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Size management by European private firms to minimize proprietary costs of disclosure*

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ABSTRACT

We examine size management by European private firms for which disclosure requirements increase at size thresholds. Our estimates suggest at least 8% of firms near thresholds that impose income statement disclosure manage size downward, and the average firm that manages size sacrifices more than 6% of its assets. We find that multiple determinants of proprietary costs predict this behavior, and that size management to avoid mandatory audits, which are similarly imposed at size thresholds, is of comparable magnitude. Our results triangulate the economic significance of proprietary costs in a setting largely without confounding capital market, agency, or compliance costs.

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1. Introduction

Proprietary costs occur when disclosures reveal commercially sensitive information that is exploited by competitors to the detriment of the firm. These costs are fundamental in theory (e.g., Verrecchia, 1983). Yet their empirical importance remains an open question (e.g., Lang and Sul, 2014; Bens et al., 2011; Berger, 2011; Beyer et al., 2010; Berger and Hann, 2007).

While the literature relates several firm and industry characteristics to decisions to withhold specific disclosures (e.g., Bernard, 2016; Ellis et al., 2012; Dedman and Lennox, 2009; Wang, 2007; Verrecchia and Weber, 2006), inferences about economic significance are limited.

Proprietary costs of disclosure are rarely observable, so it is seldom possible to directly estimate them. Inferring their scope and magnitude based on the cost incurred to avoid disclosure is also challenging. In most settings, the cost of avoidance is either very low or hard to estimate.

Moreover, the relations studied typically capture proprietary costs pertaining only to a specific disclosure (such as segment information) and a specific firm characteristic (such as profitability) and do not address costs associated with more general financial statement information. Given these limitations, it is unclear whether proprietary costs matter only in the context of highly specific disclosures (and then are only of marginal importance) or are a key friction for general financial disclosure decisions.

This paper provides evidence on the economic significance of proprietary costs of general financial statement disclosures. We examine private firms in Europe, where nearly all countries require limited liability firms to publicly disclose financial statement information but where firm size determines the extent of mandated disclosure. For the smallest firms, the requirements are typically minimal, but for larger firms that exceed bright-line thresholds, they can be substantial. Size thresholds similarly determine audit requirements: the smallest firms are generally exempt, but those exceeding bright-line size thresholds must have external audits (e.g., Kausar et al.,

2016). Thus firms are likely to manage size downward whenever these mandates impose costs that exceed the costs of size management.¹

This setting allows us to identify the source of costs incurred to avoid disclosure and audit requirements and examine the magnitude and scope of these costs. Discontinuities in otherwise smooth distributions of size classification variables (total assets, sales, and number of employees) provide evidence of size management and allow us to construct estimates of its pervasiveness. Because the thresholds that impose disclosure and audit requirements that are based on the same size variables do not always coincide, we can separately identify and compare evidence of size management due to disclosure versus audit costs. Analogously, because different countries impose different disclosure requirements, we can separately identify and compare evidence of size management to avoid disclosure of information from the income statement, the cash flow statement, and other disclosures. In the spirit of similar analyses in the economics literature (e.g., Kleven and Waseem, 2013), we can also estimate the amount of growth sacrificed to manage size downward and avoid disclosure requirements. Based on estimates of costs of size management in the literature, we illustrate how to translate these amounts into costs as a proportion of income.

The European private firm setting also allows us to sidestep many of the endogeneity concerns that bedevil the literature on proprietary costs (e.g., Shroff, 2016; Lang and Sul, 2014; Berger, 2011). Compliance costs, agency costs, and capital market incentives are often important determinants of public disclosure but are largely absent in our setting. European private firms, regardless of size, generally must prepare full accounts for shareholders and tax authorities, so incremental compliance costs imposed by additional public disclosure are de minimis. Because these firms generally have concentrated ownership and banks and other counterparties have

¹ Size management tactics impose financial and operational costs, such as the fees to factor receivables (to manage assets) or the premia to pay overtime (to manage employee count). We discuss these tactics in Section 2.2.

alternative access to their accounts and other information through private channels (Kaya, 2010; Dedman and Lennox, 2009), the effects of public disclosure on agency costs, such as perquisite consumption, are minimal. Finally, because these firms are private and rarely have imminent plans to go public, capital market incentives are essentially zero. To rule out most other endogeneity concerns, we rely on another novel characteristic of the institutional setting—staggered shifts in the levels of the size thresholds set by regulators across countries. In essence, shifts in the thresholds over time allow us to identify the evidence of size management relative to the “normal” shapes of the distributions and validate that the evidence of size management shifts in conjunction with shifts in the threshold levels. Together, our setting and empirical design help isolate the role of proprietary costs and make it unlikely that the evidence can be attributed to factors other than disclosure and audit requirements imposed at the thresholds.

To conduct the empirical tests, we draw data on private limited liability firms in 12 European countries from the Bureau van Dijk database Amadeus. These countries make up the vast majority of economic activity in Europe, have high levels of data availability, and impose disclosure and external audit requirements at size thresholds, which we identify by manual search. We use the location of an observation immediately below (versus above) the size threshold as a proxy for size management and then model size management as a function of the disclosure and audit requirements imposed. The results show that size management is common and relates significantly to both public disclosure and audit requirements, findings that are robust to a number of alternative research design choices.

We then refine the analysis to differentiate the effect of income statement disclosure from the effects of other disclosure requirements. Given the importance of information on performance to competitors (e.g., Tomy, 2018; Minnis and Shroff, 2017), we expect that size management is more common at thresholds that impose income statement disclosure. We find

evidence that size management is pervasive at these thresholds but not at other disclosure thresholds, including those that impose cash flow statement disclosure. The results suggest that at least 8% of firms that would otherwise be immediately above a threshold manage size to avoid income statement disclosure while at least 4% do so to avoid audit requirements. These findings indicate that, for many firms, proprietary costs of income statement disclosure are at least equal to audit costs, the direct fees for which are typically estimated to be at least 6% of earnings for small and medium European private firms (e.g., Kausar et al., 2016; Collis, 2008).²

We provide additional evidence that size management to avoid disclosure is largely due to proprietary costs. Size management is positively associated with proxies for profitability, growth, and leverage, consistent with theory and evidence that link these characteristics of private firms to greater proprietary costs (e.g., Bernard, 2016; Dedman and Lennox, 2009). The positive association with profitability and growth is inconsistent with the alternative view that the main motive for size management is to avoid disclosure to counterparties, as firms typically have incentives to *reveal* high growth or profitability to counterparties, such as suppliers, to obtain better terms of trade (Garcia-Teruel and Martinez-Solano, 2010; Huyghebaert, 2006). We also find that the evidence at disclosure thresholds (but not at audit thresholds) is concentrated in years after a European Commission Directive made financial disclosures generally available on websites, which made the disclosures more readily available to competitors.³

Finally, we examine the average amount of asset size (i.e., growth) sacrificed to avoid disclosure and audit costs. We compare the shape (density) of the full pooled size distributions

² Survey evidence of small and medium European private firms shows audit fees are the most commonly cited concern about obtaining an audit (Minnis and Shroff, 2017). In addition, more than 40% of managers say they “do not see any benefit in having the financial statements audited,” suggesting audit fees are a lower bound of the net cost of an audit for a substantial proportion of firms.

