

How Much Does Ownership Form Matter?

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Research summary: Previous studies have emphasized firm and industry effects on variation in firm performance, but the relationship between forms of ownership and firm performance has been the focus of limited research. This article examines the extent to which ownership form (i.e., public or private ownership) and ownership structure (including diffused ownership and blockholding) affect firm performance. The results of an analysis of 30,525 European Union (EU) firms indicate that form of ownership is an important explanatory factor in the difference in performance among firms. These results underscore the need to study firms characterized by different ownership arrangements and to provide empirical evidence for the study of firm ownership in strategic management.

Managerial summary: Motivated by growing evidence on the involvement of different types of owners in the strategies of firms, we studied the extent to which a firm's ownership form (type of legal incorporation, such as public and private ownership forms) and ownership structure (diffused ownership and blockholding) affect its performance. Our study of more than 30,000 firms from the European Union shows that ownership form differences explain some of the performance differences between firms. Our results also indicate that firms with different ownership forms are differently affected by their competitive environment. Overall, the study suggests that choosing the right ownership form can have important strategic consequences. Copyright © 2017 John Wiley & Sons, Ltd.

Introduction

But of course once you become a public company, with a duty to update investors on your finances every three months, that mission thing becomes harder to sustain. Your offices may still be full of ping pong tables and free food, but your tax planning department is occupying a whole floor. (On Google's struggle to maintain its original mission after becoming a public company

[Cellan-Jones, 2016])

Researchers in the field of strategic management have long been interested in investigating the source of performance difference across firms and their populations (e.g., Hawawini, Subramanian, & Verdin, 2003; McGahan & Porter, 2002; Misangyi, Elms, Greckhamer, & LePine, 2006; Schmalensee, 1985; Short, Ketchen, Palmer, & Hult, 2007). Two competing theoretical perspectives have driven this literature—industrial organization (IO) economics (e.g., Porter, 1980), and the resource-based view (RBV) (e.g., Barney, 2001; Peteraf, 1993; Wernerfelt, 1984). Whereas the IO economics perspective suggests that factors external to a firm (such as industry structure and competitive conditions) are primary determinants of firm performance, proponents of RBV argue that firm performance is mainly established by factors internal to a firm, such as firm resources and capabilities.

Keywords: ownership form; private firms; variance decomposition; firm effects; industry effects

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Studies from this stream of literature have attempted to quantify the relative contributions to firm performance by using variance decomposition analyses (Brush & Bromiley, 1999; Hawawini et al., 2003; McGahan & Porter, 1997, 2002; Misangyi et al., 2006; Roquebert, Andrisani, & Phillips, 1996; Rumelt, 1991; Schmalensee, 1985). In recent years, researchers have extended this work by evaluating how additional factors, such as regional location, for example, influence firm performance (e.g., Chan, Makino, & Isobe, 2010; Chang & Hong, 2002; Fitza, Matusik, & Mosakowski, 2009; Ma, Tong, & Fitza, 2013; Makino, Isobe, & Chan, 2004).

Despite the contributions of these studies, Fitza et al. (2009) have noted that their insights are limited to publicly listed firms. As a result, most studies in this stream of research have assumed that ownership form (i.e., publicly owned vs. privately held) and structure (i.e., widely held or owned by large shareholders, or blockholders) are external to performance. However, there is growing evidence that distinct behavior and strategies of firm populations are characterized by different ownership forms (Capron & Shen, 2007; Durand & Vargas, 2003; George, 2005). Thus, any attempt to generalize findings about the determinants of public firm performance to other populations such as private firms may lead to erroneous conclusions. Extrapolating such findings to other populations has other far-reaching consequences: Although public firms are important, in many countries, they represent smaller firm populations. Indeed, McGahan and Porter (2002) have suggested that “data on the profitability of privately held firms would provide results more representative of the entire economy” (2002, p. 849).

Thus, to examine to what degree ownership form explains the variance in firm profitability, we conduct a variance decomposition analysis of a comprehensive data set of 30,525 firms of different ownership forms from the European Union. This study makes two important contributions. First, our analysis quantifies the effects of ownership form relative to industry effects and firm effects. This adds a critical new effect to the literature on the sources of performance variation across firms, while contributing to the broader literature regarding the implications of ownership arrangement for firm strategy and performance (Dharwadkar, Goranova, Brandes, & Khan, 2008; Douma, George, & Kabir, 2006; Hoskisson, Hitt, Johnson, & Grossman, 2002). In addition, to our knowledge, this study is among the first to analyze the sources of firm performance in

a sample that includes both publicly listed and privately held firms. Our large sample of firms with different ownership forms allows us to extend the findings of those studies of firm and industry effects, which included only public firms.

Background

Studying the determinants of firm performance has been among the most important research areas since strategic management emerged as a distinct field. Past studies of the performance variances among firms considered industry and firm effects, employing explanations from IO economics and the RBV (McGahan & Porter, 1997; Misangyi et al., 2006; Rumelt, 1991). From the IO economics perspective, firm profitability is determined by the conditions of the industry in which the firm operates such as the degree of competition, and the level of dependency on suppliers and customers, which indicates the power these groups have to appropriate some of the value generated by firms (Caves, 1980; McGahan & Porter, 2002; Porter, 1981). RBV theorists argue that a firm's profitability is also determined by internal factors, that is, a firm's resource endowment and its ability to use these resources (Barney, 1991; Wernerfelt, 1984).

In 1985, Schmalensee contributed to this debate by estimating what parts of the variance in firm performance can be attributed to a firm's industry and what parts to the firm itself—in essence, asking that if we want to understand the differences in firm performance, how important is it to look at industry and firm effects as drivers of such differences (Schmalensee, 1985)? The study found an industry effect of about 20%. Although this analysis did not capture which specific features affect performance, it found that industry, as a whole, to be important in determining the differences in firm performance. Following that work, Rumelt (1991) showed that firm effects largely explain variance in firm performance, followed by industry effects. McGahan and Porter (1997) supported these results, finding that industry effects account for 9.4% of the aggregate variability in the performance of business units, while corporate effects account for 9.1%, and business unit effects account for 35.1%. Other studies reported similar findings (e.g., Brush & Bromiley, 1999; Hawawini et al., 2003; McGahan & Porter, 2002; Misangyi et al., 2006; Roquebert, Phillips, & Westfall, 1996).

In recent years, researchers have extended these findings by investigating the effects of additional variables; Chang and Hong (2002) included business group effects, and Fitza et al. (2009) examined the performance of startups. Other studies have added environmental effects such as country (Makino et al., 2004) and regional effects (Chan et al., 2010; Ma et al., 2013). However, most studies were conducted on samples of publicly listed firms, and neglected firm ownership form as a potential explanation for the variance in performance among firms (Fitza et al., 2009; McGahan & Porter, 2002).

This lack of focus on the effects of firm ownership may be due to the complex nature of the relationship between ownership and firm performance. Despite a growing interest in the influence of owners on firm performance (e.g., Anderson & Reeb, 2003; Connelly, Hoskisson, Tihanyi, & Certo, 2010a; Demsetz & Lehn, 1985; Gómez-Mejia, Cruz, Berrone, & De Castro, 2011; Villalonga & Amit, 2006), the empirical evidence on how ownership form (e.g., whether a firm is public or privately owned) or ownership structure (e.g., whether a firm is owned by dispersed owners or blockholders) affects performance has been mixed (Dalton, Daily, Certo, & Roengpitya, 2003).

