Corporate Ownership and Antitrust Violations

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October 13, 2019

Abstract

We study how corporate ownership shapes the firms' likelihood of being involved in antitrust indictments. Using data from Italy, we show that family-owned firms are less likely than firms with any other ownership structure to commit antitrust violations. To achieve identification, we exploit a law change that made it easier to transfer family control. Studying the mechanisms at play, we find that family firms are especially less likely to commit antitrust violations when they feature a more prominent size relative to the city of headquarter, which magnifies reputational concerns. Next, using a difference-in-differences setting we show that family firms involved in antitrust violations appoint more family members in executive positions in the aftermath of the indictment. Moreover, these firms invest less and curb equity financing as compared to nonfamily firms. Collectively, our findings suggest that family control wards off reputational damages but at the same time it weakens the ability to expand in order to keep up with fiercer competition following the dismantlement of an anticompetitive practice.

JEL Code: D22; K21; G34; G38

Keywords: antitrust; ownership; investment; financing

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1. Introduction

The lure of abnormal profits has made anticompetitive practices such as cartels ubiquitous (Hyytinen et al. 2018). Understanding the complex web of incentives that lead firms to engage in anticompetitive practices is crucial to the design of effective policies and the enactment of enforcement actions by antitrust authorities around the world.

The literature documents that the decision to pursue anticompetitive practices varies depending on several industry characteristics such as the number of firms and their concentration, as well as demand characteristics such as price elasticity and price fluctuations (Levenstein and Suslow 2006). Moving to the analysis of firm characteristics, there is evidence that companies use strategically their capital structure at the onset of cartel participation (Ferres et al. 2018). Other studies (e.g. Bos and Harrington 2010; Filson et al. 2001) have also pointed to the role of firm size and product characteristics as important predictors of cartel participation.

The decision to join a cartel is typically taken by a firm's top executives and then implemented by middle management (see Artiga et al. 2019 and references therein). Thus, a firm's organization and corporate governance arrangements may play a significant role in the decision to engage or not in anticompetitive practices. Surprisingly, the literature on this topic is limited to date. Lambertini and Trombetta (2002) explore how the decision of owners to delegate control rights to a manager affects the probability of collusion. Relatedly, Alexander and Cohen (1999) show that when top managers own a larger fraction of equity shares, the firm is less likely to commit corporate crimes. Studying the board of directors, Campello et al. (2017) show that independent members in the board of directors reduce the negative stock price reaction to the announcement of cartel investigations; independent directors, however, are hurt by those investigation and loose board seats as well as voting support. Artiga et al. (2019) focus on the

personal returns of cartelization for top managers, showing that executives obtain significant benefits from cartel membership which manifest in low turnover rates and generous compensation packages. These works have provided useful insights on the interplay between corporate governance and antitrust violations. Yet, there is an important element that has been neglected, i.e. a firm's ownership type.

Filling this research gap, our paper investigates how the identity of corporate owners shapes the incentives to engage in anticompetitive practices. Specifically, we focus on the role of *family ownership* and contrast it with nonfamily ownership. Given the pervasiveness of family-owned companies around the world (e.g. Faccio and Lang 2002) as well as the key role of family leaders in setting corporate priorities (Mullins and Schoar 2016), it is relevant to understand how such form of ownership influences a firm's competitive conduct.

We discuss three mechanisms through which family ownership may shape the incentives to contravene antitrust laws. The first relates to *reputational concerns*. The literature has shown that antitrust violations cause significant reputational damages which go beyond the mere economic value of the fine imposed by the authority (Van Den Broek et al. 2012). In parallel, we know that family owners tend to devote a significant amount of personal resources to their businesses. Such intertwinement between family and business manifests in a strong attachment to the company and in the desire to pass on a healthy business to family descendants (Burkart et al. 2003) which, in turn, makes family owners particularly subject to reputational concerns (Deephouse and Jaskiewicz 2013). Spanning across an entire controlling family over time, these reputational concerns will typically exceed those of a professional manager running a widely-held firm. Building on these notions, existing studies show that family owners strive to improve the social image of the companies they lead. For instance, Dyer and Whetten (2006) show that

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family firms undertake greater socially responsible actions than their nonfamily counterpart. These arguments are echoed in Chen et al. (2010) who document that family firms are less aggressive than nonfamily firms in terms of tax avoidance owing to stronger concerns with reputational damages arising from IRS audits. These insights suggest that family firms may be more reluctant to engage in anticompetitive practices, which may grant extra-profits in the short-term at risk of damaging the family's reputation.

The second mechanism relates to *coordination issues*. Anticompetitive practices such as horizontal agreements, which represent the prevalent type of indictment in our sample, often require an orchestration of resources and coordination on incentive-compatible collusive strategies by multiple firms. Toward this end, group identification (van Driel 2000) and informational transparency (Bourveau et al. 2019) among potentially colluding firms play a central role. When these features are lacking, coordination and monitoring costs will drain the benefits of anticompetitive practices. The literature has argued that family owners pursue objectives that are idiosyncratic to the specific needs of each family, and adopt family-centric governance structures that dampen external scrutiny and informational transparency (Anderson et al. 2009). Collectively, these arguments suggest that family firms may be less likely to fit in anticompetitive practices that require coordination across multiple firms.

The third mechanism relates to differences in *regulatory action*. Due to their idiosyncratic family governance and reticence toward outside scrutiny, family firms may represent less attractive targets for the antitrust authority. Indeed, in order to attribute responsibilities, the investigative activities of the antitrust authority rely on the search and elaboration of available information. These activities are facilitated when dealing with firms that disclose more information to the market due to e.g. the presence of outsiders in board positions (Campello et

al. 2017). As a result, family firms may display a lower likelihood of being targeted by an antitrust investigation.

We conduct the analysis on a panel dataset of Italian firms from 2001 to 2015, which contains detailed information on ownership structures as well as on whether or not a firm has been prosecuted by the antitrust authority, the type of antitrust violation, its duration and the actions undertaken by the authority. In the first part of the analysis, we study whether family firms have a different likelihood than nonfamily firms to be prosecuted for anticompetitive practices by the antitrust authority. Our results indicate that – even after controlling for several variables such as firm size, leverage, industry concentration and profitability – family firms are almost twice less likely to be prosecuted by the antitrust authority.

We confirm this finding using a matching analysis that creates observationally equivalent pairs of family and nonfamily firms within the same geographic area and industry. We further mitigate endogeneity problems by exploiting a regulatory change aimed at relaxing the notoriously stringent Italian law on succession. In 2006, the Italian legislator introduced the so-called *Family Pacts* which made it easier for owners to transfer the business or parts of it to family heirs. While the law passage generated a longitudinal variation useful for our identification purpose, it affected all firms and thus does not provide a natural control group. To solve this problem, we take advantage of another feature of the *Family Pacts*, i.e. that they required to be signed in front of a notary. We exploit the geographic differences in the availability of notaries across Italian municipalities, which according to the Italian law are determined by observable criteria and thus not subject to omitted factor bias. We then construct an interaction between the post-2006 period and the number of notaries in a municipality, which

creates variations in the prevalence of family ownership. Our two-stage least square results confirm that family firms are significantly less likely to violate antitrust laws.

Next, we test the mechanisms behind our results. We start by constructing a proxy of corporate prominence by taking the ratio of a firm's employees to the inhabitants in the municipality of headquarter. Our key argument is that the higher the value, the greater the firm's visibility and commitment towards local stakeholders. Our results show that family firms are especially less likely to commit antitrust violations when their corporate prominence is high. Next, we probe into the inter-firm coordination mechanism by investigating variations in accounting measures of informational opaqueness. Our results indicate that opaque family firms are just as likely as transparent family firms to be prosecuted by the antitrust authority. Finally, we test for the presence of differences in antitrust targeting by focusing on the consequences of the indictment. If the authority targets with a greater probability nonfamily firms, we should find not only a greater occurrence of prosecutions among such firms but also a lower *average* amount of sanctions: more intense investigations addressed toward nonfamily firms should bring to light also cases subject to lighter or no penalties at all, which would reduce the average amount of fines detected among such firms. However, analyzing the probability of fines as well the monetary amount of fines, we do not find support for this hypothesis. Thus, our results provide more support to the reputational concern mechanism, according to which family firms engage less frequently in violations of competition law as they strive to protect their social image and legacy.

In the second part of the study, we explore the material consequences of antitrust indictments. First, we explore what happens to the leadership of family firms that are hit by an antitrust intervention using other family firms as control group in a difference-in-differences

setting. If family representation acts as a device to signal to external constituents a commitment toward reputational improvements, then we may expect a greater tendency to involve family members in top executive positions after an antitrust intervention. Consistent with this view, our results indicate that the ratio of family executives significantly increases in the aftermath of the antitrust intervention (while there are no significant changes in the years before). Importantly, this result is not driven by the departure of nonfamily executives but, rather, by an increase in the absolute number of family executives.

Then, we move to the analysis of real effects in the years following the antitrust indictment. Dasgupta and Zaldokas (2019) show that the increase in competition stemming from antitrust enforcement leads to greater corporate investment, which is largely financed through equity issuances so as to retain financial flexibility. Consistent with these insights, we show that firms increase investment in the post-intervention years. However, separating out by ownership types we find that the investment increase is only present among nonfamily firms. This result has a financing rationale consistent with existing views that family firms are reluctant to finance investment through equity issuances so as to avoid control dilution (e.g. Croci et al. 2011; Ellul 2009). To reinforce the causal interpretation, we verify that these findings are not driven by diverging trends prior to the antitrust indictment. Taken together, our findings suggest that family ownership helps to protect reputation, which may accrue societal benefits from a more disciplined competitive conduct while at the same time impairing corporate growth.