³ Survey evidence also underscores the role of proprietary costs in our setting. For example, Minnis and Shroff (2017) survey managers of extremely small European private firms and find that proprietary costs of disclosure are widely perceived to be an important concern even for these firms; other concerns, such as disclosing financial information to customers, suppliers, friends, or relatives, are less frequently gauged to be important.

with estimated counterfactual size distributions that approximate the case of no size management, using an iterative empirical procedure based on Kleven and Waseem (2013). This approach relaxes the simplifying assumption in previous analyses that all size managers move from immediately above the threshold to immediately below; firms sometimes manage size by more than the width of one interval or manage size to intervals below the interval immediately below the threshold, as size management techniques are not always precise. Our estimates suggest that firms managing assets to avoid income statement disclosure on average sacrifice roughly 6.5% of total assets. To illustrate the potential cost of one common method of size management, we calculate that managing assets downward by 6.5% by factoring receivables and paying down debt with the proceeds translates into a direct cost of about 8% of earnings.

The study contributes in several ways. We exploit a unique empirical setting in which the costs firms incur to avoid both expanded public disclosure and external audit requirements—namely, the costs of managing size to stay small—are identifiable. In contrast to work that models disclosure or audit decisions as a function of proxies hypothesized to relate to higher disclosure or audit costs, we model size management as a *direct function* of the requirements themselves. Our approach allows us to gauge the pervasiveness and magnitude of disclosure and audit costs based on the costs firms incur to manage size while ensuring our estimates are not subject to many of the endogeneity concerns that pervade the literature. For example, we do not rely on the controversial conceptual relation between “competition” and proprietary costs, nor do our primary analyses rely on heavily criticized empirical proxies such as measures of industry concentration (e.g., Huang et al., 2017; Ali et al., 2014).

Overall, our findings speak directly to concerns about the identification and economic significance of proprietary costs and suggest an important role for these costs in practice (e.g., Li et al., 2017; Shroff, 2016; Lang and Sul, 2014; Berger, 2011; Berger and Hann, 2007). Our

findings suggest that size management to avoid income statement disclosure is at least as common as that to avoid an audit, evidence that helps to benchmark the significance of proprietary costs and contextualize prior work on size management at audit thresholds (Kausar et al., 2016). Our results indicate that a reasonable estimate of the average cost incurred to avoid disclosure is a high single-digit percentage of earnings, although this cost is likely to vary substantially in the cross-section. In sum, proprietary costs appear to be inherent to fundamental financial statement disclosures, stretch across countries and institutional settings, and are anticipated and avoided even by small private firms, which are rarely studied, notwithstanding the prevalence of disclosure requirements for them (Badertscher et al. 2013). In these ways, proprietary costs appear to be fundamental, consistent with their central role in disclosure theory.

The paper also contributes beyond the proprietary cost literature. Our study closely relates to the large literature that examines the management of economic variables around regulatory thresholds and benchmarks (e.g., Kausar et al., 2016; Kleven and Waseem, 2013; Gao et al., 2009; Burgstahler and Dichev, 1997). We develop a novel method of estimating size sacrificed due to different regulatory requirements imposed at size thresholds, which allows for comparisons of the requirements' relative costs and could be extended to other settings. Similarly, our extensive manual collection of European regulatory requirements and thresholds, along with their effective dates and levels, should be useful to concurrent and future work that examines European private firms in the context of disclosure and audit regulation (e.g., Bassemir, 2017; Breuer et al., 2017; Minnis and Shroff, 2017; Kausar et al., 2016).

2. Institutional background

2.1. Disclosure and audit environment of European private firms

The disclosure and audit environment of European private firms is ultimately controlled by the individual national governments, which establish and enforce accounting and disclosure

requirements within a broad framework of European Commission Directives. European countries generally require smaller firms to comply with fewer of the requirements in EU Directives. To this end, each country implements its own rules to classify limited liability private firms into size categories (small, medium, or large) based on the value of three variables: year-end total assets, annual sales, and average number of employees during the fiscal year.⁴ Firms are usually assigned to a different size category when the values of two (or more) of the three size variables move across bright-line thresholds over two successive years. For example, a small firm moves up to become a medium firm as soon as at least two of three size variables exceed the small-medium threshold for two consecutive years.

Size classification determines two key requirements. First, size classification dictates the extent of public disclosure requirements. While all limited liability firms are required to disclose some financial information, disclosure requirements increase substantially with size. For instance, small firms in the UK and Germany must disclose (at a minimum) an abbreviated balance sheet but are not required to disclose an income statement. In contrast, medium and large firms must disclose an income statement with accompanying notes.

For each of our 12 sample countries, Table 1 summarizes the main disclosure requirements for firms below versus above the small-medium threshold, and Appendix A provides further details. We focus on the small-medium threshold because the incremental increase in required disclosure at this threshold is generally substantially greater than at the medium-large threshold. Indeed, in many of the sample countries (e.g., the Scandinavian countries), the disclosure requirements shown in Table 1 and Appendix A for medium firms are

⁴ Most accounting and disclosure requirements only apply to limited liability firms, so we can examine evidence of size management only for these firms. Accordingly, our conclusions may not generalize to firms that choose other legal structures. Nonetheless, private limited liability firms employ more than 60% of all persons in Europe (over 70% when sole proprietorships are excluded), so these firms constitute a significant proportion of economic activity in their own right. See: http://ec.europa.eu/eurostat/web/products-datasets/-/bd_9ac_1_form_r2.

identical to those for large firms. Further, the much larger number of firms at the small-medium threshold makes it more likely that our tests have sufficient power to detect size management.

Second, size classification dictates audit requirements. In most of Europe, limited liability private firms classified as medium or large are required to have an external audit every year, whereas firms classified as small are typically exempt from audit requirements. Appendix B provides detailed information on audit requirements for each sample country. Because audit requirements are often imposed at slightly different levels of the *same* underlying size variable in the *same* countries, size management to avoid audits offers a benchmark to gauge the relative significance of size management to avoid expanded disclosure.

