

Variable	Definition
<i>Firm-level variables</i>	
Gross Investment	fixed assets ( <i>FIAS</i> ) minus lagged fixed assets plus depreciation ( <i>DEPRE</i> ), scaled by total assets ( <i>TOAS</i> ). Source: BvD Amadeus database.
Ln (Total Assets)	Natural logarithm of total assets ( <i>TOAS</i> ) in million USD. Source: BvD Amadeus database.
Cash Flow	Profits/loss plus depreciation ( $=CF$ ) scaled by total assets ( <i>TOAS</i> ). Source: BvD Amadeus database.
ROA	EBIT ( <i>OPPL</i> ) scaled by total assets ( <i>TOAS</i> ). Source: BvD Amadeus database.
Ln (Employees)	Natural logarithm of the number of employees ( <i>EMPL</i> ). Source: BvD Amadeus database.
Sales Growth	Operational revenues ( <i>OPRE</i> ) <sub>t</sub> minus lagged sales ( <i>OPRE</i> ) <sub>t-1</sub> scaled by lagged sales ( <i>OPRE</i> ) <sub>t-1</sub> . Source: BvD Amadeus database.
Value Added	Income taxes + Other taxes + Profit/loss for the period + Staff costs + Depreciation + Interest payable on loans. Source: BvD Amadeus database.
Value Added Growth	Value Added ( <i>VA</i> ) <sub>t</sub> minus lagged value added ( <i>VA</i> ) <sub>t-1</sub> scaled by lagged value added ( <i>VA</i> ) <sub>t-1</sub> . Source: BvD Amadeus database.
Tangibility	Total fixed assets ( <i>FIAS</i> ) scaled by total assets ( <i>TOAS</i> ). Source: BvD Amadeus database.
Leverage	Long-term debt ( <i>LTDB</i> ) plus bank loans ( <i>LOAN</i> ) scaled by total assets ( <i>TOAS</i> ). Source: BvD Amadeus database.
Ln (Age)	Firm age since the (local) incorporation. Computed as year minus year of incorporation plus 1. Source: BvD Amadeus database.
Risk Avoidance	Risk-avoidance is an index ranges from 0 to 3, with higher scores denoting greater risk avoidance. It is constructed by adding 1 when (1) a firm's leverage is in the bottom 20% of the distribution; (2) the volatility of firm-level profitability is in the bottom 20% of the distribution; and (3) if the firm survives at least 5 years. The index Source: Definition is taken from (Faccio et al, 2016).
<i>Country-level macroeconomic variables</i>	
Private Credit/GDP	Private credit scaled by GDP. Private credit is the deposit by money banks and other financial institutions. Source: WDI (World Bank).
Market Cap/GDP	Total value of all listed shares on the national stock exchange as a percentage of GDP. Source: WDI (World Bank).
GDP Growth	The annual percentage nominal growth rate of GDP denominated in the local currency. Source: WDI (World Bank).
GDP Per Capita	Real GDP per capita in 2010 USD (a proxy for country income). Source: WDI (World Bank).
GDP	Real GDP in 2010 USD (a proxy for country size). Source: WDI (World Bank).



## Pyramid (Business Group) Construction

We start with the panel of annual direct ownership links between firms in Amadeus and employ the algorithm described in Figure 1 of the Appendix to create the unique identification for owners without the tax/business ID in the Amadeus database. Because of excessive data size, we identify and create the business groups using top-down approach.<sup>6</sup> Potential top of the pyramids are the subjects listed as firm owners for which we do not have an ownership report. Therefore, as the first step we identify the ultimate owners as either individuals or firms that are not owned directly or indirectly by other firms and/or individuals. As a result, we either have individuals/families or widely held firms at the top of a pyramid. From the top, we repeat a searching algorithm that identify firms owned by the ultimate owner — level 1 firms that are directly owned by top of the pyramid (level 0), level 2 firms that are directly owned by level 1 firms, etc. The procedure is repeated until we are left only with firms that are never recorded as owners. Figure A.2 in the Appendix illustrates the algorithm schematically and Figure A.3 provides visualization of a complex (vertical) pyramidal structure.