Our study contributes to several strands of research. First, we relate to a literature on the relationships between product market competition and agency problems. The seminal paper by Bolton and Scharfstein (1990) illustrates how - by threatening to terminate funding to a firm in case of poor firm performance - shareholders can trigger predatory actions by the firm's rivals.

More recent works have explored the connections between capital structure and firms' collusive behavior (Ferres et al. 2018). Scholars have suggested that corporate governance matters, too, in understanding the incentives to engage in collusive behavior. However, no studies so far have to our knowledge explored the role of corporate owners in determining the propensity to violate antitrust laws. Our work fills this gap by testing how the incentives of family owners influence the decision to pursue anticompetitive practices. Moreover, we expand the growing literature on the nexus between corporate policies and competitive conduct (Dasgupta and Zaldokas 2019; Dong et al. 2019) by analyzing the role of ownership structures in shaping the corporate reaction to antitrust enforcement.

Our second contribution is to the literature on the relationships between family ownership and corporate misbehavior. Works in this area have focused on issues like insider trading (Anderson et al. 2012), tax aggressiveness (Chen et al. 2010), financial misconduct (Anderson et al. 2017), pollution (Berrone et al. 2010) and accounting quality (Ali et al. 2007; Anderson et al. 2009; Chen et al. 2008; Wang 2006) reaching mixed conclusions. Because collusive actions may create substantial welfare damages, antitrust authorities around the world are increasingly fighting violations of competition laws. There is now a consensus that families control many companies in developed and developing economies. Yet, the question of whether family firms display a weaker (or stronger) tendency than other firms to violate antitrust laws is still unaddressed. Filling this gap, our work suggests that examining the heterogeneity among corporate owners is a fruitful way to uncover the incentives of firms to misbehave in the product markets and thus improve the effectiveness of antitrust enforcement actions.

2. Data sources

For the empirical analysis we use a comprehensive panel dataset of companies located in Italy. The data comes from two separate data sources. The first contains detailed information on the antitrust indictments whereas the second contains firm-level variables related to ownership, executive and financial data. Below we discuss in detail each of these data sources and the final sample employed in our analyses.

2.1 Antitrust information

To gather information on indictments related to violations of the competition law in Italy, we hand-collect information provided by the Italian National Competition Authority, i.e. Agenzia Garante della Concorrenza e del Mercato (Authority, hereafter). To this end, we rely on official documentation (i.e. publications of decisions and case summaries available on the Authority website) and focus our analysis on closed investigations of alleged antitrust infringements (i.e. investigations terminated with the publication of a final decision by the Authority), whose decisions were issued in the period ranging between 2000 and 2015.[1]

We focus on infringements of Articles 101 and 102 of the "Treaty on the Functioning of the European Union", which are related to anticompetitive agreements and abuses of dominant position, respectively, thus ignoring decisions concerning the clearance and/or the prohibition of mergers and acquisitions. Anticompetitive agreements are classified as horizontal or vertical

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[1] Therefore, we do not collect information on pending cases. Caution should be used when using data on antitrust interventions to gauge the proclivity of firms to indulge in anticompetitive behaviors. Having only information on firms that engaged in and were subsequently caught and prosecuted for anticompetitive behaviors raises a partial observability concern, as firms that engage in anticompetitive behaviors but are not caught fall outside our scrutiny. However, it may be argued that by using data on antitrust interventions we capture the more severe instances of antitrust violation, as limited resources induce the authority to pursue cases deemed more likely to lead to successful prosecutions.

depending on whether they involve competing firms or firms along the value chain. The final decisions issued by the Authority can fall into three categories: "fine issued", "commitment" and "no ground for action". Fines vary depending on firm's sales and the estimated effect of the anticompetitive behavior on the firm's profits. A "commitment" decision allows firms to voluntarily offer binding commitments that are intended to address the competition concerns identified by the Authority without it formally finding that there is an infringement. Proceedings closed with "No ground for action" have no impact on the firms.

Overall, we have identified 205 antitrust indictments for which we have firm-level data (described in the next section).[2] Figure 1 provides the frequency of indictments during the sample period. Table 1 reports the distribution of these indictments by type of infringement and outcome of the proceeding. As shown, the vast majority of indictments (181 out of 205) are represented by anticompetitive agreements. Of these, 170 are instances of horizontal agreements whereas 11 represent vertical agreements. Sixty-eight percent of indictments in our sample were concluded with the attribution of a fine to the firm(s) involved, and the average fine issued amounts to 3.8 million Eur. For anticompetitive agreements we also have data on their duration as estimated by the Authority. Our data shows an average duration of 50 months.

[Insert Figure 1 about here]

[Insert Table 1 about here]

2.2 Firm-level data

For each of the companies involved in the antitrust indictments detailed above, we gather information from two different data sources. The first, represented by hand-collected official

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[2] Each of these indictments correspond to different firms, i.e. we do not have instance of multiple antitrust violations by the same company.

public filings obtained from the Italian Chamber of Commerce, contains a complete mapping of a firm's owners, executives and other individuals involved in the board of directors. We have access to such data for all firms in Italy with revenues above 20 million Eur. The second source is AIDA, the Italian branch of the Bureau van Dijk European Databases, which provides us with information on the balance sheet and income statement of each firm. We perform a name matching between these different data sources for the period from 2000 to 2015 (i.e. the same time window for which we have the antitrust data) and then drop observations with missing values in the key explanatory variables, with negative or zero revenues and book value of assets.

Having collected comprehensive information for each firm involved in antitrust indictments, we need a reference group of un-involved firms to compare against the former ones. To this end, we start from the universe of firms not involved in antitrust indictments (again above 20 million Eur) and, for each single year, we select all firms operating in a given six-digit SIC industry for which we have at least one firm involved in antitrust indictment whose final decision was issued during that given year. The benefit of this approach is that it does not impose arbitrary restrictions on the selection of firms not involved in antitrust actions.

As a result of this sampling strategy, we obtain a sample of 5,195 unique firms, of which 205 are involved and the remaining 4,990 un-involved in antitrust indictments. The rare occurrence of antitrust indictments is coherent with the empirical distribution documented in the literature.[3] Table 2 shows the distribution of sampled firms by industry and antitrust indictment status.

[Insert Table 2 about here]

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[3] As a robustness test, we will adopt an estimation strategy specifically designed to handle the rare occurrence of ones in a binary dependent variables.

2.3. Variables and summary statistics

The key explanatory variable for our study relates to the distinction between family and nonfamily firms. We follow the literature in classifying as family firms private companies in which a family owns the absolute majority (i.e., at least 50%) of equity shares. Since the ownership of Italian firms is typically highly concentrated, the absolute majority is often a necessary condition to ensure family control (Miller et al. 2013). However, following existing studies on European companies (e.g., Andres 2008), we reduce the threshold to 25% for the listed firms in our sample, as collective action problems and/or the use of control-enhancing mechanisms makes it possible to achieve control with smaller levels of ownership. Our data contain 71 listed firms (corresponding to 1.4% of the full sample), which account for 12 of the 205 antitrust indictments.[4]

Table 3 shows the distribution of owner types among our sample firms. As shown, family firms are the vast majority of the sample – a figure which is coherent with existing insights on the prevalence of family firms in Italy and worldwide. Nonfamily firms are classified depending on whether they are owned by multiple nonfamily investors, financial investors (banks, insurance and private equity firms), foreign multinationals, and state or cooperatives. To classify the dominant owner in the case of financial investor, foreign multinational, and state or cooperative, we follow the same 50% (or 25%) equity threshold used for family firms.

[Insert Table 3 about here]

We compute a number of firm variables that capture some of the factors commonly used in the literature on the determinants of antitrust violations. First, we take the logarithm of the book value of total assets and the logarithm of firm age to account for structural differences in a

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[4] All results of this paper hold after excluding listed firms from the analysis.

company's size and stage of development, which may vary capacity constraints and thus the incentives to join cartels (Bos and Harrington 2010).[5] Second, we compute the ratio of total debt scaled by total assets to account for the role of capital structure in shaping anticompetitive behavior (Ferres et al. 2018). Third, we move to a set of well-known industry factors that affect the firms' competitive conduct. In particular, we compute the Herfindahl-Hirschman concentration index using revenues across each 3-digit industry and year. Fourth, we compute the annual growth rate of an industry's revenues to account for differences in demand across sectors. Fifth, we construct a measure of industry profitability by computing the average of the ratio between earnings before interest, taxes and depreciation to total assets across each industry and year. Each of these industry factors is defined at the 2-digit industry and year level. Table A1 describes the construction of each variable.

Panel A of Table 4 compares firm- and industry-level characteristics for firms hit by antitrust indictments and firms not involved. As shown, the former group contains a significantly higher fraction of nonfamily firms. As expected, it also contains firms that are on average larger, older, and more financially indebted. Finally, the table shows that firms hit by antitrust indictments operate in industries that are more concentrated, more prone to grow and with a higher profitability.

[Insert Table 4 about here]

Panel B of Table 4 focuses on the subsample of firms hit by antitrust indictments and provides a comparison between family and nonfamily firms within such subsample. As it turns out, family firms are significantly smaller while at the same time older than their nonfamily

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[5] We also check that our findings hold when controlling for the squared term of total assets (to account for non-linearities in the relationship between firm size and antitrust violations) as well as when controlling for size differently, e.g. by taking the logarithm of fixed capital.

counterpart. Moreover, they have a higher debt ratio. None of the industry characteristics display significant differences, suggesting that both groups of firms tend to operate in similar industry environments.