Table 2 lists the small-medium size thresholds in effect during our sample period (Jan. 1, 2003, through Dec. 31, 2011) for the 12 sample countries, and Appendix C provides further details, including links to primary information sources for the levels and dates of implementation for the thresholds. Although all analyses are conducted in local currencies, for comparability across countries, we translate all non-euro threshold levels in Table 2 into euro using the average exchange rate for the period when the thresholds were in effect. The table shows that thresholds are updated frequently—generally to adjust for inflation and changes in other economic factors—though some countries update their thresholds more frequently than others. For countries that have updated their threshold levels, the assets and sales thresholds have generally been increased at a rate that has outpaced inflation. As a result, the proportion of firms exempt from audit or additional disclosure requirements has grown, consistent with concerns about imposing disclosure and audit costs on small and medium firms (European Commission, 2010; DTI, 1995). There has not been a corresponding relaxation over time in the employee threshold—the small-medium threshold for employees is 50 in most countries and did not change in almost all countries from the beginning of our sample period.

2.2. *Management of size classification variables*

Firms have a menu of tactics available to manage size-classification variables downward (e.g., Kaya, 2010). Some methods, which tend to be emphasized in the European practitioner literature, are focused on only one of the variables. For example, to manage assets downward, some firms factor receivables—that is, sell their receivables at a discount—and use the proceeds to pay down debt. Depending on industry, creditworthiness, and other factors, factoring typically imposes direct costs of roughly 3%–4% of the gross receivables factored (e.g., Soufani, 2001). To manage employee count, some firms pay for overtime work or contract with outside agencies to supply labor. These methods tend to be costly given strict labor laws in most of Europe. For instance, the average overtime premium in the UK is roughly 40%, and in Germany, firms typically pay two to three times more for a temporary worker from an outside entity than for an employee (Holtbrügge, 2007; Kvasnicka, 2003; Pannenberg and Wagner, 2001; Bell and Hart, 1999).⁵ To manage sales, firms can either delay sales, which risks creating supply chain problems for customers and merely defers the issue of maintaining sales below the threshold, or provide discounts, which directly reduce current profitability.

Other methods affect more than one size variable. Some firms outsource business processes, which can reduce both total assets and employee count. For example, in most European countries, services are readily available for straightforward financial functions, such as payroll, billing, and processing of receivables and payables. However, these nonstandard employment relations are often costly and require substantial planning to establish. Another option is to split the firm, a method that reduces all three size variables. This method is relatively uncommon because, while it is the most effective, it also entails considerable transitional costs as

⁵ As an example, suppose a UK firm pays employees a 40% overtime premium to avoid hiring an additional worker. Assuming an average annual wage of £30,000, the incremental cost to manage size would equal £12,000, which is roughly 15% of the median earnings of UK firms in the vicinity of the threshold during the sample period.

well as ongoing administrative and operational costs, such as the costs of keeping multiple sets of accounts every year and separate invoicing and payroll systems for each entity.⁶

Some firms may also misreport to manage size downward. However, misreporting is unlikely to be common for several reasons. First, financial statements are the basis of tax filings in most of Continental Europe and therefore scrutinized by tax authorities (Burgstahler et al., 2006). European tax authorities conduct regular audits, the results of which are often shared with regulators that monitor financial reporting and disclosure (e.g., Svanström, 2013). These mechanisms likely improve the reliability of the financials, consistent with work that shows stronger monitoring by tax authorities improves financial reporting (Hanlon et al., 2014).⁷ Second, national laws penalize managers and directors for misleading or false financial reporting. For instance, under the 2006 Companies Act in the United Kingdom, directors are responsible for ensuring their companies keep appropriate records and prepare financial statements that give a “true and fair view” of their companies’ state of affairs. Managers can be disqualified from serving as directors for up to 15 years for violating these requirements. Under German law (Section 331 of the German Commercial Code), false reporting can result in financial penalties or imprisonment for up to three years.⁸ Third, misreporting to manage size conveys few additional benefits, as typical equity market benefits of misreporting are absent in the private firm setting. While these factors do not necessarily preclude misreporting, they imply, at a minimum, that size management via misreporting is costly to managers.

⁶ For example, consider a German firm close to the size threshold that splits into two firms (i.e., the existing and a newly incorporated firm). Transitional costs alone include registration fees at the commercial register for the new firm, fees for notarization of contracts such as memorandum of association, and fees related to tax issues, since splitting requires the firm to transfer assets and liabilities to a new firm, among other costs. By law (*Steuerberatervergütungsordnung*), these fees typically total well more than €20,000.

⁷ For example, in a given year, about 21% of German manufacturers are subject to a tax audit of the previous three years. See: <http://www.bundesfinanzministerium.de/Content/DE/Monatsberichte/2016/10/Inhalte/Kapitel-3-Analysen/3-1-Ergebnisse-der-steuerlichen-Betriebspruefung-2015.html>.

⁸ Criminal penalties are imposed in other countries as well. For a review of enforcement activities in 2011 in Ireland, for example, see: http://www.odce.ie/Portals/0/EasyDNNNewsDocuments/191/ODCE_AR2011_EN.pdf.

3. Hypotheses and related literature

3.1. Size management to avoid disclosure costs

Public disclosure of financial information to competitors can impose proprietary costs in a variety of ways. Competitors can use sales, gross profit, and operating profit disclosures from the income statement to evaluate entry into a product market or infer the success of a firm's new or revamped product line, advertising campaign, or capacity expansion. Competitors can use knowledge of price changes, together with a rival's financial statement disclosures, to better understand market sizes and price elasticities in specific segments. They can use income statement, balance sheet and notes disclosures to benchmark their own sales growth, production efficiency, SG&A costs, collection and payment periods, or investment in PP&E. Rivals can even use expanded balance sheet and cash flow statement disclosures to identify and prey on weaker rivals (e.g., Bernard, 2016; Chevalier, 1995). These possibilities are all consistent with managers' stated concerns about the competitive implications of public disclosure requirements (e.g., Minnis and Shroff, 2017) as well as the economics literature that models endogenous information acquisition (Veldkamp, 2011; Hellwig and Veldkamp, 2009; Reis, 2006).

Although papers study specific characteristics associated with proprietary costs, a number of factors limit conclusions about economic significance. Chief among these factors is that, in most empirical settings, the costs to avoid disclosure are small or difficult to estimate. For example, several papers show that managers withhold segment disclosures for highly profitable segments but provide no estimate of either the proprietary costs these disclosures impose or the cost incurred to withhold them (Botosan and Stanford, 2005; Harris, 1998). Other papers provide evidence that the costs of avoiding other specific disclosures are small. Verrecchia and Weber (2006) show that the adverse selection component of the bid-ask spread is 2% higher for firms that redact information from material contract filings than for those that do not. Dedman and

Lennox (2009) examine medium UK private firms' use of an exemption to disclose only gross profit without disclosing its components—sales and cost of goods sold. They find that the use of this exemption increases with perceptions of competition (based on a survey of sample firm managers) but also that nearly half of the firms in their sample choose to not incur the very small nominal cost (£100-250) to avoid more detailed disclosure. As they note, “[t]he low cost of non-disclosure raises doubts about the economic significance of the decision to withhold information about sales and costs and the magnitude of the competitive costs of disclosure.”