Why Does Firm Ownership Matter?

The influence of owners on their firm's strategy and performance has been the subject of an increasing number of studies (Anderson & Reeb, 2003; Connelly et al., 2010a; Gómez-Mejia et al., 2011; Villalonga & Amit, 2006). Early work on this topic originated in finance and economics, regarding the separation of ownership and control by expert management in corporations and its implications for firm performance (Berle & Means, 1932; Jensen & Meckling, 1976). More recent studies in strategic management have focused on the interests of owners and the ways in which ownership forms may influence firms' strategic actions and performance (Berrone, Cruz, Gómez-Mejia, & Larrazza-Kintana, 2010; Tihanyi, Johnson, Hoskisson, & Hitt, 2003). Studies have also looked at the difference between public firms with many individual shareholders and those with smaller groups of owners, such as blockholders or families (Bethel, Liebeskind, & Opler, 1998; Connelly et al., 2010a; Gómez-Mejia et al., 2011). These have shown that owners' preferences about the actions their firms should take in response to challenges and opportunities, and how firms

develop their capabilities, can vary substantially. Owners of widely held public firms may sell their stake when performance declines or problems arise in how firms cope with new challenges. By comparison, owners of private firms may be motivated by broader considerations to support their firms when performance declines. These may include societal and political preferences as well as consideration of family owners' so-called "socioemotional wealth" (Carney, Van Essen, Gedajlovic, & Heugens, 2015; Gómez-Mejia et al., 2011; Megginson & Netter, 2001; Vasudeva, 2013).

Although research on firm ownership suggests that different ownership arrangements explain in part the performance differences between firms, empirical findings regarding the relationship between ownership form and performance have been less conclusive. Past studies have investigated differences in *ownership structures* in public firms, such as insider and outsider blockholdings or different institutional owners, including mutual and pension funds. Demsetz and Villalonga's (2001) study of public firms argued that ownership structure is endogenous. That is, certain ownership structures offer both advantages and disadvantages; "these structures differ across firms because of differences in the circumstances facing firms, particularly in regard to scale economies, regulation, and the stability of the environment in which they operate" (Demsetz & Villalonga, 2001, p. 231).

Demsetz and Villalonga (2001) conducted their study on public firms. Such firms are exposed to the market for corporate control that makes changes in ownership structure relatively easy. However, changes of ownership form (such as changes from public to private ownership) may involve transactions that are more complex and create more friction. Thus, their study can be extended to investigate whether or not *ownership form* contributes to the variance in firm performance, a question that so far remains relatively unexplored (Capron & Shen, 2007; Durand & Vargas, 2003; George, 2005; Megginson & Netter, 2001; Zenger, Litov, & Moreton, 2012). Thus, our goal in this study is to examine the relationship between ownership form and performance. For the purpose of this study we define ownership form by the legal form of incorporation of a firm (such as whether or not a firm is publicly or privately owned), but we also differentiate between public firms that are owned by many investors (widely held) and those that are owned by large blockholders (a feature usually considered to

be part of a firm's ownership structure) because, as we show below, the latter share some similarities with private firms and including them allows us to highlight (both theoretically and empirically) these similarities and differences.

Ownership in public firms can be traded freely, but private firms are often held by smaller groups of investors closed to outside investors interested in purchasing shares on the stock market (Durand & Vargas, 2003; George, 2005). As we show, firms with different ownership forms may respond to similar challenges, but specific differences of ownership forms in regard to transparency and access to financial markets, goals, and governance can result in performance variance.

Transparency and access to financial markets. The actions of publicly listed firms and private firms are visible to the public in different ways. Publicly traded firms are continuously evaluated by analysts and investors via their buy-and-sell decisions in the stock market (Dalton, Hitt, Certo, & Dalton, 2001). Unlike privately held firms, public firms are required by laws and regulations to report details of their strategies and organizational changes and publicly announce strategic actions, including major acquisitions and alliances. This enforced transparency may be linked to enhanced competition since it gives others valuable insights into firms. The more information available about a firm, the better their competitors are able to understand the relationship between resources and performance, reducing a firm's ability to maintain an inimitable resource base (Peteraf, 1993). For their part, private firms are better able to shield resources and to employ strategies that benefit from secrecy. Although they rely on limited private funding, their discretion in using such funds, the time horizon over which they need to generate returns, and the information they convey are based on private negotiations with small groups of investors. Thus, without the requirement to report information to the financial markets, private firms are able to pursue a range of strategies not open to public firms, either widely held or owned by blockholders (e.g., Zenger et al., 2012).

The disadvantage this transparency brings to public firms is offset by the ability to access funds from the financial markets. In fact, the need for funding is often the main reason that firms go public (Draho, 2004). As a result, private firms tend to be smaller, and as such, might not be able to use strategies or compete in industries that require large economies of scale (Demsetz & Lehn, 1985;

Villalonga & Amit, 2010). They may overcome this limitation by competing in niche markets (Ebben & Johnson, 2005), resulting in strategic differences between public and private firms.

Goal functions. A review of the literature suggests that firms with different ownership forms tend to optimize different goals that can affect their strategies and performance (Berrone et al., 2010; Gómez-Mejía, Haynes, Jacobson, Nunez-Nickel, & Moyano, 2007; Morck & Yeung, 2003; Zenger et al., 2012). Depending on the firm's ownership form, owners share different risk propensities and seek different gains. Many owners of widely held public firms diversify their portfolios by buying small numbers of shares in different firms. Such diversification is difficult for blockholders and owners of private firms. Because of their ability to diversify, smaller owners of widely held public firms tend to be less averse to risky actions of a given firm in their portfolio (La Porta, Lopez-de-Silanes, Shleifer, & Vishny, 1999), while owners of private firms and blockholders, on average, tend to be more risk-averse, and thus, more likely to oppose actions that have a high risk-return relationship (Morck & Yeung, 2003). As a result, private firms and public firms with large blockholders are likely to employ less risky strategies than public firms with dispersed ownership.

Ownership form may also affect the strategic goals a firm is trying to optimize. On one hand, owners with a controlling stake, such as owners of private firms and blockholders of public firms, may extract benefits that go beyond financial returns, such as favorable transfer pricing to other firms or private consumption (Barclay & Holderness, 1989; Maher & Andersson, 1999). On the other hand, owners of private firms and large blockholders may personally identify with or be emotionally attached to a firm. That is, the goals of concentrated owners may be not only financial gain, but also the ability to continuously control the firm's actions (Gómez-Mejía et al., 2007; Gómez-Mejía, Larrazza-Kintana, & Makri, 2003). This will ultimately result in strategic priorities of public firms with blockholders and private firms that are different from the priorities of widely held public firms (Gómez-Mejía et al., 2007; Gómez-Mejía et al., 2003).

Governance. Public and private firms often employ different governance mechanisms. Public firms rely on their board of directors (e.g., Mayer, 1998) and market scrutiny, which in turn, may further increase transparency. Investors can

also be incited to take over, and replace a firm's management, which can lead to higher firm performance (Bethel et al., 1998). Managers of private firms are less vulnerable to takeovers if they miss performance targets (Reuer & Ragozzino, 2008). Rather, the concentrated ownership of private firms¹ enables owners to directly monitor and influence firm management (Jensen & Meckling, 1976; Shleifer & Vishny, 1997).