Using the algorithm, we sort each firm into the following structural ownership categories: 1) Stand-alone firms and business groups. To account for possible effect of the complexity of the pyramidal structure, we distinguish between 2) horizontal pyramid or subsidiary structure and 3) vertical pyramid or complex business group. For horizontal pyramid we assume that all controlled firms are located in the level 1, while vertical pyramid represents a more complex structure with more levels that vary in shape. See Figure 1 and Figure 2 for typical examples.

Figure 1: Visualization of the ownership links for the horizontal pyramid (subsidiary-type structure)

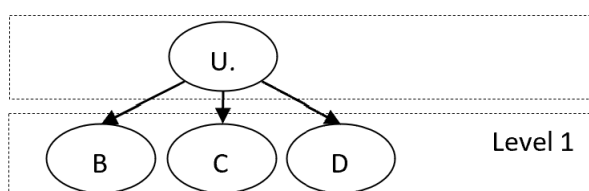
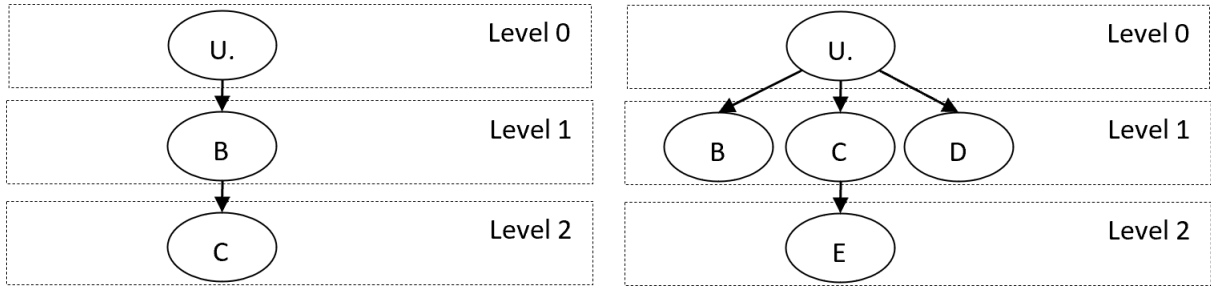


Figure 2: Visualization of the ownership links for a complex pyramid

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<sup>6</sup> Alternatively, ownership chain in pyramids could be constructed from the bottom-up (e.g., Belenzon and Berkovitz (2010)).



While we keep identification of different business group structures, we will primarily distinguish between stand-alone firms and firms that belong to a business group.