Other factors could also partly account for the limited evidence on the economic significance. In most settings (particularly those that rely on public firm data), the public disclosure choice relates to a highly specific incremental disclosure (such as segment data), whose importance may be small relative to the rich set of other information disclosed in the financials. Identification is another challenge, as in most settings disclosure avoidance can also reflect other factors, including capital market incentives, compliance costs, and agency costs (e.g., Berger, 2011). Studies also typically focus on assessing the statistical significance of the relation between disclosure decisions and a specific incentive theorized to be associated with higher competitive costs (e.g., Ellis et al., 2012). To what extent the disclosure decision entails proprietary costs, other than that specific incentive, is generally unclear. For example, while Bernard (2016) provides evidence that disclosure avoidance among private limited liability German firms increases with financial constraint, his estimates do not capture proprietary costs imposed by financial disclosure unrelated to financial constraint. Collectively, these limitations help account for Lang and Sul's (2014) conclusion that “we know relatively little empirically about the likely prevalence and magnitude of proprietary costs in practice.”

We provide evidence of the economic significance of proprietary costs using a setting and research design that avoids many of the limitations of prior work. Our study examines the

disclosure of fundamental financial statement information (e.g., disclosure of an income statement) by small private European firms, a setting where alternative sources of information are generally not available and disclosures are more clearly attributable to specific business activities and geographies. This setting also does not require claiming a specific incentive or set of incentives associated with higher competitive costs of disclosure; firms may manage size to minimize the risk of new competition, to thwart predatory behavior, or to mitigate any other proprietary cost. Put differently, because few extraneous factors can alternatively explain disclosure avoidance in this setting, we can isolate the effect of proprietary costs on size management while remaining agnostic about the exact sources of these costs.

Of course, there are also factors that potentially limit the economic significance of the proprietary costs we examine. For example, owners of small private firms may not understand or anticipate proprietary costs. Similarly, their competitors may be too constrained or unsophisticated to exploit this information.⁹ On balance, then, whether proprietary costs of disclosure commonly outweigh the operational and financial costs of size management is an empirical question. Our first hypothesis, in alternative form:

H1: European private firms manage size to avoid incremental public disclosure of financial statement information.

3.2. Size management to avoid audit costs

The net cost of an audit is the gross cost (the sum of direct audit fees and other indirect costs, such as the time and effort incurred to provide information to auditors) less any offsetting benefits. Estimates of direct audit fees for small UK firms during our sample period range from £1,000 to £10,000, depending on the firm's audit history, industry, and other factors (Kausar et al., 2016; Collis, 2008). For example, Kausar et al. (2016) estimate the average audit fees for

⁹ Additionally, the costs of size management may not be entirely exogenous to proprietary costs. For example, firms that have greater growth than rivals may have greater proprietary costs of disclosure, but these firms may also face greater costs to stay small. We address this possibility further in Section 5.3.

their sample of small and medium UK private firms to be roughly £6,000 or 6% of average after-tax earnings. Audit fees for Continental European firms are unavailable for many countries, including Germany and Austria, but appear to be of similar magnitude (approximately €7,000 on average) where they are available, such as in Spain (e.g., Gandia and Huguet, 2015). The indirect costs of an audit are hard to separately estimate for small private firms but are lessened by 1) the high level of book-tax conformity in Europe (because information provided for an audit often duplicates information provided for tax purposes) and 2) national laws that require firms to prepare full accounts for owners (because firms must keep reliable books and records, regardless of public disclosure or audit requirements). Nonetheless, the time and effort required to communicate with auditors is likely to be nontrivial. Consistent with this, Minnis and Shroff (2017) find that 54% of the private firm managers believe the time demands of auditors is an important concern in obtaining an audit.¹⁰

The benefits that can offset the gross cost of an audit include reductions of monitoring, control, and contracting costs. The separation of ownership and control creates a demand for monitoring, and audits can substitute for other forms of monitoring by owners or company directors (Güntert, 2000). Consistent with this, Dedman et al. (2014) provide evidence that firms are more likely to purchase voluntary audits if they have greater agency costs or are riskier. Audits can improve managerial decision-making by providing assurance that the financial statement information used for planning and control purposes is reliable (Minnis and Shroff, 2017). Audits also play a key role in reducing financing frictions by increasing the credibility of financial disclosures provided to capital providers. For example, Blackwell et al. (1998) and Minnis (2011) show that audits reduce debt contracting costs, and Minnis and Shroff (2017) find

¹⁰ Although book-tax conformity and requirements for fair reporting likely constrain opportunistic reporting among small private firms, one additional cost that external audits may impose is the loss of reporting flexibility, which could serve to limit the usefulness of financial information revealed to competitors. However, survey evidence from Minnis and Shroff (2017) suggests that European private firm managers do not believe that competitors are one of the main beneficiaries of a financial statement audit.

that managers believe that lenders and creditors are among the top beneficiaries of financial statement audits.¹¹ Two factors that could reduce the debt contracting benefits of an audit in Europe are the high level of book-tax alignment, which allows lenders to rely on scrutiny by tax authorities for some assurance that borrowers' financials are fairly stated (Minnis and Sutherland, 2016; Hanlon et al., 2014), and the heavy reliance on relationship lenders, which can substitute alternative information for financial reporting (e.g., Kim et al., 2011).

On balance, we expect the net cost of mandatory audits is nontrivial for most firms, notwithstanding the potential offsetting benefits. This expectation is based on the relatively low rates of voluntary audits among small and medium private firms documented elsewhere (e.g., less than 25% by Minnis (2011)), survey evidence that more than 40% of small and medium private firm managers see no benefit of an audit (Minnis and Shroff, 2017), and the decisions of regulators in many European countries to reduce the number of firms subject to mandatory audits by increasing audit thresholds over time. Kausar et al. (2016) provide direct evidence consistent with our expectation: they show that small and medium UK firms manage size variables downward in the early 2000s to avoid audit requirements. Given the relatively rich body of work that helps quantify audit costs for small private firms, evidence that the results of Kausar et al. (2016) generalize to subsequent years and other countries will provide an important benchmark to gauge the relative significance of size management to avoid disclosure requirements.

Our second hypothesis, in alternative form:

H2: European private firms manage size to avoid mandatory audits.