Differences between firms characterized by ownership form are also apparent with regard to managerial incentives that may influence which strategies managers pursue and how they execute them (David, Kochhar, & Levitas, 1998). Owners of public firms may create incentives that emphasize financial return, such as share options (e.g., Jensen & Murphy, 1990), however, in private firms whose owners have other interests, the creation of such incentives is more difficult. For example, if long-term survival is more important than short-term growth, a complex set of variables is needed to create an effective incentive system (Cruz, Gómez-Mejía, & Becerra, 2010; Gómez-Mejía et al., 2003).

Governance mechanisms may also lead to differences in performance between widely held public firms, whose owners may have limited say in their management, and firms with large blockholders, who are more likely to wield power and expertise in influencing firm strategy and performance (Hoskisson et al., 2002). Moreover, because of the presence of these blockholders, public firms with concentrated ownership are less affected by the market for corporate control (e.g., Bethel et al., 1998).

Overall, these differences in transparency, goal functions, and governance may result in different strategies to be pursued, and thus, in different performance outcomes for firms characterized by different ownership forms. Thus, we hypothesize that a significant portion of the variance of firm performance can be attributed to ownership forms. In the next section, we present arguments on how ownership forms may change the relationships between industry and firm effects and performance that have been the subjects of previous studies (e.g., McGahan & Porter, 2002; Misangyi et al., 2006; Short et al., 2007).

¹ Over 98% of the private firms in our study have at least one owner who held 25% or more of the firm's shares.

Do Industry and Firm Effects on Performance Vary by Ownership Form?

Differences in ownership form not only account for variance in firm performance, but may also affect the relationships between industry and firm effects and performance. Strategy scholars have argued that a firm's industry exposure not only depends on external forces, but also on the characteristics of the firm itself (e.g., Dess, Ireland, & Hitt, 1990).

A firm's ownership form is likely among the most important firm characteristics that can affect the degree to which a firm is exposed to its competition or how it maintains relationships with its customers and suppliers. Thus, as we argue below, firm and industry effects are not universal, but depend to some degree on a firm's ownership form. By investigating this relationship, our study contributes empirical evidence about ownership form effects to the broader variance decomposition literature (Hawawini et al., 2003; McGahan & Porter, 2002; Misangyi et al., 2006; Short et al., 2007).

Industry effect. In terms of industry forces, disclosure requirements require public firms to reveal their motivations for taking competitive actions in order to attract investments. Such openness may make them more vulnerable to counter moves by fellow industry players compared with the limited disclosure requirements of private firms. This, in turn, can result in a smaller industry effect for private firms than either widely held public firms or those owned by large blockholders. Furthermore, because private firms have less access to funding, they may have difficulty competing head to head with public firms in scale-intensive sectors. As a result, private firms sometimes pursue niche strategies or seek a dominant position in a smaller part of the market (Ebben & Johnson, 2005). This positioning means that private firms are less exposed to strategic moves made by industry rivals than both types of public firms, further weakening the industry effect on private firms.

The long-term orientation that is often the result of private ownership, and to some degree, the presence of large blockholders, may also reduce exposure to industry effects (Hoskisson et al., 2002) because long-term strategies may result in more cooperative relationships with suppliers and customers (Cheung, Myers, & Mentzer, 2011; Hoetker, 2005). For example, Kotabe, Martin, and Domoto (2003), in their study of Japanese and U.S. automotive suppliers, found that long-term

cooperative relationships contribute to higher performance because such relationships encourage cooperation over competition. Strategies that are more cooperative can reduce the negotiating power of certain groups, an important element of industry effects (Poppo & Zenger, 2002). Such dynamics suggest that private firms as well as public firms with large blockholders are less exposed to, or influenced by, their industry environment compared with public firms with dispersed owners. Although these arguments do not indicate any particular size of a given effect, they do suggest that industry effects are greatest for public firms with dispersed ownership, smaller for public firms with large blockholders (who share characteristics of both public and private firms), and smallest for private firms.

Firm effect. Firm effect, the percentage of performance difference between firms that can be attributed to the firms themselves, captures the degree to which firms differ from one another. They are the result of differences in firm resources and capabilities as well as resulting strategies (Barney, 1991; Wernerfelt, 1984). We suggest that the degree to which firms differentiate their resource base may depend in part on their form of ownership. The requirement that public firms be transparent to potential shareholders, for example, makes it easier for competitors to perceive the resources that underlie a firm's strategies (e.g., Zenger et al., 2012). Thus, if a firm's strategies are successful, transparency may result in increased competition for these resources, making it difficult for public firms to maintain a unique resource base and leading to the implementation of similar strategies by other firms. As a result, transparency often increases similarity of public firms, reducing the firm effect in this population. However, the relative secrecy enjoyed by private firms makes it easier for them to sustain their idiosyncratic resource bases, leading to a relatively large firm effect for private firms.

Furthermore, public firms, especially those with dispersed ownership, are subjected to market scrutiny and to the market for corporate control, and on average, the market will assert similar pressure on—and will require similar performance goals and strategies from—public firms. Such uniform pressure may result in a smaller variance among public firms. In contrast, private firms—and to a lesser degree, public firms with large blockholders—do not face such a homogenizing effect by the market. For example, certain owners or blockholders may have different strategic

objectives and preferences for monitoring, resulting in a range of strategies that increases the variance among private firms and public firms with large blockholders.

Taken together, these arguments suggest that the size of the firm effect will show a pattern that is the reverse of the industry effect pattern. That is, the firm effect will be greatest among private firms, smaller among public firms with large blockholders, and smallest for widely held public firms.

Methods

Data

For this study, we turned to the Amadeus database, compiled by Bureau van Dijk, a specialist provider of public and private company information. We collected firm data from all European Union (EU) countries between 2001 and 2013. Since our data set begins in 2001, we included only countries that were members of the EU during that year. We focused on the European Union to insure a level of institutional similarity between the countries in our data set. We included all companies found within the Very Large Company subset of Amadeus. To be classified as a “very large company” by Bureau van Dijk, a firm must have total assets of at least 200 million Euros, operating revenue of at least 100 million Euros, or at least 1,000 employees. We chose this subset of the Bureau van Dijk data as these companies are most comparable in size to public firms used in previous studies. Following McGahan and Porter (1997), we excluded financial institutions (SIC codes in the 6000s), as well as government and unclassified industries (SIC greater than 9000), given that returns, especially return on assets (ROA), of these firms are not comparable to other industries.

All the countries in our data set differentiate between forms of incorporation. Some are more suited to not-for-profit organizations, but others are reserved for business operations. For the purpose of this study, we used the ownership forms (type of legal incorporation) provided by Bureau van Dijk, but we focused on only the ownership forms used most often for business operations: variations of private firms and publicly listed firms. Although slight variations exist among legal systems, all countries offer incorporation forms that include firms whose shares may be freely sold and traded to the public (public firms) and firms whose ownership stakes

cannot be offered to the general public (private firms). Bureau van Dijk also classifies companies according to their degree of independence in regards to their shareholders. Thus, companies qualify as “independent of large blockholders” when no shareholder owns more than 25% of their equity. Based on the different types of incorporation found in the data set we classified firms as private firms, public firms with dispersed ownership, and public firms with blockholders (based on the degree of independence, as noted above).