3. Family ownership and antitrust violations

This section analyzes the effect of family ownership on anticompetitive behavior. We start by showing that family firms have a lower likelihood to be hit by an antitrust indictment as compared to nonfamily firms. Then, we seek to alleviate endogeneity concerns by using a variety of estimation techniques. Finally, we probe into the mechanisms driving our main result.

3.1. Baseline results

Of the 205 antitrust indictments in our sample, 105 are related to nonfamily firms (i.e. 6.3% of all nonfamily firm observations) and 100 to family firms (i.e. 2.8% of all family firm observations). To explicitly test whether family firms have a more disciplined market conduct, we use a linear probability model to estimate the following:

$$Antitrust\ indictment_{it} = \alpha + \beta Family\ firm_{it} + X'\gamma + \gamma_t + \delta_j + e_{it} \qquad (1)$$

in which the dependent variable is a dummy equal to one if a firm has been hit by an antitrust indictment and zero otherwise. The main explanatory variable is the dummy equal to one for family firms and zero for nonfamily firms. In order to account for differences between family and nonfamily firms, which in turn may correlate with the dependent variable, we control for the vector X including the variables described in the previous section, namely firm size, firm age, debt to assets and – at the industry level – profitability, concentration and revenue growth. Moreover, depending on the specification, we control for year dummies, γ_t, to account for

shocks common to all firms (e.g. changes in the intensity of antitrust enforcement due to variations in budget) as well as for a set of macro-area dummies δ_j (i.e., north east, north west, center and south/islands) or municipality dummies, which account for the fact that firms across space may have a different likelihood to be family-controlled and may also have a different likelihood to violate antitrust laws, e.g. due to differences in the mode of competition or in the exposure to foreign competition. Standard errors e_{it} are adjusted for heteroskedasticity. As a result of our sampling strategy (see section 2.2), firms in the reference group can be sampled at more than one year, thus making the number of observations in the regression analysis to increase from 5,195 (unique firms) to 10,895.

As Column (1) of Table 5 shows, family firms are significantly less likely to be involved in antitrust indictments. This result holds controlling for macro-area dummies (Column 2), industry characteristics (Column 3), and municipality dummies (Column 4). In economic terms, the most restrictive specification indicates that family firms are 1.4 percentage points (i.e. 74% from the average frequency) less likely than nonfamily firms to be involved in antitrust indictments.

<center>[Insert Table 5 about here]</center>

So far, we have used a binary classification based on whether or not a family owns a majority stake (or 25% for listed firms) of a company's equity. As such, this classification does not distinguish between firms that are fully owned by a family and firms in which the family holds a majority stake while featuring the presence of nonfamily investors as well. In Figure 2, we illustrate the predicted logit probability of antitrust indictments for different values of family

<center>15</center>

ownership. The graph shows an intensive margin of family ownership on the likelihood of antitrust indictment: the probability sharply declines as the share of family equity increases.[6]

The descriptive analysis in Table 3 has shown that firms hit by antitrust indictments are on average larger – a finding which is consistent with existing insights. In Figure 3 we explore the joint effect of family ownership and firm size in determining the probability of indictments. To this end, we estimate a logit model using the same covariates of Table 5, and then plot the predicted probability of indictment separately for family and nonfamily firms along the size distribution. For both groups, we also reproduce the 5% confidence interval. As shown, the predicted probability of indictment at low values of firm size is indistinguishable from zero for both family and nonfamily firms. For nonfamily firms, the graph shows that the predicted probability increases markedly as firm size increases. Family firms, too, experience a higher probability of indictment as their size increases; however, such probability is consistently below that of nonfamily firms at any point of the size distribution.

[Insert Figure 3 about here]

Existing works (Alexander and Cohen 1999) show that firms with more concentrated ownership have a lower probability of committing corporate crimes. This finding suggests that the lower likelihood of antitrust indictments among family firms may stem not from the fact that the controlling owner is a family but from the fact that the company has *any* form of concentrated ownership. To rule out this interpretation, we contrast family control with all other ownership types shown in Table 3. Specifically, we replace the family firm dummy in equation (1) with a set of dummies equal to one for family firms and zero for each of the nonfamily firm types. As

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[6] In untabulated tests we explored how our finding varies depending on the involvement of family founders in CEO or board chairman positions. Results indicate that family firms are less likely than nonfamily firms to be involved in antitrust indictments regardless of the presence or absence of founders in such positions.

shown in Column (1) of Table 6, family firms have a lower likelihood of antitrust indictment (significant at the 10% level) than firms owned by nonfamily investors (and thus with more dispersed ownership). But, importantly, family firms also have a lower likelihood of antitrust indictment as compared with firms controlled by financial institutions, i.e. where there is majority stake in the hands of a private equity fund, bank or insurance (Column 2), and as compared with firms controlled by a foreign multinational (Column 3). We derive an insignificant result only when we contrast family firms with firms controlled by the state or cooperatives (Column 4).

[Insert Table 6 about here]

3.2. Alternative estimation strategies

Although our specification controls for a host of firm- and industry-level variables, the risk of omitted factor bias remains. In particular, there might be omitted factors that correlate with both family control and the likelihood of indictment, thus making our previous coefficients biased. To alleviate this concern, we provide evidence from a variety of alternative specifications. We begin by exploiting a law change in 2006 which enhanced the ability of entrepreneurs to transfer the business (or its parts) to family heirs. The Italian succession law, and more generally that of civil law countries, is notoriously stringent. While in most common law countries the founder has significant discretion on how to distribute the estate to heirs, in civil law countries that ability is bounded by the family structure. As Ellul et al. (2010) write, "a person with a spouse and two children can freely allocate only one fourth of his total wealth, so that he cannot give more than 50 percent of the family's wealth to one child. The percentage goes down to 41.7 percent with three children, and decreases monotonically to 33.3 percent with six children" (Ellul et al. 2010: p. 2426). Such stringent provisions tend to fragment the family equity and impair the incentives

of family firms to invest during a succession process, thereby threatening the cohesion of family control and the whole continuity of family businesses. As a result, family entrepreneurs have advocated in favor of more flexibility in the Italian succession law.

A partial solution was implemented in March 2006 with the introduction of the so called "*Family Pacts*". Family Pacts are essentially *inter vivos* contracts (which do not fall within the provisions of the succession law) which allow family owners to transfer the business or part of it to one or more heirs. They must be redacted by a notary as an official document in front of all potential heirs. The goal of the Family Pacts was to ease the intergenerational transmission of family control. The sharp implementation in 2006 provides a longitudinal variation useful to build our identification strategy: after 2006, family owners had a much more flexible instrument to arrange a succession while preserving the unity of family control.

Since the law potentially affected all firms, we lack a control group. To solve this issue, we exploit the fact that the law required Family Pacts to be redacted in the form of an official document in front of a notary. We can thus use the notaries in a given municipality to capture cross-sectional variations in the exposure to Family Pacts: the greater the number of notaries in the municipality of firm's headquarter, the easier for the family owner to take advantage of the law change to undertake a business succession. This argument particularly applies to the owners of small privately-held businesses, for whom the transaction costs of transferring family control are more relevant than those faced by listed firms' owners (recall that our sample has a broad coverage including not only the few listed firms in Italy but also a large number of privately-held firms). An advantage of our approach lies in the fact that the number of notaries in each

municipality is entirely determined by observable criteria.[7] Our data shows a significant geographic heterogeneity in the presence of notaries: around 15% of our observations are in municipalities without any notary (in a 25 kilometers radius around the municipality); another 12% of observations are in municipalities with 1 notary; the median number of notaries is equal to 11, whereas the average is equal to 80. Exploiting this variation, we construct an instrumental variable that combines the longitudinal variation around 2006 with the number of notaries in each municipalities. A greater value of such variable corresponds to a greater opportunity to adopt Family Pacts after 2006, which by easing the preservation of family control should be associated with a greater frequency of family businesses. Our approach allows to control for municipality fixed effects and thus absorbs any level difference across municipalities (such as inhabitant size and income).

We present the 2SLS results in Table 7. Standard errors are clustered by municipality to account for heteroskedasticity and serial correlation at the municipality level, which is the level of aggregation of our instrumental variable. As anticipated, we also control for municipality dummies similar to Column (4) of Table 5 so as to absorb level differences in inhabitants and economic development across municipalities. In the first-stage results of Panel A, we show that the instrument has a positive and significant effect on the likelihood of family control. The F-statistic is equal to 30, which confirms the joint significance of the model. In Panel B, we show the second-stage results in which the dependent variable is the indictment dummy and the key explanatory variable is the instrumented family firm dummy from the first stage. The coefficient

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[7] Notaries in Italy are a licensed profession whose entry is strictly regulated by law, which requires candidates to take a highly selective exam and sets a maximum number of notaries at the municipality level as a function of the municipality' population and income; in practice, however, the number of notaries tends to be stable over time (Pellizzari et al. 2011).

of such variable is positive and statistically significant at the 5% level. In magnitude, it is only marginally smaller than our previous OLS results, suggesting that omitted factor biases would lead to a slight over-estimation problem. Collectively, these results confirm that family firms have a lower probability to be involved in antitrust indictments.