¹¹ Using a sample of small US firms, Blackwell et al. (1998) show that firms that choose to be audited pay significantly lower interest rates than similar unaudited firms. In their sample, the interest savings from audits cover between 28% and 50% of typical audit fees. Minnis (2011) finds that audited firms enjoy significantly lower interest rates than unaudited firms (roughly 70 basis points, on average), with larger effects for smaller firms.

4. Sample selection and data

4.1. Sample selection

We obtain firm-year data from Amadeus, a Bureau van Dijk product that provides both financial and non-financial (e.g., employee count) data about public and private European firms (Tendeloo and Vanstraelen, 2008; Burgstahler et al., 2006). Amadeus dramatically expanded its coverage of private firms in the early 2000s, so we focus on a nine-year period beginning in 2003, when data availability increases substantially.

We select observations from 12 countries with the largest number of observations available on Amadeus: Austria, Belgium, Denmark, Finland, France, Germany, Ireland, Italy, the Netherlands, Spain, Sweden, and the UK. Examining evidence of size management across a dozen countries reduces the probability that our conclusions are affected by any country-specific institutional factor. Further, by comparing evidence of size management at disclosure and audit thresholds for the same underlying size variable within countries, we minimize the possibility that any differences could be attributable to country-level institutional factors such as the quality of legal enforcement or book-tax alignment.

Table 3 summarizes the selection criteria and their effects on sample attrition by country. We select (unconsolidated) financial statement accounts of firms not in a consolidated group (similar to Burgstahler et al., 2006), which yields about 46.6 million firm-year observations within the sample period (see Panel A). We then restrict the sample to private firms, as publicly traded firms are subject to extensive disclosure requirements, and to firms not in finance, insurance, or public administration (NAICS codes beginning with 52 and 92), as firms in these industries are often subject to other disclosure and audit requirements under national laws (e.g., Lennox and Pittman, 2011). We also exclude non-limited liability firms, as these firms are typically not subject to disclosure or audit requirements, as well as the few private firms that

voluntarily adopt International Financial Reporting Standards (IFRS) to ensure financial statement comparability within each country. These selection requirements reduce the number of potential firm-years to about 37.2 million.

We conduct our analyses at the size-variable level (as each firm-year observation corresponds to at most three observations of total assets, sales, and employee count), focusing on observations immediately below or above threshold levels at which disclosure or audit requirements are imposed. Most of our tests focus only on these observations, as most other observations provide little information about size management, either because there is no incentive to manage size (for observations far below the threshold) or because size management is too costly (for observations far above the threshold). To operationalize the concepts of “immediately above” and “immediately below,” we select bin sizes (i.e., interval widths) to be 2% of the size threshold—large enough so the distributions of the size variables are smooth in the absence of size management but small enough so firms could manage the variables by the width of the interval at reasonably low cost.

Our design necessitates two final selection criteria. First, we exclude observations at thresholds that do not permit 2% size bins. These thresholds consist of employee count thresholds less than 50, such as audit thresholds of 3 employees in Finland and Sweden or 12 employees in Denmark. We also exclude observations with rounded data. Amadeus sometimes obtains approximate, rounded employee count and sales figures from sources other than company filings, such as from national credit bureau offices. It is necessary to exclude these estimates because rounding creates potential for false significance in tests of size management.¹²

¹² These cases are relatively easy to identify, as the size distributions exhibit large spikes that recur at levels corresponding to rounded values. The country-size variable combinations that exhibit rounding include Austria employee count, Austria sales, Finland employee count, Germany sales, and Netherlands employee count.

A total of 503,666 size-variable observations within 2% of the thresholds meet these criteria (see Table 3 Panel B). This sample includes observations within 2% of the disclosure and audit thresholds during years the thresholds are in effect *as well as during years when they are not*. For example, the sample includes German firm observations with assets within 2% of €4,015,000 for all years of the sample period, not just for years when audit and disclosure requirements were imposed at that level. In effect, this approach exploits the time-series variation in threshold levels set by regulators to construct a distributional counterfactual. The estimated effects of disclosure and audit requirements are therefore incremental to the “normal” slopes of the underlying size distributions, as well as any effects of time-invariant thresholds that impose other regulations at the same levels of the size variables.

4.2. Unavailable data below certain sales and employee count thresholds

For some thresholds based on sales and employee count, there is an inherent limitation in observing firms below the threshold. In every country, small firm disclosure requirements include at least an abbreviated balance sheet, and therefore total assets data are available regardless of firm size. However, in some countries, small firms are not required to report sales or employee count, whereas medium firms are. As a result, data are not fully available below these disclosure thresholds, which likely attenuates evidence of size management.

In light of this inherent data limitation, we focus on subsamples for which data are fully observable on both sides of the threshold—assets data are disclosed above and below the threshold in all countries, and sales and employee count data are disclosed above and below the small-medium threshold in many countries, such as France, Sweden, and others. In a few cases, we broaden the analysis to include results for distributions affected by nondisclosure, because these distributions may still provide incremental evidence, albeit attenuated, of size management. Even though nondisclosure eliminates the effect of size management on excess observations in

the bin left of the threshold in the observable distributions, it does not eliminate the deficiency in the number of observations in the bin above the threshold, where the observations would have been had the firms not managed size downward.

5. Empirical results

We present four types of empirical evidence related to size management to avoid disclosure and audit requirements. First, to illustrate the underlying data, we present graphical and statistical evidence of size management for selected countries. Second, we develop and estimate a logit model to 1) differentiate size management to avoid disclosure versus size management to avoid audit requirements, 2) provide evidence on the type of financial statement disclosure that drives size management, and 3) develop estimates of the pervasiveness of size management. Third, we test predicted relations between size management and determinants of proprietary costs. Finally, we develop estimates of the magnitude of size management and illustrate the likely costs size management imposes.

5.1. Evidence of size management at disclosure and audit thresholds

We first provide selected graphical and statistical evidence of size management. We do not present graphical and statistical evidence for all of the possible size distributions, as there are three size variables from 12 countries, and in most cases, two or three different thresholds were in effect during the sample period for each requirement. Instead, Section 5.1.1. focuses on one size variable (assets) in one country (the UK) and shows results separately for three different periods when different size thresholds were in effect. We focus on UK assets because the assets variable is disclosed regardless of firm size and because there is a relatively large number of observations available in the UK, which allows us to confirm that discontinuities occur at the threshold currently in effect (consistent with size management) but not at thresholds that were previously in effect (inconsistent with alternative explanations for discontinuities). In Section

5.1.2., we combine size distributions across time for the assets variable for four countries with high data availability where disclosure and audit thresholds coincide: Germany, Italy, Spain, and the UK. Together, these results provide evidence of the existence of size management across countries and periods and illustrate how discontinuities shift with changes in the size thresholds.