We excluded 890 public firms that were not traded, as they were not subject to the kind of market scrutiny as traded public firms, making them atypical. We also excluded observations for which data about industry membership, ownership form, or ROA were unavailable, resulting in a sample of 30,525 firms, or 247,602 firm-year observations. Table 1 summarizes the descriptive statistics of our sample. The average ROA is 4.7%. Our data set contains 40,732 observations of public firms (15,105 for public firms with dispersed ownership, 25,627 for public firms owned by large blockholders), and 206,870 for private firms. In our data set, those public firms with dispersed ownership have the lowest average ROA (−2.0%); those owned by large blockholders have an average ROA of 0.6%, and all public firms have an average ROA of −0.4%; the mean ROA for private firms is 5.7%.² Table 1 also gives average firm size in total assets for each ownership form. The value assigned to private firms is on average smaller (453 million Euro) than that of public firms (1,729 million Euro), but among public firms, those owned by large blockholders are smaller (1,375 million Euro) than those with dispersed ownership (2,330 million Euro).

² To test whether differences in ROA originated from industry distributions of ownership forms, we estimated a regression of ROA on different forms of ownership, with each represented by a dummy variable. The intercept of this regression is 0.63 ($p < .001$), the coefficient for private firms is 5.04 ($p < .001$), while for public firms with dispersed owners it is −2.66 ($p < .001$) and for public firms with blockholders it is zero. These coefficients represent the extent to which the mean of each form of ownership differs from the intercept (e.g., the coefficient for public firms with blockholders is zero, making the mean ROA for this ownership form equal to the intercept). We ran the same analysis, controlling for industry; the individual coefficient of this regression represents the difference between ownership forms beyond that which can be explained by the industry distribution of ownership forms. The coefficients for this regression were as follows: 4.67 ($p < .001$) for private firms, −1.87 ($p < .001$) for public firms with dispersed ownership, and zero for public firms owned by blockholders. Thus, even after controlling for industry, the difference in ROA between different forms of ownership remains.

To provide additional information about the composition of the data set, we calculated descriptive statistics for each SIC code, as shown in Appendix. In order to save space, this table presents two-digit SIC codes rather than three-digit codes. Most of the firms in each industry are private firms, which is not unexpected since most firms found in our sample countries are privately held. We then calculated the percentage of observations for private firms and public firms that fell into a given two-digit SIC code. For most industries, the difference between these percentages was less than 2%. However, we found private firms to be over represented in SIC 50 and 51 (Wholesale Trade-Durable Goods and Wholesale Trade-Non-Durable Goods), while public firms are over represented in SIC 27 (Printing and Publishing) in SIC 73 (Business Services) and in SIC 87 (Engineering, Accounting, Research, Management, and Related Services). We run a sensitivity analysis that excluded these industries and found that results to be similar to those in our main analysis.

Analytical Approach

To estimate the ownership form effect, we used a variance decomposition analysis. This method is often employed to estimate the proportion of variance in a dependent variable that can be attributed to certain categories commonly called effects. These may include the industry to which firms belong, or as in our case, forms of ownership. Following prior variance decomposition research (McGahan & Porter, 1997; McGahan & Victor, 2010; Rumelt, 1991), we took ROA as our measure of firm performance, which served as the dependent variable in our study. As in previous studies, we assessed the importance of firm, industry, and year effects, including ownership form as an additional effect. We followed McGahan and Porter (2002), and Ma et al. (2013), and used a simultaneous ANOVA approach to determine the size of individual classes of effects. Specifically, we estimate the following equation:

$$ROA_{o,y} = \mu + \alpha_y + \beta_f + \delta_c + \gamma_i + \tau_o + \varepsilon_{o,y}. \quad (1)$$

The dependent variable $ROA_{o,y}$ denotes the return on assets of firm o in year y . On the right-hand side, the first term μ is a constant equal to the grand mean. The term α_y represents the *Year* effect, or the extent to which the variance in ROA can be explained by changes in the general economic conditions, as they

Table 1
Descriptive Statistics

Ownership form	Number of observations	Mean ROA	ROA standard deviation	Size (total assets in Mil Euro)	Size standard deviation
All firms	247,602	4.67	14.55	663	6,315
Private firms	206,870	5.67	13.27	453	4,853
Public firms	40,732	−0.35	19.02	1,729	11,008
Public firms with dispersed ownership	15,105	−2.03	21.09	2,330	12,121
Public firms with large blockholders	25,627	0.63	17.62	1,375	10,279

vary from year to year. The *Ownership form* effect is depicted by β_f , which denotes the portion of the variance in ROA that can be attributed to the different forms of ownership (legal type of incorporation as provided by Bureau van Dijk) for firms in the data set. The term δ_c represents the country effect, which we included as a control variable following recent variance decomposition studies which showed that country influences variance in firm performance (e.g., Makino et al., 2004). The *Industry* effect, or the portion of the variance in ROA attributable to the industries in which firms in our sample operate, is captured by γ_i (firms are assigned to an industry based on their three-digit SIC codes as provided by Bureau van Dijk). *Firm effect*, or the portion of variance in ROA that can be attributed to the differences among the firms themselves, is captured by τ_o , and $\varepsilon_{o,y}$ stands for the residual.

All effects are represented by sets of dummy variables. The size of a specific effect is determined by measuring how much the inclusion of the set of dummies representing an effect increases the explained variance (R^2) in the simultaneous ANOVA model (Ma et al., 2013; Mackey, 2008; McGahan & Porter, 2002). Some studies have examined the origins of firm performance using a nested ANOVA or variance components technique, methods that rely on certain restrictive assumptions. A nested ANOVA assumes that no covariance exists between individual effects. Similarly, the variance components technique is based on a random-effects model, which assumes that each individual effect is independent of the other effects in the model. We addressed these shortcomings by utilizing the simultaneous ANOVA approach taken by McGahan and Porter (2002).

Since our data represent a time series, we also controlled for the possibility of first-order serial

correlation, or the effect that performance in year $t-1$ can have on performance in year t . We follow McGahan and Porter (1997), and Fitza et al. (2009), and used the residual of Equation (1) in the following equation:

$$\varepsilon_{o,y} = \rho \varepsilon_{o,y-1} + v_i, r. \quad (2)$$

With serial correlation, the value of the error term ($\varepsilon_{o,y}$) in the current period is not independent of the value of the error term in the previous period ($\varepsilon_{o,y-1}$). We used Equation (2) to determine the value of ρ (the rate of persistence). We then calculated a null model that assumes that firm performance is determined only by the rate of persistence and the economic mean, and restricts the year, industry, ownership form, and firm effects to zero. Individual effects are then estimated by regressing the residual of this null model on a set of dummies representing all effects (year, ownership form, country, industry, and firm effects).

Because of the data set's size, we were unable to conduct the analysis on the complete data set due to computational constraints.³ Instead, we follow Roquebert et al. (1996), and employ a random sampling procedure. We drew five subsamples, each containing 20% of the firms in our data set, and averaged the results for each sample (see also Fitza, 2014).