[Insert Table 7 about here]

In Table 8, we conduct a number of robustness checks to further validate our finding. In Column (1), we account for the fact that our binary dependent variable contains very few ones by estimating a rare-event Logit model (King and Zeng 2001).[8] Second, we provide results from different computations of the standard errors, e.g. by clustering them at the industry level (Column 2). In Column (3), we include in our model a set of 3-digit industry dummies interacted with year dummies to control for time-varying industry heterogeneity. In Column (4) we show the results derived by employing a matched sample of family and nonfamily firms (constructed using 1:1 matching without replacement). All of these tests support our previous conclusion that family firms are less likely to be involved in antitrust violations.

[Insert Table 8 about here]

Finally, we assessed whether family ownership affects the duration of anticompetitive agreements. Our data indicate that the duration of such agreements does not significantly differ depending on the presence or not of a family business. The difference in the average (median) duration of cartels with and without family firms is 0.8 (1) months and is not statistically different from zero. Figure 4 illustrates the duration of cartels with and without family firms. The lack of significant differences among the two groups is useful to ameliorate the concern

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[8] In an untabulated test we also check the robustness to estimating a Firth's logistic regression.

that our main findings are driven by family firms being better able than other firms to organize cartels that are harder to detect by the antitrust authority.

[Insert Figure 4 about here]

3.2. Mechanisms

What makes family firms less likely to violate antitrust laws? The first mechanism suggests that family owners feature a strong desire to promote the social image of their firm. In the pursuit of these objectives, family owners would become less willing to engage in corporate actions that, albeit profitably, may threaten the reputation of the family. This notion is in line with a stream of research, spanning from tax evasion to human resources and pollution, which suggests that family owners actively invest to preserve the reputation of their companies (Berrone et al. 2010; Chen et al. 2008, 2010; Kang and Kim 2019). We probe into this mechanism by constructing a measure of firm's social prominence and visibility. Specifically, we compute a ratio equal to a firm's number of employees divided by the inhabitants in the municipality where the firm is headquartered (data from the Italian Statistical Office). We conjecture that *large firms* that are headquartered in *small municipalities* tend to feature greater visibility and stronger commitment to local stakeholders; indeed, such companies are typically perceived as key actors for the welfare of the local community and, as a result, they tend to champion local initiatives and symbolic or substantive actions that engender an isomorphism between the company and the community itself. Prime examples are the food producer Ferrero for the town of Alba, or the eyewear manufacturer Luxottica for the town of Agordo. This mechanism would increase the reputational concerns of family owners of prominent firms as compared, for instance, with family owners of small companies headquartered in large cities.

In Table 9, we provide results from a regression in which we augment the baseline model of Table 5 with the interaction between the Family firm dummy and the ratio of firm's employees by municipality inhabitants. The table shows that the direct effect of family firms on the likelihood of antitrust indictments remains negative and significant. Yet, consistent with our arguments, the interaction between family firms and the prominence ratio is also negative and significant: being a more prominent firm amplifies the negative propensity of family firms to engage in antitrust violations.

[Insert Table 9 about here]

The second mechanism we propose relates to the fact that anticompetitive practices (especially horizontal agreements, which are the vast majority of antitrust violations in our sample) require a coordination on collusive strategies by multiple firms. To achieve this coordination, firms should feature a significant group identification and mutual understanding (van Driel 2000). A low group identification will erect barriers to coordination and raise monitoring costs. Bourveau et al. (2019) show that when firms have imperfect information on rivals' behavior, a greater level of informational transparency can improve the ability of firms to coordinate product market actions.

Family firms often have governance structures confined to members of the inner family and aimed at maximizing family-centric objectives; these features impair their ability to collaborate with external parties that are perceived as different due to the pursuit of family-unrelated goals (Bettinazzi et al. 2018). Moreover, family firms tend to less informationally transparent than non-family firms – a feature which obstacles the coordination on collusion arrangements (Bourveau et al. 2019). Collectively, these arguments suggest that family firms may be less likely to join anticompetitive practices requiring coordination across multiple firms. We test this

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argument using two measures of informational transparency from the accounting literature. The first hinges on variations in discretionary accruals, which we compute using the modified Jones model proposed by Dechow et al. (1995), whereas the second is a measure of accrual aggressiveness. The rationale behind both approaches is that higher discretionary accruals make a firm more informationally opaque; in turn, such opaqueness creates more obstacles to inter-firm coordination.

As Table 10 shows, family firms are less likely to violate antitrust laws regardless of their level of accounting transparency. In untabulated checks, we further verify that our results hold while controlling for discretionary accruals rather than using this variable to construct the subsamples of Table 10. These findings provide little support to the inter-firm coordination mechanism.

[Insert Table 10 about here]

The final mechanism relates to the fact that the antitrust authority may apply a different level of regulatory oversight to family and nonfamily firms. From this perspective, family firms may represent less attractive targets for the antitrust authority which, in order to prosecute anticompetitive practices, conducts investigative activities that rely on the search and elaboration of available information under budget constraints. These activities are facilitated when firms disclose more information to the market due to e.g. the presence of institutional owners or outsiders in board positions. Therefore, an antitrust authority who wishes to maximize the likelihood of sanctioning anticompetitive behaviors may target more intensively nonfamily firms in its investigative and prosecutor activities. Similarly, the antitrust authority may prosecute less intensively family firms due to their roles in the community or their entrenchment with the political sector. In these instances, the data should reveal not only a greater occurrence

of antitrust interventions among nonfamily firms but also a lower amount of sanctions: a more intense investigation addressed toward nonfamily firms should bring to light also cases that are subject to lighter penalties or no penalties at all.

We test this argument in Table 11, in which we focus the analysis only on those firms hit by an antitrust intervention and use the outcome of such intervention as dependent variable. As shown, nonfamily firms do *not* display a higher probability of receiving a fine as result of the antitrust indictment. Neither they display a significant difference from family firms in the monetary amount of fines. Albeit indirectly, these results do not support the argument that our previous results are driven by differences in regulatory oversight between family and nonfamily firms.

[Insert Table 11 about here]

4. Effect of antitrust indictment on leadership and corporate policies

In this section, we move the focus to the period around the antitrust indictment and explore the adjustments in family firms' executive positions as well as the differences in corporate policies between family and nonfamily firms.

4.1. Family firms' leadership

The previous section has provided evidence showing that family firms are significantly less likely to be involved in antitrust violations owing to their desire to protect the family reputation. If the family acts as a reputation-protecting mechanism, then we may expect significant changes in the degree of family involvement in managerial positions following antitrust violations. In

particular, the controlling family may appoint family relatives in top executive positions in order to signal to external stakeholders a commitment to improve the corporate reputation.[9]

We test this argument in Table 12, where we exploit the longitudinal variation of our data to estimate the following generalized difference-in-differences model:

$$y_{it} = \alpha + \beta Post\ indictment_{it} + X'\gamma + \gamma_{jt} + \delta_i + e_{it} \tag{2}$$

in which the dependent variable is the ratio of family top executives (i.e. CEOs and executive board chairman).[10] The key explanatory variable is a dummy equal to one for years subsequent to an antitrust indictment, and zero for the years before the indictment as well as for firms not involved in antitrust indictments. The coefficient of such variable indicates whether family firms hit by antitrust indictments change the involvement of family members in top executive positions as compared to firms involved at a later stage or never involved. Notice that, taking advantage of the panel structure of our data, we can augment the model with firm fixed effects δ_i, thus controlling for all the unobserved heterogeneity at the company level, as well as for the interaction between industry and year dummies γ_{jt}, thus absorbing temporal changes in family involvement that are heterogeneous across industries. Standard errors are clustered by firm to account for both heteroskedasticity and serial correlation.

As shown in Panel A of Table 12, family firms experience a significant increase in the presence of family executives in the aftermath of the antitrust indictment. An important assumption for the validity of these results is that family firms involved in antitrust indictments

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[9] Using data from US listed firms, Niehaus and Roth (1999) show that firms involved in securities class actions have an abnormal level of CEO turnover. Alexander (1999), too, finds greater managerial turnover following criminal allegations. Agrawal et al. (1999) find that the revelation of fraud does not create enough incentives to change directors or top managers. More recently, Aharony et al. (2015) conclude that the significance of executive changes depends on the type of corporate litigation (i.e., environmental, intellectual, contractual and antitrust).
[10] In Italy it is common for firms to have more than one CEO. In our sample, 40% of the companies have more than one CEO. The average number of all CEOs is 2, whereas the average number of family CEOs is 1.4.

did not exhibit different trends in the representation of family executives (as compared to firms not involved) prior to the indictment year. This assumption may be violated if e.g. the nonfamily executives, who may have private information on the ongoing investigation and the liabilities that the company is facing, leave the family firm in anticipation of the antitrust decision.[11] We shed light on the *parallel trends* assumption by replacing the Post indictment indicator in equation (2) with a set of dummies that capture the dynamic effect of the intervention from 1 year before up until 2 years or more later (and using as benchmark group 2 years or more before the intervention). As shown in Panel B of Table 12, the ratio of family executives does not differ across firms one year prior to the intervention. By contrast, we detect a positive and significant effect on the year of the intervention and one year after. This dynamics is in line with the absence of diverging trends and confirms that most of the executive changes occur in the immediate period following the antitrust decision. After two years, the effect vanishes.

[Insert Table 12 about here]

As anticipated, the results of the previous table raise an important question of whether the ratio of family top executives increases due to the entry of family members in top executive positions, or due to the departure of professional executives for a given number of family members. To tease apart these two explanations, we use as dependent variables the (log of the) absolute number of family and nonfamily CEOs separately. Results in Table 13 shows that the number of family executives significantly increases in the aftermath of the antitrust indictment. By contrast, the number of nonfamily executives remains constant.[12]

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[11] Existing works suggest that directors have incentives to leave their firms *prior to* negative events such as lawsuits, though such departures do not protect them from reputational damages (Dou 2017).