5.1.1. Temporal variation in size management

Fig. 1 presents distributions of unscaled UK assets during three different periods when different size thresholds were in effect (see Table 2). We use the standardized difference statistic for the interval immediately left of the threshold to assess the significance of the discontinuities at the thresholds (Burgstahler and Dichev, 1997). Panels A–C show distributions at thresholds currently in effect. During each of the three periods, the standardized difference statistic is highly significant (as shown at the bottom of each panel), suggesting that UK private firms manage size below the threshold in effect.

Panels D–F show the distributions at the threshold level in effect during the *previous* sub-period as a falsification test in the spirit of Kausar et al. (2016). Intuitively, we would not expect to observe discontinuities at threshold levels no longer in effect if the discontinuities we identify are due to size management to remain below the threshold currently in effect. Consistent with this intuition, the distributions in Panels D–F show no evidence that firms manage size to remain below thresholds that are no longer in effect. For example, in Panel F there is no evidence that firms manage size to remain below £2.8 million after the threshold moved to £3.26 million starting April 5, 2009. Although we present these falsification tests only for total assets thresholds in the UK, untabulated tests for other size variables and other countries show similar results.¹³

¹³ Specifically, the results show that discontinuities at assets and sales thresholds shift when the levels of the thresholds set by regulators shift, and we find no evidence of size management at assets and sales thresholds previously in effect. Of course, we cannot test for shifts for cases where there is not significant evidence of size

5.1.2. Cross-sectional variation in size management

Fig. 2 presents distributions for total assets in the vicinity of the corresponding active size thresholds for Germany, Italy, Spain, and the UK. Because the assets thresholds vary across time (see Table 2), we combine results across time by scaling by the period-specific threshold. The statistical significance of the discontinuities is again assessed using the standardized difference for the interval immediately below the threshold.

The tenor of the evidence in Fig. 2 is that size management is common but varies significantly by country. We find strong evidence of size management in the UK and Germany,¹⁴ somewhat weaker evidence for Spain, and no evidence for Italy, where both the disclosure and audit requirements imposed at the threshold are minimal (see Appendices A and B). Untabulated results suggest similar cross-country variation in size management for the other variables. For example, we find strong evidence of size management of the sales variable in Spain and the employee count variable in Germany, but little evidence of management of either sales or employee count in the UK.¹⁵

5.2. Cross-country regressions and the pervasiveness of size management

5.2.1. Primary specification and results

To test our main hypotheses, we combine data across countries, years, size variables, and threshold values, retaining only observations in either the bin immediately below or immediately above the threshold. We then estimate the following logit model:

management, which often occur for country-size variable combinations with low sample sizes. We can only test for shifts in size management for a single employee count threshold (the disclosure threshold in France), but this test is confounded by overlapping labor law requirements imposed at both the previous (10 employee) and new (20 employee) threshold.

¹⁴ Fig. 2 Panel D is a scaled combination of the distributions shown in Fig. 1 Panels A–C.

¹⁵ Variation in size management across size variables, countries, and time is difficult to predict because multiple factors affect size management. For example, differences in institutional factors and changes in macroeconomic conditions create variation in the cost of managing each variable. Law changes that alter the levels of the size thresholds relative to one another also matter, as the relative levels of the thresholds affect which threshold is most binding for the average firm.

$$(1) \text{ Below threshold}_{i,t} = \gamma_0 + \gamma_1 * \text{Expanded disclosure}_{i,t} + \gamma_2 * \text{External audit}_{i,t} + \varepsilon_{i,t}$$

where i indexes the firm and t the sample year. The dependent variable is a probabilistic proxy for size management that equals one if the observation is in the bin immediately below the threshold and zero if it is immediately above. The regressors are indicator variables for the imposition of an expanded financial statement disclosure requirement or an external audit requirement at the threshold in year t . Because distributions of size variables tend to slope downward even in the absence of size management, we expect γ_0 to be slightly greater than zero. Our hypotheses suggest that requirements for expanded disclosures or external audits partly explain variation in size management. Specifically, $\gamma_1 > 0$ constitutes evidence consistent with H1, and $\gamma_2 > 0$ constitutes evidence consistent with H2.

Table 4 presents the results of estimating Eq. (1). Columns 1 and 2 present the baseline specification without and with country-year fixed effects, respectively. The inclusion of country-year fixed effects helps to address concerns that time-varying (or time-invariant) country-level factors, such as the level of enforcement, book-tax conformity, civil tradition, etc. can account for the findings (e.g., La Porta et al., 1998). The specifications in columns 3-5 focus only on observations not subject to the effects of employee count and sales nondisclosure. Column 3 excludes observations of sales or employee count where disclosure of the size variable is not required below the threshold but is required above the threshold. Column 4 excludes all observations of sales and employee count and instead focuses only on results for the assets variable, which tends to have the largest available sample size, is least subject to the confounding effects of data nondisclosure, and has few, if any, other regulatory requirements unrelated to

disclosure and audit requirements imposed at size thresholds based on it.¹⁶ Column 5 presents the same specification as column 4 but drops country-year fixed effects.

Across all specifications, the results provide consistent evidence of size management at both expanded disclosure and external audit thresholds. The estimated coefficients on expanded disclosure in Table 4 are significant at the 5% level or better and the coefficients are relatively consistent in magnitude across the specifications, suggesting the results are not highly sensitive to data nondisclosure issues. The evidence of size management at audit thresholds is similarly consistent. The coefficients on external audit are significant at the 1% level or better in each specification and are also relatively consistent in magnitude. Together, the results provide support for both H1 and H2.

While there are minor differences across countries in the external audit requirements imposed at size thresholds (see Appendix B), there are substantial differences in the requirements for disclosure of financial statement information (see Table 1 and Appendix A). In some countries, firms above the disclosure threshold must disclose an abbreviated income statement, whereas firms below it do not. In other countries, firms both above and below the threshold must disclose an income statement, so the incremental disclosure requirement is smaller. Similarly, in some countries cash flow statement disclosure is required above the threshold but not below, while in other countries cash flow statements are not required either above or below. Given prior evidence that firm performance is of particular interest to competitors (e.g., Minnis and Shroff, 2017; Dedman and Lennox, 2009), we expect to find stronger evidence of size management at thresholds that impose income statement disclosure. We might also expect cash flow statement disclosure to impose additional proprietary costs, as the cash flow statement is a useful source of information on changes in the firm's liquidity, a key component of financial constraint (e.g.,

¹⁶ In contrast, other regulatory requirements are sometimes based on sales or employee count size thresholds. For example, in several countries, labor law requirements are imposed at thresholds based on employee count.