Figure A.1: Scheme of the data preparation algorithm

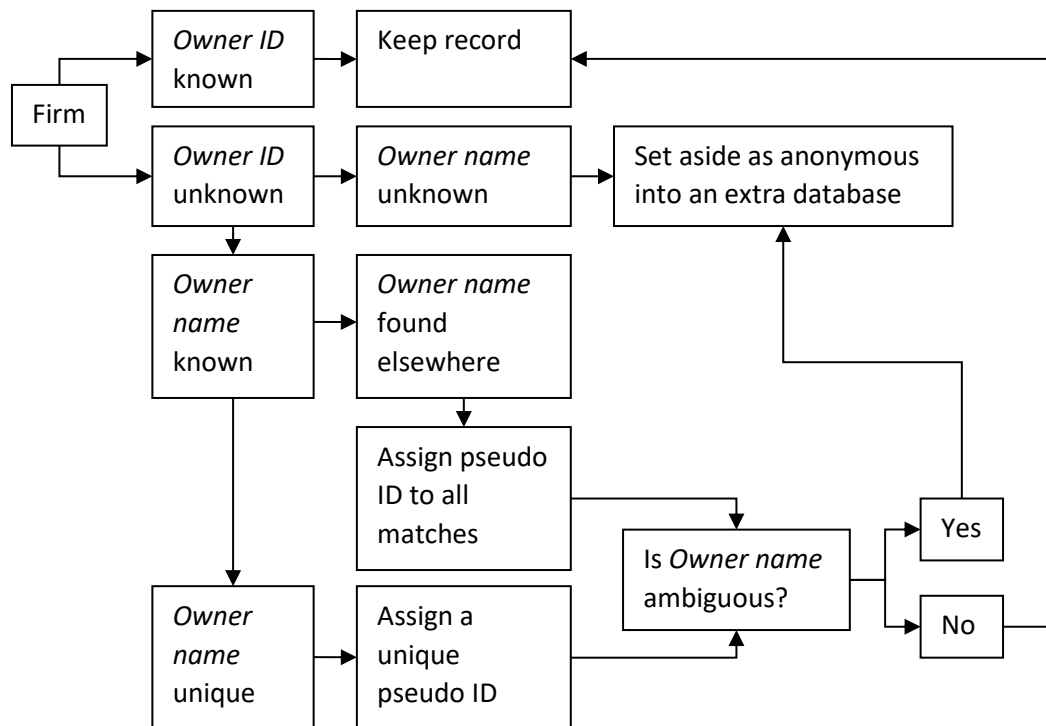


Figure A.2: Scheme of the pyramid construction algorithm, year-by-year

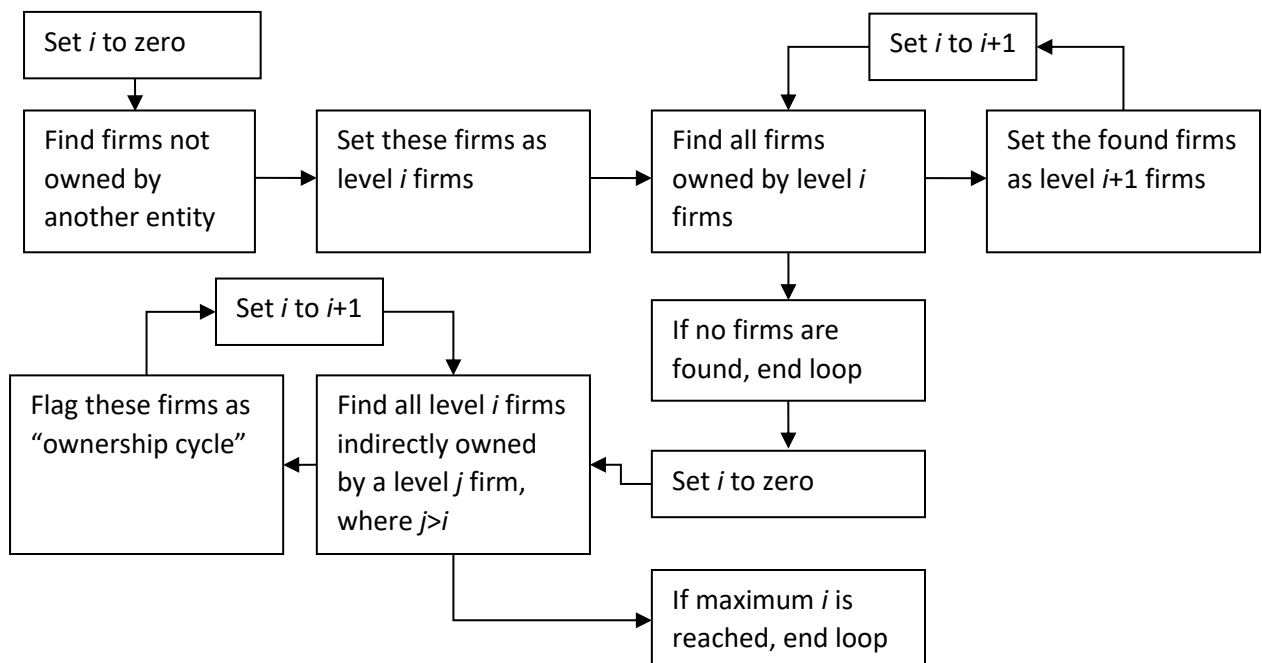


Figure A.3: Visualization of a complex pyramidal structure