[12] These results are also supported using alternative estimation techniques such as a Poisson regression to model the expected count of family and nonfamily executives.

[Insert Table 13 about here]

4.2. Corporate policies

The final part of our analysis concerns the real effects of antitrust indictments, and how such effects differ depending on the identity of the controlling owners. In their study of anti-collusion enforcement around the world, Dasgupta and Zaldokas (2019) show that stronger antitrust enforcement triggers an increase in corporate investment. The logic behind this result is that antitrust enforcement moves the market equilibrium toward more competition, and - as a result of this movement - firms need to invest more in order to face stronger competitive forces. At the same time, firms wish to maintain financial flexibility and avoid making themselves vulnerable to competitors' strategies, and thus finance their greater investment activity primarily through equity issuances (Dasgupta and Zaldokas 2019).

We conjecture that family firms may be disadvantaged when it comes to confronting the challenge of increased competition due to the dismantlement of an anticompetitive practice by the antitrust authority. Indeed, families strive to maintain control over their companies and are typically reluctant to issue new equity which would dilute their stake (Croci et al. 2010; Ellul 2009). Issuing debt may provide a financing opportunity but that would also make the company more financially fragile in confronting the stronger competitive threats.[13] Due to their joint desire to preserve family control while avoiding excessive financial risk, families' priorities may dampen the investment ability of family businesses in the aftermath of the antitrust infringement.[14]

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[13] Chevalier (1995) show that debt impairs a firm's competitive ability.
[14] An alternative interpretation can relate to the fact that family leaders (who increase in the post-indictment period, as we have shown above) can be less able than professional CEOs to identify and pursue growth strategies due to risk aversion (e.g. Anderson et al. 2012) or human capital considerations (e.g. Perez Gonzalez 2006). In an additional test we contrast nonfamily firms with family firms solely led by family members, or family firms led by

We test these arguments by estimating the following model:

$$y_{it} = \alpha + \beta_1 Post\ indictment_{it} + \beta_2 Post\ indictment_{it} \times Family\ firm_{it} +$$

$$+X'\gamma + \gamma_{jt} + \delta_i + e_{it} \tag{3}$$

where we use the annual growth in fixed assets as dependent variable. The key explanatory variables are given by: (1) the Post indictment dummy equal to one for the years after the intervention, and zero for the years before as well as for firms not involved in antitrust indictments; (2) the interaction between the Post indictment dummy and a dummy equal to one for family firms, and zero for nonfamily firms. The coefficient of the Post indictment dummy provides the effect of an antitrust indictment on the change in firm investment (as compared to compared to firms hit by antitrust indictments at later years, or firms never hit). The coefficient of the interaction term gives the triple-difference estimate of how the antitrust indictment changes differently family and nonfamily firms' investment. Firm fixed effects control for constant heterogeneity across family and nonfamily firms, whereas the interaction between year and industry dummies controls for different trends in investment across industries. Standard errors are clustered by firm.

Results are reported in Panel A of Table 14. Consistent with Dasgupta and Zaldokas (2019), we find that firms step up investment in the aftermath of the antitrust enforcement: the direct effect of antitrust indictment indicates that asset growth increases by 6% (which is economically relevant given an unconditional mean of 14%). As shown, the coefficient of such interaction (corresponding to a 13% decline in investment) is negative and significant in both statistical and

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professional CEOs. Our results indicate a lower investment rate for both types of family firms as compared to nonfamily firms.

economic terms. Put it differently, family firms are significantly less able than nonfamily firms to invest in the years following the antitrust enforcement.

[Insert Table 14 about here]

In Panel B of Table 14 we validate the parallel trends assumption, which maintains that family and nonfamily firms did not exhibit diverging trends in investment prior to the antitrust action. To this end, similar to what we did in Table 13, we unpack the Post indictment dummy of equation (3) into a set of dummies for each of the years before and after the antitrust intervention. The table shows that the direct effect is significant only one year after the antitrust intervention, after which firms arguably reach a new (more competitive) equilibrium. No significant differences are detected prior to the antitrust action. More importantly, the table shows that the coefficients of the triple interaction are different from zero (and negative) only in correspondence of the intervention year and one year after. Collectively, these findings support the parallel trend assumption needed to interpret our results causally.

We have argued that the lower investment ability of family firms can arise from a lower propensity to issue equity (in order to avoid diluting family control), which is required to fund greater investment needs without incurring in the disadvantages of debt in times of greater competition (Dasgupta and Zaldokas 2019). In Table 15, we test this argument by using equity issuance as dependent variable in equation (3). The specification is similar to the one used above, with the only exception that we remove debt to asset from the control variables (since we are using capital structure items on the left-hand side of the regression). As shown, there is a positive and significant effect of antitrust indictments on equity issuances in the post-indictment period (equal to 0.015 which is more than half of the unconditional average). Yet,

the coefficient of the triple interaction is negative: family firms issue significantly less equity than their nonfamily counterpart to propel growth in the aftermath of the antitrust indictment.

[Insert Table 15 about here]

5. Conclusion

To understand why firms engage in anticompetitive actions, the literature has explored a wealth of factors spanning from firm size to industry concentration and demand growth. Only recently, scholars have started to uncover the role of corporate governance characteristics. Contributing to this growing literature, we have focused the analysis on the role played by owners' identity in shaping the propensity of firms to violate antitrust laws.

We have argued that the desire of controlling families to protect their reputation and social image would make family firms less likely than their nonfamily counterparts to violate antitrust laws. Using a variety of estimation strategies including instrumental variables and matching, our evidence confirms that family firms are less likely to be hit by antitrust indictments. This result is particularly pronounced for the more prominent family businesses size-wise, which are expected to feature stronger reputational concerns due to their greater visibility and relevance for local stakeholders.

We have then employed a difference-in-differences approach to understand the real effects of antitrust indictments. If the family spurs reputational concerns, we should expect an increase in family involvement in the aftermath of the indictment: appointing more family members to key corporate positions would signal to external stakeholders a stronger commitment to improve a firm's standing and cleanse its reputation. Our results support this interpretation: following an antitrust indictment, the number of family top executives significantly increases, whereas that of nonfamily executives does not change. Finally, we show that increasing familiness to

ameliorate the reputational costs of indictments comes at a cost: family firms become significantly less able than their nonfamily counterpart to step up investment and thus face competitive pressures following the dismantlement of the anticompetitive practice.

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Figure 1. Time trend in antitrust indictments
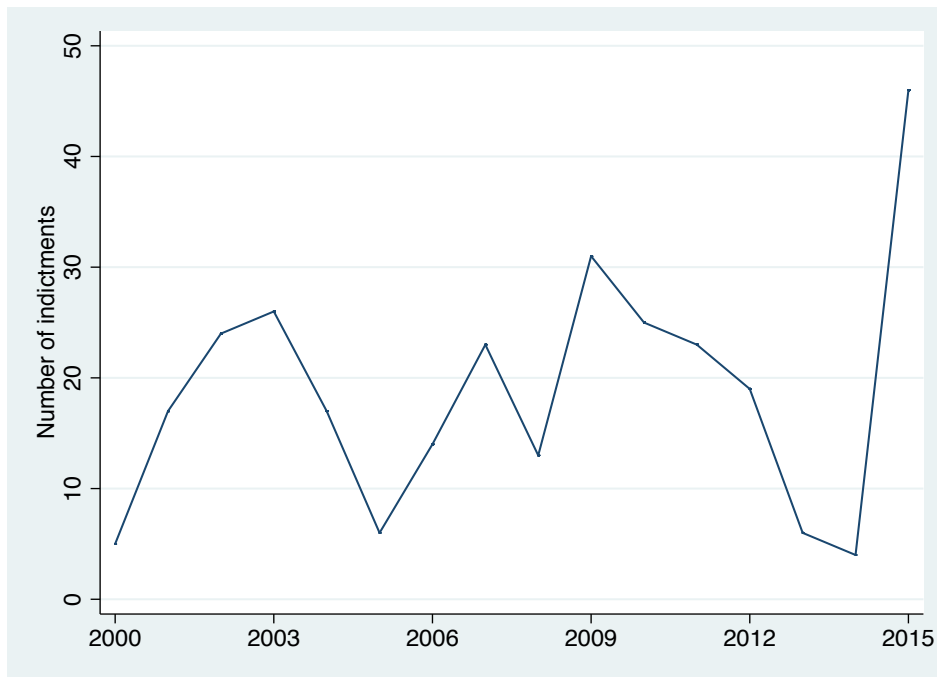
This graph illustrates the number of antitrust indictments in our sample from 2000 to 2015.