Bernard, 2016). There may be still different costs imposed by disclosure of other types of financial statement information, such as the disaggregation of certain income statement and balance sheet accounts (e.g., Dedman and Lennox, 2009). Thus, to examine whether heterogeneity in the extent of size management corresponds to these differences in disclosure requirements imposed at size thresholds, we adjust Eq. (1) to decompose the expanded disclosure indicator into separate indicators for income statement disclosure, cash flow statement disclosure, and other disclosures.

In Table 5, we present the results of Eq. (1) after decomposing the expanded disclosure indicator variable. The coefficient on income statement disclosure is significant at the 5% level or better in each specification, whereas the coefficients on cash flow statement disclosure and on other disclosures are much lower magnitude and are generally not significant. Evidence that external audits are associated with greater size management remains highly significant across the various specifications. Overall, the decomposition in Table 5 suggests that significant evidence of size management to avoid disclosure is driven primarily by cases where the additional required disclosure is income statement information rather than cash flow or other financial statement information.¹⁷

To interpret the economic significance of the findings, we translate the implied marginal effects of the estimated regression coefficients into estimates of the proportion of firms that manage size due to the regulation imposed. We first make the simplifying assumption that firms above the threshold must manage each size variable downward to remain classified as small, an assumption not strictly true, because the size classification criteria are based on the values of two of three variables in consecutive years. We focus on column 5 of Table 5, the specification least

¹⁷ The absence of evidence of size management to avoid disclosures other than the income statement helps validate our assumption that compliance costs are unlikely to explain disclosure avoidance in our setting. For example, if financial statement preparation costs were the primary driver of size management, firms would likely manage size to avoid cash flow statement disclosure as well as income statement disclosure.

subject to data nondisclosure issues and confounding effects that also *excludes* country-year fixed effects (which allows for estimates not relative to country-year averages). Untabulated marginal effects show that approximately 8% of firms immediately above the threshold manage assets to immediately below the threshold due to income statement disclosure requirements.¹⁸ For comparison, we estimate that about half as many firms, approximately 4%, manage assets due to external audit requirements. Because firms could also manage some combination of sales and employee count in addition to assets, these estimates suggest that *at least* 8% of firms in the vicinity of the small-medium threshold manage size to avoid income statement disclosure.¹⁹ These results underscore the perceived costs of disclosing performance information among small firms, even in comparison to the costs of audit mandates.

5.2.2. Supplemental analyses

We conduct several additional (untabulated) tests to validate our results. First, we examine the effects of reasonable alternative design choices. We find that the results in Tables 4 and 5 are robust to using bin sizes for assets and sales that are 1% or 3% of the threshold, rather than 2%, and the inclusion of multiple control variables. For example, inferences are unchanged if we control for country-year GDP growth, country-year inflation, and the number of observations in bins adjacent to the threshold (to account for the threshold's location along the size distribution), none of which have statistically significant explanatory power in any of our

¹⁸ This estimate equals the difference between the predicted proportion of firms below the threshold, given income statement disclosure is imposed at the threshold, less the predicted proportion, given income statement disclosure is not imposed (i.e., the marginal effect), scaled by the unconditional proportion of observations above the threshold. In this case, the marginal effect (the numerator) is roughly 4%, and the denominator is roughly 50%.

¹⁹ Our estimate of the pervasiveness of size management likely understates the propensity to manage size for another reason: the number of firms above the threshold with a potential incentive to manage size is a subset of the actual number above the threshold, because the size classification criteria are based on multiple variables in consecutive years. Approximately two-thirds of firms immediately above total assets thresholds that impose income statement disclosure requirements still do not disclose income statement information (untabulated), which suggests the incentive to manage size downward is binding for only one-third of the observations above the threshold. This implies that when the total assets threshold is *binding*, at least 24% (8% divided by one-third) of firms manage assets due to income statement disclosure requirements.

tests. The results are also robust to excluding observations at inactive thresholds, so identifying variation is strictly from observations at thresholds during periods they are in effect.

Second, we test for an increase in size management at income statement disclosure thresholds after a European Commission Directive (2003/53/EG) mandated limited liability private firms make their financial statement information available as electronic filings beginning Jan. 1, 2007. Before 2007, in many countries, interested parties had to visit local commercial registries to obtain physical copies of firms' financial disclosures. Thus online filing beginning in 2007 likely increased proprietary costs of disclosure by reducing the costs for rivals to access financial disclosures. Consistent with this conjecture, in untabulated tests we find that income statement disclosure requirements are associated with significant evidence of size management for years 2007–2011 ($p < 0.01$) but not for years before 2007. If this change were due to general time trends related to data availability, costs of size management, or other factors, we would expect to find a similar pattern of significance at audit thresholds. In fact, we find that external audit requirements are associated with size management both for 2007–2011 and for years before 2007 ($p < 0.01$). In combination, these results are consistent with the interpretation that evidence of size management at disclosure thresholds is due to costs of disclosure, not some unidentified correlated omitted factor.

Third, as related evidence on the propensity to avoid disclosure of income statement information, we also collect an extensive random sample of original filings to examine how frequently firms that are not required to disclose an income statement nonetheless choose to do so *voluntarily*. For this analysis, we inspect original filings, as size classification cannot be determined with 100% accuracy from Amadeus data alone. Our sample includes 1,000 firm-years from the UK and 1,000 firm-years from Germany, the two largest countries that impose income statement disclosure at the threshold. We randomly draw these observations from the 20

bins below the assets threshold. The use of 20 bins below the threshold ensures the level of voluntary disclosure we observe is broadly representative of firms not required to disclose but also excludes very small firms far below the thresholds. We find that only about 9% of these firms below the small firm threshold voluntarily disclose an income statement. The low rate of voluntary disclosure is consistent with that observed by private companies in the US and contrasts with the higher rate obtaining voluntary audits (slightly more than 20%).

5.3. Determinants of the choice to manage size

In this section, we examine the relation between the probability of size management and characteristics previously associated with proprietary costs. To maximize the power of the test, we again restrict our focus to the UK assets threshold, where size management is pervasive, data nondisclosure unlikely, and the sample size large. We limit the sample to observations within 2% of each assets threshold while it was in effect and exclude observations with low revealed incentives to manage size to avoid disclosure—those above the threshold that do not disclose income statement information as well as those below that do.²⁰ We then estimate Eq. (2):

$$(2) \text{ Below threshold}_{i,t} = \beta_0 + \beta_1 * \text{Change in firm equity}_{i,t-2 \text{ to } t-1} + \beta_2 * \text{Assets growth}_{i,t-2 \text{ to } t-1} + \beta_3 * \text{Noncurrent liabilities}_{i,t-1} + \text{Controls} + \varepsilon_{i,t}$$

where the dependent variable is defined as in Eq. (1). Consistent with work on proprietary costs (Minnis and Shroff, 2017; Bernard, 2016; Dedman and Lennox, 2009), we expect the probability that an observation falls immediately below the threshold (consistent with size management) increases with firm performance, growth, and financial constraint. Because income statement data are missing for a large proportion of firms, we rely on a balance sheet proxy for firm

²⁰ Because the purpose of this analysis is to understand *why* firms manage size, we focus only on firms that plausibly faced a choice whether to manage size to avoid disclosure. Thus we exclude firms for which the assets threshold is not a binding determinant of size classification as well as firms below the threshold that voluntarily disclose income statement information.

performance—the change in total equity, scaled by total assets.²¹ We proxy for growth using the change in total assets, scaled by total assets, and for financial constraint using noncurrent liabilities, scaled by total assets. Thus prior evidence leads us to predict β_1 , β_2 , and $\beta_3 > 0$.