³ Our complete data set had 247,602 observations and 30,525 firms. Measuring the firm effect requires the inclusion of a dummy variable for each firm (classification variables). Estimating a data set with such a large number of independent variables is computationally demanding. As a result, statistical packages tend to place limits on the number of independent variables, which may be estimated (e.g., Stata limits them to 10,998).

Table 2
Results of Main Analysis (in Percent)

Effect	Results without serial correlation correction	Results, with serial correlation correction
Year effect	0.4	0.6
Country effect	1.1	1.0
Ownership form effect	4.1	3.9
Industry effect	4.5	4.1
Firm effect	45.8	40.2
Total variance explained:	55.9	49.8

Note. All effects are significant at the 0.001 level, except the year effects that are significant at the 0.05 level.

Results

Results are summarized in Table 2, and compared with the results of previous studies in Table 3. Our results are corrected for serial correlation (McGahan & Porter, 2002); the value for ρ (the rate of persistence) is 0.19. Table 3 contains both corrected and noncorrected effects. The corrected year effect accounts for 0.6% of the variance in firm performance, the corrected ownership form effect accounts for 4.1%, the corrected country effect accounts for 1.0%,⁴ the corrected industry effect accounts for 4.1%, and the corrected firm effect accounts for 40.2%. The magnitude of the ownership form effect is small compared to the firm effect, but slightly larger than the industry effect. This suggests that ownership form is an important factor additionally influencing variance in performance across firms.

To examine the degree to which all effects of interest vary among ownership forms, we separately calculated the variance explained by each effect of interest for each form of ownership (classified as private firms, public firms with dispersed ownership, and public firms with blockholders, based on the degree of independence, as noted above). One

way to do this is splitting the sample into subsamples, each representing a different form of ownership. However, comparing effects across such subsamples may be problematic since the estimation is affected by the size of the subsample (Fitza, 2014). We therefore estimated effect sizes for each ownership form within the context of the complete sample after correcting for serial correlation. For example, to assess the effects on private firms, we estimated Equation (1) for the entire data set and saved the residual. We then used the residual of only those observations representing private firms in order to estimate the size of our effects of interest for private firms. This allowed us to measure the effects of interest for each ownership form subgroup within the context of the complete model.⁵ To test whether these effects differed significantly between ownership forms, we calculated a 95% confidence interval for each of our results. This allowed us to evaluate whether an effect (e.g., industry effect) for one ownership form differed significantly (at the $p < .05$ level) from other ownership forms (Cohen et al., 2003). We analyzed those public firms owned by blockholders and those with dispersed ownership as well as private firms. To render our results comparable to past studies focused on public firms, we also conducted an analysis of all public firms in our data set. Table 4 summarizes the effects within each form of ownership.

As shown in Table 4, industry and firm effects vary substantially among different forms of ownership. The industry effects for public firms with dispersed ownership, public firms with large blockholders and private firms are all significantly different from each other at the 0.05 level. Privately owned firms registered the smallest industry effect (2.8%), while publicly listed firms registered an industry effect of 8.2%. Industry effects for public firms with dispersed ownership and with large ownership blocks were 9.4 and 5.7%, respectively.

Private enterprises showed the smallest industry effect, but registered the largest firm effect at 41.2%. The firm effect was 38.3% for all public firms, 37.8% for public firms with dispersed ownership, and 39.2% for public firms with blockholders. The firm effects for private firms differed from the firm effects of all other ownership forms at $p < .05$, while the difference between both types of public firm was significant at $p < .1$.

⁵ We would like to thank the editor for suggesting this methodological approach.

⁴ Makino et al. (2004) found a much larger country effect of 5.6%. However, they estimate the effect of country on firm performance in a sample of foreign affiliates of Japanese corporations across a large set of countries. Thus, their country effect cannot be directly compared to our country effect. In addition, the relatively small country effect we find might be due to the fact that country differences between the European Union members are less pronounced than the country differences in the Makino sample, which included developing as well as developed countries.

Table 3
Results of this Study Compared to Previous Studies Utilizing Similar Approaches (in Percent)

Effect	Our results ^a	Our results, all public firms ^a	Rumelt (1991) ^b	Roquebert et al. (1996) ^c	McGahan and Porter (1997) ^d	McGahan and Porter (2002) ^e	Makino et al. (2004) ^f
Year effect	0.6	0.8	na	2.3	0.3	0.4	0.1
Ownership form effect	4.9	na	na	na	na	na	na
Country effect	1.0	1.1	na	na	na	na	5.5 ^g
Industry effect	4.1	8.2	8.3	10.2	9.4	10.3	6.9
Corporate effect	na	na	0.8	17.9	9.1	11.6	10.8
Business unit effect or firm effect for our study ^h	40.2	38.2	46.4	37.1	35.1	36.0	31.4

^a Results, with serial correlation correction. All effects are significant at the 0.001 level, except the year effects that are significant at the 0.05 level.

^b Components of variance technique, US firms (Sample A in Table 3 in Rumelt, 1991).

^c Nested ANOVA, US firms (Table 4 in Roquebert et al., 1996).

^d Nested ANOVA, US firms (Table 5A in McGahan & Porter, 1997).

^e Simultaneous ANOVA, US firms (Table 4 in McGahan & Porter, 2002).

^f Components of variance technique, (Model 1, Table 2 in Makino et al., 2004).

^g Makino et al. measure the country effect in a sample of subsidiaries of Japanese firms in different countries. This does not directly compare to our country effect.

^h Corporate and business unit effects are not separated in our study.

Table 4
Effect Size by Ownership Form (in Percent)

Effect	Private	All public firms	Public, dispersed ownership	Public, with large blockholders
Year effect	0.5	0.9	0.6	1.1
Country effect	0.9	1.1	1.2	0.9
Industry effect	2.8	8.2	9.4	5.7
Firm effect	41.2	38.3	37.8	39.2

Notes. All effects are significant at the 0.001 level, except the year effect, which is significant at 0.05 for all groups. All industry effects are significantly different from each other at least at the 0.05 level. The firm effects for private firms is significantly different from the firm effect of all types of public firms at least the 0.05 level. The firm effect for public firms with dispersed ownership and public firms with large blockholders are significantly different from each other at the 0.1 level.

Sensitivity Analyses

Industry measurement. Our main analysis employed three-digit SIC codes in order to identify which industry a firm belongs to (three-digit SIC codes are the maximum resolution provided by Bureau van Dijk). To check whether results were robust across industry specifications, we also conducted an analysis using two-digit SIC codes, which yielded similar results.

Definition of blockholders. In our main analysis, we followed Bureau van Dijk in defining a firm as independent (dispersed owners) if no single shareholder hold more than 25% of a firm's shares. To check whether our results are driven by this choice, we also estimated our model using 50%

as a blockholder threshold, which resulted in effect sizes close to that of our main analysis.

Firm size. As shown in Table 1, we found substantial differences in firm size between different ownership forms. To test whether results are driven by firm size, we ran an additional analysis: We added total assets as a control in our main model (see McGahan and Victor [2010] for how to use control variables in variance decomposition analyses), which led to results similar to our main analysis.