Figure 2. Predicted probability of antitrust indictment by family equity
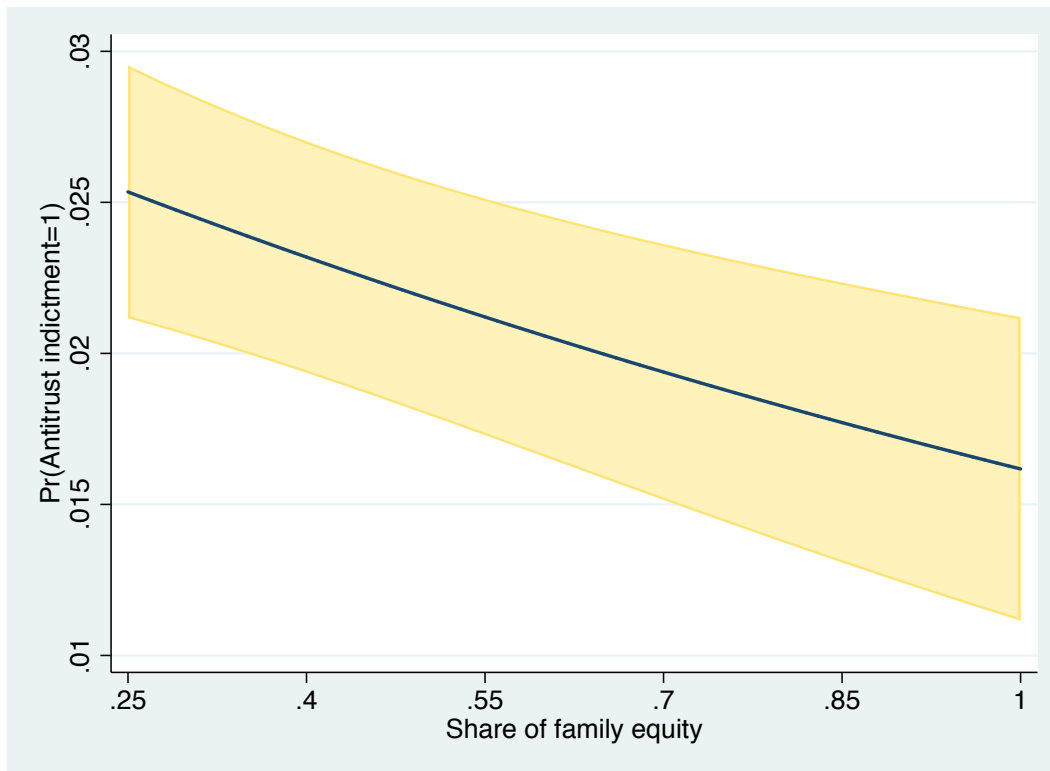
This figure illustrates the predicted probability of antitrust indictment computed by estimating with a logit regression the baseline model in Table 5. The continuous line gives the predicted probability for family firms at different values of the share of family equity. The colored area indicates the 5% confidence intervals.

Figure 3. Predicted probability of antitrust indictment by firm size
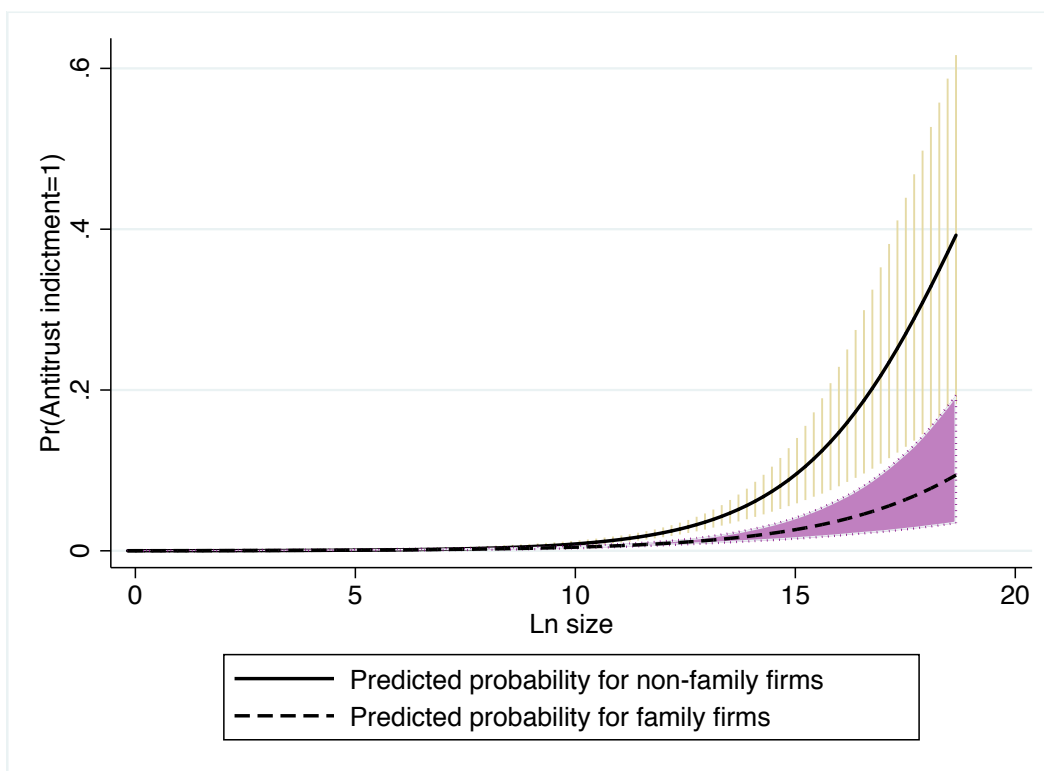
This figure illustrates the predicted probability of antitrust indictment computed by estimating with a logit regression the baseline model in Table 5. The continuous line gives the predicted probability for nonfamily firms, whereas the dotted line gives the predicted probability for nonfamily firms. Both predicted probabilities are estimated along firm size represented in the x axis. The colored areas indicate the 5% confidence intervals.

Figure 4. Cartel duration
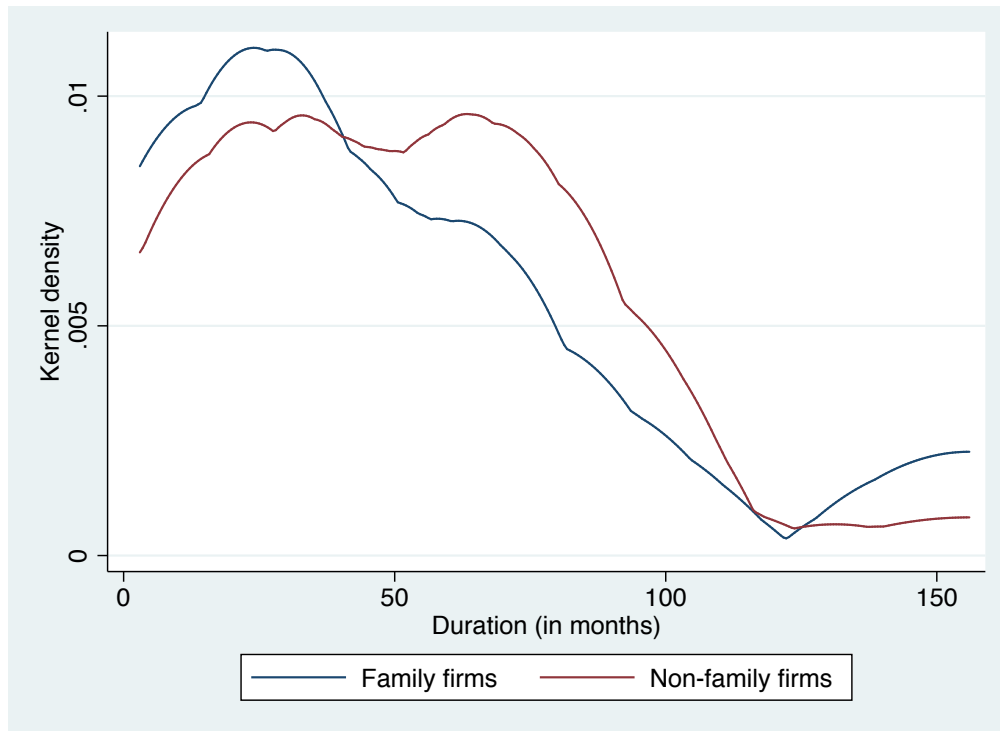
This figure illustrates the kernel density of cartel duration (expressed in months) separately for family and nonfamily firms.

Table 1. Description of antitrust indictments

Total number of indictments	205
Horizontal anticompetitive agreements	170 (82.9%)
Vertical anticompetitive agreements	11 (5.4%)
Abuse of dominance	24 (11.7%)
Outcome of the indictment	
Commitment/no-ground for action	65 (31.7%)
Fines issued	140 (68.3%)
Average fine issued (in Eur)	3,811,966

This table shows the frequency of antitrust indictments by type (upper part) and the implication of the indictment for the firm involved (lower part).

Table 2. Firms by industry

	Firms involved in antitrust indictments	Un-involved firms	Total
Manufacturing	76	893	969
	(7.8%)	(92.2%)	
Electricity, gas, steam and air conditioning supply	11	204	215
	(5.1%)	(94.9%)	
Water supply and waste management	2	76	78
	(2.5%)	(97.5%)	
Construction	6	228	234
	(2.5%)	(97.5%)	
Wholesale and retail trade	42	1,486	1,528
	(2.7%)	(97.3%)	
Transportation and storage	31	400	431
	(7.2%)	(92.8%)	
Accommodation and food service activities	4	32	36
	(11%)	(89%)	
Information and communication	9	159	168
	(5.3%)	(94.7%)	
Financial and insurance activities	3	410	413
	(0.7%)	(99.3%)	
Real estate activities	1	164	165
	(0.6%)	(99.4%)	
Professional, scientific and technical activities	17	835	852
	(2.0%)	(98.0%)	
Administrative and support service activities	3	103	106
	(2.8%)	(97.2%)	
Total	205	4,990	5,195

This table shows the industry distribution for the firms involved in antitrust indictments (Column 1) and the industry distribution of control firms not involved in antitrust indictments (Column 2).