Sensitivity to estimation method. Recent studies have used hierarchical linear modeling (HLM) to estimate effect sizes in variance decomposition studies (Misangyi et al., 2006; Short et al., 2007). HLM is beneficial if the effect of interest is nested in a clear hierarchical structure. However, such a clear

hierarchical structure does not exist in our data. Although firms are nested within industries, they are also nested within ownership forms. However, in order to validate our selected estimation method, we completed an HLM analysis of a subsample of public firms. This allowed us to compare our results with those of Misangyi et al. (2006), who used HLM to estimate similar effects in a sample of U.S. public firms. Although our samples differed (EU vs. U.S. firms), the results were comparable in magnitude.

Endogeneity. Based on a firm's features or attributes, founders and owners of firms may decide their ownership form. This potential choice raises the possibility of endogeneity bias for any sample that is used to investigate performance variance in a population with different forms of ownership.⁶ To examine the influence of endogeneity, we analyzed a subset of firms changing their ownership form. Although theoretically all firms may change their form of ownership, in practice this is quite rare. Perhaps the most common change occurs when a private firm undergoes an initial public offering (IPO). We used the SDC New Issues database by Thomson Financials to identify such firms. This resulted in 4,934 observations (based on a SEDOL number match). For this subset, we estimated year, firm, and industry effects before and after the IPO. Our main argument is that industry and firm effects differ, depending on ownership form. If firms systematically choose a different ownership form, the change from private to public should not result in a change of industry and firm effect for these subsamples. However, we found that industry and firm effects in this subsample changed after the firms went through an IPO in ways that are consistent with our main results. Industry effect increased while firm effect decreased. Thus, the results of this subsample showed a pattern similar to our main sample.

Sample. To test whether our results were driven by choosing an EU sample, we conducted an analysis of the entire Amadeus Database provided by Bureau van Dijk, which contains data from 43 European countries (EU members as well as

nonmembers). The ownership form effect in this larger sample was 5.1%.

Industry * ownership type interaction. Since ownership form could be affected by industry to some degree (as the Appendix suggests, the prevalence of certain ownership forms differ between industries), we also conducted an analysis in which we included an interaction effect between industry and ownership form in our main model. We found this interaction effect to be 4.1%, after controlling for serial correlation. The size of this interaction indicates the degree to which the ownership form effect is moderated by the industry effect, but it also shows how much the industry effect is moderated by form of ownership. Given these two possible interpretations of the same interaction, it is difficult to draw conclusion from the effect size. Rather, we used our split-sample approach to investigate the second aspect in greater detail. However, investigating the first interpretation might be an interesting avenue for future research.

Institutional context. We analyzed all effects on a sample of European Union countries. Owing to their membership in the EU, institutional contexts within these countries are similar. However, in order to investigate if the ownership form effect depends on the country or if the institutional differences between the countries in our sample moderate the ownership form effect, we also estimated an ownership form country interaction. This size of this effect is only 0.39% which suggests that the variance in performance among firms with different ownership forms is not attributable to institutional differences in our sample.

We also estimated results for each of the four largest countries in our data set (France, Germany, Italy, United Kingdom) to evaluate if the overall differences we find between different ownership forms can also be found within each of these countries. We only ran this analysis for the four largest countries as smaller countries did not have a sufficient number of observations for each ownership form. The results of these additional analyses are shown in Table 5. The results of these additional analyses show a similar pattern to our main analysis.

Discussion and Conclusions

This study extends previous research on the origins of variance in firm performance (e.g., Fitza

⁶ We would add that endogeneity is common across many variance decomposition studies. For example, based on their attributes, firms may choose the regions in which to locate; corporations choose the industry in which to become active; business units are chosen by corporations through mergers and acquisitions, and so on. However, endogeneity is usually not considered in variance decomposition analysis as such studies usually estimate how the performance of certain firm populations differs (in different industries, etc.), not why firms belong to certain populations.

Table 5
Effect Size by Ownership Form for the Four Largest EU Countries (in Percent)

	All firms	Private	All public firms	Public, dispersed ownership	Public, with large blockholders
France					
Year effect	0.5	0.2a	1.0	1.0	0.9
Ownership form effect	2.3				
Industry effect	4.9	3.3	7.8	11.6	5.1
Firm effect	46.0	49.3	41.1	38.2	42.1
Germany					
Year effect	0.7	0.6	1.0	0.8	1.1
Ownership form effect	3.2				
Industry effect	6.6	5.9	7.3	7.6	6.4
Firm effect	42.1	45.6	34.8	31.3	36.4
Italy					
Year effect	1.0	0.9	1.4	0.8	1.6
Ownership form effect	1.9				
Industry effect	7.3	5.9	15.5	19.0	10.1
Firm effect	41.3	42.9	33.2	29.6	33.7
United Kingdom					
Year effect	0.4	0.3a	0.4	0.5	0.3a
Ownership form effect	6.3				
Industry effect	2.4	1.6	5.1	5.9	2.0
Firm effect	36.6	37.0	38.9	38.1	39.7

Note. All effects are significant at the 0.05 level, except the year effect marked with an a.

et al., 2009; Hawawini et al., 2003; McGahan & Porter, 2002; Misangyi et al., 2006), by examining the effect of ownership form. By doing so, we respond to calls in the broader strategy literature to better understand the ways ownership influence performance of firms (Connelly, Tihanyi, Certo, & Hitt, 2010b; McGahan & Porter, 2002).

In a large sample of EU firms with different ownership arrangements, operating over a 13-year period, we find ownership form to be an important explanatory factor for performance differences across firms. In fact, in our study, the ownership form effect has a greater magnitude than the industry effect and it is also greater than the country effect. These results have important implications. First, they indicate that relative to other factors, the effect of ownership form is consequential for firm performance, which justifies the attention of a wider range of research streams within strategic management. Conceptualizing the antecedents of firm performance as either indicators of adaptation to industry factors or the exploitation of internal capabilities by firms may downplay the intrinsic differences among firms based on their ownership forms. Our results not only show that performance

variance among firms is in part attributable to ownership form, but they demonstrate that firm and industry factors affect performance differently depending on ownership form, that is, public vs. private firms. Since most previous variance decomposition research was conducted on public firms, our findings shed light on whether past studies are generalizable to more diverse firm populations.

Second, estimating the level at which firm ownership affects performance contributes to the literature on firm ownership—a growing body of literature that has analyzed the differences across a wide range of owners. Previous studies, for example, have provided a better understanding of the preferences and behavior of different owners, including their trading behavior and shareholding preferences (Connelly et al., 2010b; Hoskisson et al., 2002). Moreover, studies have shown how the preferences of owners can shape the strategies of firms and how these preferences can influence firm performance (Carney et al., 2015; Dharwadkar et al., 2008; Tihanyi et al., 2003). Empirical evidence on the extent to which performance of private firms and publicly listed firms varies may generate new interest in understanding the performance consequences of the ways firms are owned.

Finally, by analyzing firm performance in a broader context that includes private firms in addition to public firms, we find smaller industry effects than the effects reported in past research using samples of public firms alone. Even though previous studies have reported larger industry effects than our overall findings (e.g., Makino et al., 2004; McGahan & Porter, 2002; Roquebert et al., 1996; Rumelt, 1991), their results are comparable to the industry effect found in our subsample of public firms.⁷ This suggests that industry effects have been overestimated in past studies using only public firms.⁸ However, similar to the results of previous studies, we found that the largest part of the variance in firm performance can be attributed to effects internal to the firm. These findings are consistent with the RBV, which postulates that performance differences result from the heterogeneous distribution of critical resources among competitors (e.g., Barney, 1991; Hatten & Hatten, 1987; Wernerfelt, 1984).

Our results do not undermine the importance of industry factors advocated by IO economists, but rather they suggest that industry factors differ for public firms compared to a general population including privately held firms. Scholars have emphasized that some industries require different strategies (e.g., Covin & Slevin, 2006; Huff, 1982) and that different ownership forms are more or less beneficial, depending on the industry in which firms operate. Thus, firms in certain industries may benefit differently from their ownership form as they develop operating strategies.

Results of our subsample analysis are also consistent with the core assumption of IO economics, suggesting that a firm's competitive environment affects its performance. However, our results show that the ownership form of a firm affects the extent to which a firm is exposed to the general competitive

conditions in a given industry. We expected (and found) that private ownership with its ability for firms to use more secrecy and its unique governance system, may enable private firms to mitigate some effects of industry environment on their performance, but that public firms are more exposed.

Our subsample analysis also indicates that private firms demonstrate the largest firm effects (41.2%), while public firms with dispersed ownership exhibit the smallest firm effect (37.8%). This suggests that private firms are more different from each other than public firms are. These results confirm our theoretical arguments that private ownership allows firms to pursue a wider range of resources and enact more heterogeneous strategies than public firms.

We analyzed public firms with dispersed ownership as well as those owned by large blockholders, and suggested that the latter share some features of public firms with more dispersed shareholders and other features of private firms. On one hand, they are exposed to the same regulations as all public firms, which, for example, demand a certain level of transparency. On the other hand, they share certain governance features with private firms, for example, an ownership structure that lends itself to direct monitoring of management; and blockholders of different firms, such as families or governments, may be more diverse in their goal functions. Thus, we argue that the population of public firms with large blockholders has industry and firm effects that are in between those of public firms with dispersed owners and private firms.

Our results confirm these arguments. They also show the differences in the industry and firm effects are largest between private firms and all types of public firms. However, such differences were less pronounced in the two types of public firms we studied. Past studies have suggested that ownership structure has a limited effect on firm performance. Our results support these findings to some degree. We find greater variation in firm and industry effects between the public and private ownership forms than between firms with different ownership structures. This suggests there may be value in extending ownership research beyond ownership structure in public firms.

Our findings also have practical implications. The relationship between firm ownership and performance signifies change of ownership form as a meaningful management strategy. Such changes tend to be rare events, used in exceptional circumstances such as obtaining new capital (e.g., an

⁷ Our methodology is similar to those studies, using data based on firms from the European Union, whereas most studies have used U.S. data.

⁸ Due to data restrictions, we were only able to measure industry effect based on three-digit SIC codes. Some studies have used four-digit SIC codes, which may result in slightly larger industry effects, but our analysis of public firms showed industry effects of similar size to those in past studies. This suggests that even though our three-digit industry definition may depress industry effect slightly, this seems to be a relatively small problem as our approach generally replicates past results. It was only when we included other ownership forms that the measured industry effect became markedly smaller. This suggests that the smaller industry effect is not an artifact of our analysis, but a feature of any sample that contains more than just private firms.

IPO) or addressing crises (e.g., buyouts and sell-offs). But the magnitude of ownership effect in firm performance suggests that managers may achieve improvements by modifying form of ownership or by finding the “right owners” for their firms.

Another practical implication involves changes in business education concerning the role of owners in the life of firms. Whereas understanding customer preferences, competitive dynamics, and the development of firm capabilities continue to be important, learning about owner preferences and how to implement effective ownership changes may improve business performance. Last, these results have implications for government policy. Although private firms tend to represent large firm populations, the operation of public firms has been the subject of extensive government regulations in many countries, leading to a possible “liability of publicness.” The difference in performance between these populations may partly result from the overregulation of public firms and underregulation of private firms. Thus, governments may want to use a balanced approach in providing business opportunities for firms with different ownership arrangements.

As most studies, ours is not without limitations, some of which may provide opportunities for future research. First, as in all variance decomposition studies, our study does not examine why the individual effects are a particular size. Instead, variance decomposition studies can emphasize that a certain effect is large enough to warrant future research. Second, unlike in some past studies, corporate and business unit effects are indistinguishable in our study due to data limitations. However, as we have argued, the origins of this literature stream stem from a debate between IO economics and RBV about what matters more for firm performance, industry environment or firm idiosyncrasies. Since corporate and business unit effects are both examples of the latter, they are captured by the firm effects measured by our study. In addition, because we do not have business unit data, we use the industry membership of the firm as defined by Bureau van Dijk to calculate the industry effect. This may introduce some measurement errors since certain firms are active in a wide spectrum of industries and Bureau van Dijk only reports the major industry for each firm.

Third, our different ownership form subsamples are of different sizes; as a result, performance might be more systematically dispersed in the larger subsamples. This may explain to some degree the larger

firm effect we found in private firms. However, our complete sample should show an even more systematic performance dispersion than our private firm sample, yet for that sample, the firm effect is smaller.

Finally, the ownership forms in our study include the most common legal arrangements found in EU countries that also characterize other developed market economies, including the United States. However, some firms around the world operate with ownership forms that differ from the dominant forms in either the European Union or the United States. For example, under certain conditions, firms may be owned by business groups, including Keiretsus, Chaebols, and Grupos. Furthermore, firms in countries with various forms of state capitalism can be partly or fully owned by the state. There may be an opportunity for future researcher to examine the performance implications of such ownership arrangements.

In conclusion, by showing that ownership arrangements matter for firm performance, our study contributes an important source of variance in firm performance to an established literature stream in strategic management as well as empirical evidence to a growing literature on the strategic implications of firm ownership. Although significant progress has been made in the field by studying public firms, our results suggest that additional value lies in investigating the strategies and performance of different firm populations and in examining some of the established constructs of our field in different ownership contexts. The results of this study indicate that firms may differ not only in their resources, but also in the extent that forms of ownership allow them to manage those resources. We hope the results of this study will generate new research into the effectiveness of ownership arrangements under various conditions and in the context of different strategies—for example, how changes in forms of ownership facilitate acquisitions, divestments, and international diversification strategies as well as influence firm performance.