Table 3. Description of firm owners

Family firms	3,537
	(68.1%)
Firms controlled by coalitions of nonfamily investors	305
	(5.9%)
Firms controlled by financial investors	94
	(1.8%)
Firms controlled by foreign investors	737
	(14.2%)
Cooperatives or state-owned firms	515
	(9.9%)
Firms controlled by other types of investors	7
	(0.1%)
Total	5,195

This table shows the frequency of the ownership type for the companies in our sample. Details in the construction of each variable are reported in Table A1.

Table 4. Summary statistics

Panel A. All firms					*Panel B.* Firms involved in antitrust indictments			
	Firms involved in antitrust indictments	Un-involved firms	Difference (1)-(2)			Family firms	Nonfamily firms	Difference (1)-(2)
	(1)	(2)	(3)			(1)	(2)	(3)
Family firm	0.4878	0.7282	-0.2404***		Firm size	11.49974	12.3638	-0.8641***
			(0.0315)					(0.2628)
Firm size	11.9423	10.9032	1.0391***		Firm age	3.1809	2.8622	0.3187**
			(0.1151)					(0.1284)
Firm age	3.0176	2.6859	0.3317***		Debt to assets	0.6422	0.5842	0.0580**
			(0.0689)					(0.0271)
Debt to assets	0.6125	0.6472	0.0347***		Industry concentration	0.2255	0.2114	0.0141
			(0.0148)					(0.026)
Industry concentration	0.2183	0.0967	0.1215***		Industry growth	0.0917	0.0943	-0.0026
			(0.0074)					(0.0305)
Industry growth	0.0930	0.0656	0.0274***		Industry profitability	0.0843	0.0898	-0.0056
			(0.0097)					(0.0041)
Industry profitability	0.0871	0.0789	0.0083***					
			(0.0016)					

The table reports the results of t-test average comparisons for firms involved or not in antitrust indictments (Panel A) and for family- and nonfamily firms involved in antitrust indictments (Panel B). Details in the construction of each variable are reported in Table A1. Standard errors are reported in parentheses. *, **, and *** denote significance at (respectively) the 10%, 5%, and 1% level.

Table 5. OLS estimates

Dependent variable: Antitrust indictment

	(1)	(2)	(3)	(4)
Family firm	-0.0206***	-0.0209***	-0.0146***	-0.0148***
	(0.0036)	(0.0036)	(0.0035)	(0.0043)
Firm size	0.0091***	0.0091***	0.0089***	0.0104***
	(0.0014)	(0.0014)	(0.0014)	(0.0016)
Firm age	0.0058***	0.0059***	0.0057***	0.0064***
	(0.0014)	(0.0014)	(0.0013)	(0.0017)
Debt to assets	-0.0016	-0.0017	-0.0012	-0.0094
	(0.0063)	(0.0063)	(0.0063)	(0.0078)
Industry concentration			0.2137***	0.2131***
			(0.0284)	(0.0331)
Industry growth			0.0279	0.0220
			(0.0207)	(0.0205)
Industry profitability			0.0003	-0.0025
			(0.0017)	(0.0019)
Year dummies	Yes	Yes	Yes	Yes
Area dummies	No	Yes	Yes	No
Municipality dummies	No	No	No	Yes
Observations	10,895	10,895	10,895	10,895

The table reports the results of OLS regressions in which the dependent variable is a dummy equal to one if a firm was involved in an antitrust indictment and zero otherwise. Details in the construction of each variable are reported in Table A1. Firm-clustered standard errors are reported in parentheses. *, **, and *** denote significance at (respectively) the 10%, 5%, and 1% level.

Table 6. Family firms vs. different types of nonfamily firms

Dependent variable: Antitrust indictment

	(1)	(2)	(3)	(4)
Family vs. Firms controlled by coalitions of nonfamily investors	-0.0152*			
	(0.0082)			
Family vs. Firms controlled by financial investors		-0.0297*		
		(0.0180)		
Family vs. Firms controlled by foreign investors			-0.0277***	
			(0.0068)	
Family vs. Cooperatives or state-owned firms				-0.0011
				(0.0084)
Firm size	0.0050***	0.0052***	0.0089***	0.0070***
	(0.0015)	(0.0016)	(0.0017)	(0.0017)
Firm age	0.0053***	0.0055***	0.0066***	0.0047***
	(0.0015)	(0.0016)	(0.0018)	(0.0017)
Debt to assets	0.0043	0.0095	-0.0066	0.0029
	(0.0075)	(0.0075)	(0.0080)	(0.0075)
Industry concentration	0.2139***	0.2071***	0.2361***	0.1573***
	(0.0431)	(0.0445)	(0.0423)	(0.0341)
Industry growth	0.0302	0.0300	0.0189	0.0314
	(0.0225)	(0.0226)	(0.0225)	(0.0231)
Industry profitability	-0.0035	-0.0049*	-0.0039*	-0.0034
	(0.0024)	(0.0026)	(0.0022)	(0.0022)
Year dummies	Yes	Yes	Yes	Yes
Municipality dummies	Yes	Yes	Yes	Yes
Observations	8,506	8,047	9,332	8,680

The table reports the results of OLS regressions in which the dependent variable is a dummy equal to one if a firm was involved in an antitrust indictment and zero otherwise. Details in the construction of each variable are reported in Table A1. Firm-clustered standard errors are reported in parentheses. *, **, and *** denote significance at (respectively) the 10%, 5%, and 1% level.

Table 7. 2SLS estimates

Panel A. Dependent variable: Family firm		*Panel B.* Dependent variable: Antitrust indictment	
Instrument	0.0325***	Family firm	-0.1089**
	(0.0108)		(0.0470)
Firm size	-0.0241***	Firm size	0.0082***
	(0.0063)		(0.0016)
Firm age	0.0310***	Firm age	0.0091***
	(0.0074)		(0.0019)
Debt to assets	-0.0322	Debt to assets	-0.0121*
	(0.0622)		(0.0065)
Industry concentration	-0.5151***	Industry concentration	0.1644***
	(0.1082)		(0.0390)
Industry growth	-0.0504	Industry growth	0.0183
	(0.0407)		(0.0189)
Industry profitability	-0.0229*	Industry profitability	-0.0047***
	(0.0123)		(0.0018)
Year dummies	Yes	Year dummies	Yes
Municipality dummies	Yes	Municipality dummies	Yes
Observations	10,895	Observations	10,895

The table reports the results of 2SLS regressions. In Panel A, the dependent variable is a dummy equal to one for family firms and zero otherwise. The key explanatory variable (Instrument) is constructed as the interaction between (one plus) the logarithm of the number of notaries in a given municipality and a dummy equal to one for the years after 2006 and zero for the years before. In Panel B the dependent variable is the dummy equal to one if a firm was involved in an antitrust indictment and zero otherwise. Both Panels A and B include the firm- and industry-level controls of the Table 5, Column 4. Details in the construction of each variable are reported in Table A1. Municipality-clustered standard errors are reported in parentheses. *, **, and *** denote significance at (respectively) the 10%, 5%, and 1% level.

Table 8. Alternative estimation strategies

Dependent variable: Antitrust indictment

	Rare-event Logit	Industry clustering	Industry-year intercepts	1:1 matching
	(1)	(2)	(3)	(4)
Family firm	-0.8591***	-0.0146***	-0.0082**	-0.0180***
	(0.1520)	(0.0042)	(0.0034)	(0.0041)
Year dummies	Yes	Yes	Yes	Yes
Area dummies	Yes	Yes	Yes	Yes
Industry controls	Yes	Yes	Yes	Yes
Observations	10,895	10,895	10,895	5,996

Details in the construction of each variable are reported in Table A1. Firm-clustered standard errors (unless differently specified) are reported in parentheses. *, **, and *** denote significance at (respectively) the 10%, 5%, and 1% level.

Table 9. The role of size prominence

Dependent variable: Antitrust indictment	
Family firm	-0.2300***
	(0.0907)
Family firm×Size prominence	-0.0955**
	(0.0398)
Size prominence	0.0868**
	(0.0400)
Firm size	0.0098***
	(0.0017)
Firm age	0.0066***
	(0.0017)
Debt to assets	-0.0102
	(0.0077)
Industry concentration	0.2136***
	(0.0341)
Industry growth	0.0161
	(0.0208)
Industry profitability	-0.0022
	(0.0208)
Year dummies	Yes
Municipality dummies	Yes
Observations	10,651

Details in the construction of each variable are reported in Table A1. Firm-clustered standard errors are reported in parentheses. *, **, and *** denote significance at (respectively) the 10%, 5%, and 1% level.

Table 10. Heterogeneity by informational opaqueness

Dependent variable: Antitrust indictment

	Discretionary accruals		Accruals aggressiveness	
	Low	High	Low	High
	(1)	(2)	(3)	(4)
Family firm	-0.0133**	-0.0121**	-0.0142**	-0.0147**
	(0.0064)	(0.0053)	(0.0058)	(0.0066)
Firm size	0.0106***	0.0081***	0.0081***	0.0108***
	(0.0026)	(0.0021)	(0.0025)	(0.0026)
Firm age	0.0098***	0.0067**	0.0077***	0.0085***
	(0.0030)	(0.0028)	(0.0028)	(0.0032)
Debt to assets	0.0176	-0.0116	-0.0025	0.0206**
	(0.0113)	(0.0104)	(0.0125)	(0.0105)
Industry concentration	0.1894***	0.2413***	0.0785***	0.3477***
	(0.0432)	(0.0457)	(0.0277)	(0.0585)
Industry growth	0.0036	0.0599	0.0111	0.0649*
	(0.0387)	(0.0388)	(0.0406)	(0.0381)
Industry profitability	0.0016	-0.0019	0.0003	0.0014
	(0.0024)	(0.0028)	(0.0023)	(0.0027)
Year dummies	Yes	Yes	Yes	Yes
Area dummies	Yes	Yes	Yes	Yes
Observations	3,729	4,644	3,771	3,735

Details in the construction of each variable are reported in Table A1. Firm-clustered standard errors are reported in parentheses. *, **, and *** denote significance at (respectively) the 10%, 5%, and 1% level.

Table 11. Differences in regulatory oversight

Dependent variable:	Fine (binary)	Amount of fine
	(1)	(2)
Family firm	-0.0578	-0.5612
	(0.0669)	(0.4183)
Firm size	-0.0630***	0.3917***
	(0.0163)	(0.1317)
Firm age	0.0834**	0.2756
	(0.0390)	(0.2643)
Debt to assets	0.1500	-1.5301
	(0.1585)	(1.0786)
Industry concentration	-0.1649	0.1713
	(0.1769)	(1.5126)
Industry growth	0.2368	-0.3982
	(0.1975)	(1.0643)
Industry profitability	0.0358**	-0.0648
	(0.0156)	(0.1181)
Year dummies	Yes	Yes
Area dummies	Yes	Yes
Observations	205	140

Details in the construction of each variable are reported in Table A1. Firm-clustered standard errors are reported in parentheses. *, **, and *** denote significance at (respectively) the 10%, 5%, and 1% level.

Table 12. Effect of antitrust indictment on family firm leadership I

Panel A. Dependent variable:	Ratio family executives	*Panel B.* Dependent variable:	Ratio family executives
	(1)		(2)
Post indictment	0.0789**	Post indictment [$t = -1$]	0.0351
	(0.0330)		(0.0294)
Firm size	-0.0054	Post indictment [$t = 0$]	0.0961**
	(0.0086)		(0.0406)
Firm age	0.0265	Post indictment [$t = 1$]	0.1178***
	(0.0198)		(0.0423)
Debt to assets	-0.0187	Post indictment [$t = 2^+$]	0.0709
	(0.0275)		(0.0441)
Firm fixed effects	Yes	Firm size	-0.0055
Year×Industry fixed effects	Yes		(0.0086)
Observations	21,614	Firm age	0.0259
			(0.0197)
		Debt to assets	-0.0188
			(0.0275)
		Firm fixed effects	Yes
		Year×Industry fixed effects	Yes
		Observations	21,614

Details in the construction of each variable are reported in Table A1. Firm-clustered standard errors are reported in parentheses. *, **, and *** denote significance at (respectively) the 10%, 5%, and 1% level.

Table 13. Effect of antitrust indictment on family firm leadership II

Dependent variable:	Ln(1+Family executives)	Ln(1+Nonfamily executives)
	(1)	(2)
Post indictment	0.0820**	-0.0391
	(0.0386)	(0.0378)
Firm size	0.0188**	0.0258**
	(0.0083)	(0.0108)
Firm age	0.0186	-0.0215
	(0.0200)	(0.0214)
Debt to assets	-0.0408	0.0035
	(0.0306)	(0.0320)
Firm fixed effects	Yes	Yes
Year×Industry fixed effects	Yes	Yes
Observations	21,614	21,614

Details in the construction of each variable are reported in Table A1. Firm-clustered standard errors are reported in parentheses. *, **, and *** denote significance at (respectively) the 10%, 5%, and 1% level.

Table 14. Effect of antitrust intervention on firm growth

Panel A. Dependent variable: Asset growth		*Panel B.* Dependent variable: Asset growth	
Post indictment	0.0579*	Post indictment [$t = -1$]	0.0032
	(0.0323)		(0.0435)
Post indictment×Family firm	-0.1311**	Post indictment [$t = 0$]	0.0502
	(0.0586)		(0.0779)
Firm size	0.1040***	Post indictment [$t = 1$]	0.1816**
	(0.0142)		(0.0752)
Firm age	-0.1581***	Post indictment [$t = 2^+$]	0.0294
	(0.0271)		(0.0338)
Debt to assets	-0.0478	Post indictment [$t = -1$]×Family firm	0.0002
	(0.0454)		(0.0856)
Firm fixed effects	Yes	Post indictment [$t = 0$]×Family firm	-0.1604*
Year×Industry fixed effects	Yes		(0.0959)
Observations	41,610	Post indictment [$t = 1$]×Family firm	-0.2369**
			(0.0983)
		Post indictment [$t = 2^+$]×Family firm	-0.0918
			(0.0730)
		Firm size	0.1038***
			(0.0142)
		Firm age	-0.1582***
			(0.0271)
		Debt to assets	-0.0478
			(0.0454)
		Firm fixed effects	Yes
		Year×Industry fixed effects	Yes
		Observations	41,610

Details in the construction of each variable are reported in Table A1. Firm-clustered standard errors are reported in parentheses. *, **, and *** denote significance at (respectively) the 10%, 5%, and 1% level.

Table 15. Effect of antitrust intervention on equity financing

Panel A. Dependent variable: Equity issuance	
Post indictment	0.0146**
	(0.0068)
Post indictment×Family firm	-0.0226**
	(0.0115)
Firm size	0.0037
	(0.0026)
Firm age	-0.0238***
	(0.0055)
Firm fixed effects	Yes
Year×Industry fixed effects	Yes
Observations	40,944

Panel B. Dependent variable: Equity issuance	
Post indictment [$t = -1$]	0.0006
	(0.0092)
Post indictment [$t = 0$]	0.0502***
	(0.0185)
Post indictment [$t = 1$]	0.0170
	(0.0170)
Post indictment [$t = 2^+$]	0.0038
	(0.0088)
Post indictment [$t = -1$]×Family firm	-0.0044
	(0.0157)
Post indictment [$t = 0$]×Family firm	-0.0591**
	(0.0252)
Post indictment [$t = 1$]×Family firm	-0.0076
	(0.0256)
Post indictment [$t = 2^+$]×Family firm	-0.0203
	(0.0185)
Firm size	0.0036
	(0.0026)
Firm age	-0.0239***
	(0.0055)
Firm fixed effects	Yes
Year×Industry fixed effects	Yes
Observations	40,944

Details in the construction of each variable are reported in Table A1. Firm-clustered standard errors are reported in parentheses. *, **, and *** denote significance at (respectively) the 10%, 5%, and 1% level.

Table A1. Description of variables

Variable	Definition
Antitrust indictment	Dummy variable that takes the value of one if the firm has been involved in an antitrust indictment, and zero otherwise
Amount of fine	Natural logarithm of the monetary amount of fines for those antitrust indictments that led to any monetary sanction
Asset growth	Growth rate of a firm's fixed assets (winsorized at 1%)
Area dummies	Set of dummies identifying firms' headquarter in regions in the North-West, North-East, Center and South of Italy.
Debt to assets	Ratio of total debt to total assets. Values greater than 1 or lower than 0 are coded as 1 or 0, respectively.
Equity issuance	Change in a firm's equity scaled by 1-year lagged capital (winsorized at 1%)
Industry concentration	Herfindahl-Hirschman Index of industry concentration computed using firm revenues for each 2-digit industry and year
Industry growth	Growth rate of revenues for each 2-digit industry and year
Industry profitability	Ratio of earnings before interest, taxes depreciation and amortization divided by total assets for each 2-digit industry and year. We exclude values in the extreme 1% to the right and left tails of the profitability distribution
Family firm	Dummy variable that takes the value of one if the firm is a family firm, and zero otherwise. We classify a company as family firm if at least 50% of its equity shares is in the hands of a family (or 25% if the company is listed). Family relationships are identified using surname affinity or cohabitation criteria
Firms controlled by coalitions of nonfamily investors	Dummy variable that takes the value of one if the firm is controlled by a coalition of investors that do not share family ties, and zero otherwise
Firms controlled by foreign group	Dummy variable that takes the value of one if at least 50% of a firm's equity shares (or 25% if the company is listed)are in the hands of a foreign group, and zero otherwise
Firms controlled by financial investors	Dummy variable that takes the value of one if at least 50% of a firm's equity shares (or 25% if the company is listed) are in the hands of a financial entity (i.e. bank, insurance or private equity fund), and zero otherwise

Cooperatives or state-owned firms	Dummy variable that takes the value of one if the firm is a cooperative or if at least 50% of a firm's equity shares (or 25% if the company is listed) are in the hands of the state or local administration, and zero otherwise
Firms controlled by other types of investors	Dummy variable that takes the value of one for companies owned by any other type of investor, and zero otherwise
Fine (binary)	Dummy variable that takes the value of one if the antitrust indictment led to a monetary fine, and zero otherwise (i.e. if it led to non-monetary sanctions or there if there was no ground for action)
Firm size	Natural logarithm of the firm's total assets
Firm age	Natural logarithm of the firm's age since foundation
Ln (1+family executives)	Logarithm of (one plus) the number of family-related top executives
Ln (1+nonfamily executives)	Logarithm of (one plus) the number of family-unrelated top executives
Municipality dummies	Set of dummies corresponding firms' municipality of headquarter
Post-indictment	Dummy variable equal to one – among firms hit by an antitrust indictment – for the years following the antitrust indictment, and zero for the years before (and up until the indictment year) as well as for firms not hit by antitrust indictments
Ratio family executives	Ratio of the number of family-related top executives to the total number of top executives
Size prominence	Logarithm of (one plus) the ratio between the number of a firm's employees and the population size in the municipality of firm's headquarter