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Appendix A:

Average Profitability of Firms and Number of Observations by Two-digit SIC^a Industry and Ownership Forms

SIC	SIC	All firms		Private firms		Public firms		Public firms with dispersed ownership		Public firms with large blockholders	
2D	Abbreviated description	No.	ROA	No.	ROA	No.	ROA	No.	ROA	No.	ROA
1	Agricultural production	441	6.4	374	7.4	67	3.2	8	4.2	59	3.1
2	Livestock and animal	564	4.2	449	5.5	115	−0.8	40	−0.7	75	−0.8
7	Agricultural services	367	6.1	310	7.5	57	−1.3	17	2.7	40	3.5
8	Forestry	149	4	139	3.3	10	14.7	–	–	10	14.7
9	Fishing, hunting	59	5.9	47	6.4	12	4.4	–	–	12	4.4
10	Metal mining	595	−1	219	6.6	376	−8.8	195	−8.7	181	−8.8
12	Coal mining	158	−1.8	88	2.4	70	−7.5	24	−9.4	46	−5.4
13	Oil and gas extraction	3,378	8.4	2,764	12.2	614	−7.6	395	−8.4	219	−6
14	Mining and quarrying of nonmetallic minerals	1,002	−2.5	435	4.5	567	−10.1	309	−10.2	258	−10
15	Building construction	9,241	2.5	7,582	3.2	1,659	0.5	646	1.4	1,013	−0.1
16	Heavy construction	2,370	4	2,130	4.4	240	3.5	20	3.8	220	3.4
17	Construction special trade contractors	2,926	5.3	2,517	6	409	2.4	148	1	261	3.2
20	Food	11,022	5.6	9,512	5.9	1,510	4.6	388	5.1	1,122	4.5
21	Tobacco products	369	12.9	329	12.9	40	12.6	20	12.2	20	13.1
22	Textile mill products	1,110	3.1	658	4.6	452	0.1	90	3.3	362	−0.6
23	Apparel	1,044	8.1	720	10.3	324	3.5	42	3.9	282	3.5
24	Lumber and wood products	1,223	2.4	1,043	2.8	180	0.4	34	−4.8	146	1.6
25	Furniture and fixtures	559	3.8	293	5.4	266	1.9	70	9.2	196	−0.7
26	Paper	2,873	3.9	2,428	4.1	445	2	122	5.8	323	0.6
27	Printing, publishing	4,154	4	2,380	6	1,774	1	594	2.4	1,180	0.3
28	Chemicals	9,668	6.7	7,974	7.8	1,694	0.4	639	−1.4	1,055	1.5
29	Petroleum refining and related industries	949	5.4	772	6	177	2.9	21	5.3	156	5.4
30	Miscellaneous plastics products	2,472	6	1,956	5.9	516	4.2	179	5.5	337	3.5
31	Leather and leather products	155	11.6	131	13.5	24	11.2	–	–	24	11.2
32	Stone, clay, glass, and concrete products	2,566	5.8	1,860	6.8	706	4.4	194	3.4	512	4.7
33	Primary metal industries	3,726	3.8	3,204	4.1	522	0.6	161	−1.5	361	1.6
34	Fabricated metal products	4,282	6.2	3,655	7.2	627	2.6	182	3.5	445	2.3
35	Industrial and commercial machinery	7,970	6.3	6,123	7.1	1,847	4	651	3.4	1,196	4.3
36	Electronic, except computer equipment	5,785	4.2	4,288	5.6	1,497	−0.7	733	−2.6	764	1.1
37	Transportation equipment	4,720	2.4	4,144	2.6	576	0.7	152	2.8	424	–
38	Measuring, analyzing, and controlling	2,534	6	1,682	9.8	852	−3.2	488	−4.2	364	−1.9
39	Miscellaneous manufacturing industries	1,267	6.5	1,004	7.5	263	5	61	7.5	202	4.2
40	Railroad transportation	568	3.6	538	3.9	30	4.8	10	8.2	20	3.2
41	Local and suburban transit	2,167	0.8	2,014	1.6	153	−0.2	20	4	133	−0.9

Appendix A: Continued

SIC	SIC	All firms		Private firms		Public firms		Public firms with dispersed ownership		Public firms with large blockholders	
2D	Abbreviated description	No.	ROA	No.	ROA	No.	ROA	No.	ROA	No.	ROA
42	Freight transportation and warehousing	2,367	4.8	2,229	5	138	4.4	76	4.7	62	4.1
43	Postal services	451	6.7	371	7.2	80	7.8	30	6	50	8.9
44	Water transportation	2,504	4.7	2,049	5.3	455	1.9	97	4.8	358	1.1
45	Transportation by air	1,672	2.9	1,437	2.8	235	4.3	59	4.5	176	4.2
46	Pipelines, excluding natural gas	246	11.3	206	11.9	40	9.1	20	11.6	20	6.6
47	Transportation services	3,968	5	3,660	5	308	5.3	50	1.8	258	6
48	Communications	3,800	2.6	2,786	3.5	1,014	1.5	471	0.8	543	2.2
49	Electric, gas, and sanitary services	11,152	3.9	9,874	4	1,278	2.1	218	2.1	1,060	2.1
50	Wholesale trade-durable goods	28,753	5.6	26,555	5.8	2,198	2.9	716	2.1	1,482	3.3
51	Wholesale trade-non-durable goods	18,906	7	17,733	7.8	1,173	0.2	388	1.2	785	−0.2
52	Building materials, hardware, garden supply	541	5	423	5.5	118	5.5	50	8.9	68	3.1
53	General merchandise stores	983	6.3	868	6.1	115	10.6	76	9.3	39	3.4
54	Food stores	2,690	5.8	2,572	6.6	118	6	78	3.5	40	8.8
55	Automotive dealers and gasoline service stations	1,483	4	1,440	4.3	43	−1.6	18	0.8	25	−3.3
56	Apparel and accessory stores	2,216	10.1	1,944	10.7	272	4.7	59	0.8	213	5.8
57	Home furniture, and equipment stores	1,122	5.3	970	5.6	152	1	38	−3.3	114	2.5
58	Eating and drinking places	2,083	4.7	1,824	5	259	2.3	138	1.8	121	3
59	Miscellaneous retail	3,502	6.7	3,074	7.1	428	4.8	134	7.5	294	3.5
70	Hotels and other lodging places	1,722	1.5	1,390	1.4	332	2.6	73	2.2	259	2.7
72	Personal services	2,465	5.2	2,161	6.2	304	−1.3	121	−4.8	183	1.1
73	Business services	31,981	4.3	25,520	5.4	6,461	0.3	2,510	−0.3	3,951	0.7
75	Automotive repair, services, and parking	1,569	2.3	1,445	2.6	124	0.6	23	2.2	101	0.3
76	Miscellaneous repair services	652	4.9	622	5.4	30	−2.6	—	—	30	−2.6
78	Motion pictures	1,285	1.7	913	5.6	372	−7.5	54	−9.1	318	−5.5
79	Amusement and recreation services	2,181	3.4	1,628	4.8	553	1.5	225	0.6	328	2.1
80	Health services	5,251	2.6	4,913	2.7	338	−0.5	144	3.3	194	−3.2
81	Legal services	206	4.8	194	8.6	12	−5.6	10	5.1	2	−5.9
82	Educational services	832	7.1	701	8.3	131	−0.1	86	2.8	45	−5.5
83	Social services	1,619	3.5	1,545	3.6	74	2.7	—	—	74	2.7
84	Museums, art galleries	56	2	15	4.7	41	1.1	15	0.3	26	1.5
86	Membership organizations	185	1.1	185	0.8	—	—	—	—	—	—
87	Engineering, accounting, research, management, and related services	16,668	1.4	11,803	5.1	4,865	−10.7	2,475	−14.1	2,390	−7.3
88	Domestic services	58	5.4	58	5.4	—	—	—	—	—	—

^aAlthough three-digit SIC codes were used in the analysis, in order to save space, this table lists two-digit SIC industries.