We also include control variables reflecting various factors studied in the proprietary costs literature and the literature on voluntary audits, including industry concentration, public firm presence, asset intangibility, firm age, inventory and fixed asset intensity, and ownership dispersion. We capture industry concentration using a Herfindahl index formed by four-digit NAICS code, based on the total assets of UK firms with publicly disclosed financial statements (e.g., Bernard, 2016; Dedman and Lennox, 2009). We capture the presence of public rivals using the percentage of total assets in the four-digit NAICS code held by public firms (e.g., Badertscher et al., 2013) and ownership dispersion using the total number of shareholders of the firm (e.g., Dedman et al., 2014). Asset intangibility, inventory intensity, and fixed asset intensity are the intangible assets, inventory, and fixed assets of the firm, scaled by total assets (e.g., Dedman et al., 2014; Ellis et al., 2012; Minnis, 2011).

All explanatory variables are measured using lagged values to abstract from any mechanical relations arising from the costs of size management in year t (e.g., lower profitability due to factoring receivables).²² Explanatory variables in levels are measured in $t-1$; those in changes are measured between $t-2$ to $t-1$. All continuous variables are winsorized at the 5% and 95% levels to minimize the influence of outliers, consistent with the higher levels of winsorization often used to deal with extreme values that are common in studies of private firms (e.g., Gao et al., 2013; Minnis, 2011).

²¹ Operating income scaled by total assets and the change in firm equity scaled by total assets have a positive correlation of roughly 0.50 among observations for which data on operating profits are non-missing.

²² If the firm manages size in multiple years, then the costs of size management could affect explanatory characteristics in subsequent years. Our results are robust to only including observations of firms the first year they are in the sample.

The results are presented in Table 6. In all specifications, the change in firm equity, assets growth, and noncurrent liabilities are significantly positively related to the probability that the firm falls in the interval immediately below (rather than immediately above) the threshold in the following year. These findings are consistent with evidence that private firms seek to avoid disclosing financial statement information about performance, growth, and financial constraint to competitors (Minnis and Shroff, 2017; Bernard, 2016; Dedman and Lennox, 2009).²³ These results are not easily explained by incentives to manage size to avoid a mandatory audit or to avoid disclosure to other parties, such as suppliers or customers. For example, Minnis (2011) finds no relation between leverage or growth and the probability of obtaining a *voluntary* audit, and Dedman et al. (2014) find some evidence of a positive relation between leverage and the probability of obtaining a *voluntary* audit. Similarly, prior work shows that firms typically have incentives to *reveal* high growth or profitability to obtain better terms of trade from counterparties (Garcia-Teruel and Martinez-Solano, 2010; Huyghebaert, 2006). Overall, these findings are consistent with our interpretation that it is largely competitive reasons that drive many firms to limit their size.

5.4. *Size sacrificed to stay small*

We next construct estimates of the amount of size that size managers sacrifice to avoid disclosure and audit costs. Whereas our previous analyses focus strictly on the intervals immediately adjacent to the threshold (i.e., within 2% of the threshold), size management may also affect bins further from the threshold. For example, some firms more than 2% above the threshold may manage size to move below the threshold if disclosure is particularly costly.

²³ The coefficients on the control variables generally align with our expectations. For example, like Dedman and Lennox (2009) and Bernard (2016), we find mixed results on the effect of industry concentration. Like Bernard (2016), we find mixed results on the effect of public firm presence and a positive relation between the firm's year of incorporation and disclosure avoidance. We also find that inventory intensity and fixed asset intensity positively predict size management. This is consistent with our expectation that firms with higher levels of fixed assets and inventory have more flexibility to manage size (e.g., firms with high levels of fixed assets have the ability to outsource asset-intensive business processes).

Similarly, because size management tactics are not always precise, some firms may manage to bins more than 2% below the threshold. By presenting evidence on the average size firms sacrifice to avoid disclosure and audit costs, we can provide more comprehensive estimates of the economic significance of these costs.

To conduct the analysis, we focus on the total assets size variable. Assets data are available for almost all firms, whereas observations below sales and employee count disclosure thresholds are sometimes not disclosed (as discussed in Section 4.2.). We use an empirical method that allows us to use assets data from all countries to estimate from which bins to the right of the threshold the excess mass left of threshold originates. To illustrate using the UK as an example, Figure 2 Panel D appears to show that some UK firms manage assets from bins more than 2% above the threshold, and at least some firms manage assets to bins more than 2% below the threshold. Our empirical method first models the effects of income statement disclosure and audit requirements on the density of the distribution in a range of bins surrounding the threshold and then calculates the average size managed under the counterfactual assumption of smoothness in the vicinity of the threshold. Put differently, we estimate the average size sacrificed based on the intuition that the excess number of observations below the threshold in the observed distribution should equal the deficiency in the number of observations above the threshold. We provide a technical description of our approach in Appendix D.

The results of this estimation procedure suggest firms that manage assets downward do so by an average of 3.24 bins, or about 6.5% of the assets thresholds, to avoid income statement disclosure, and by an average of 3.35 bins, or about 6.7% of the assets thresholds, to avoid external audit requirements.²⁴ The estimated amounts managed as a percentage of the threshold

²⁴ The results also validate the intuition that a greater proportion of firms managing size come from bins closer to the threshold, and most manage size to the bin immediately below the threshold. For example, the results in Panel A of Appendix D suggest that, of the total 0.0037 excess density below the threshold, 68% (0.0025/0.0037) is in the

can be translated into estimates of the potential costs to manage size for each country-threshold combination. As an example, consider a UK firm in 2006 with total assets of £2,982,000. Suppose this firm factors receivables of £182,000 (6.5% of the threshold of £2,800,000) and pays creditors with the proceeds to reduce its total assets below the disclosure threshold. Based on a total factoring charge of 3%–4% (e.g., Soufani, 2001), the direct cost of managing size would equal roughly £5,460–£7,280, which equates to approximately 7%–9% of the median income of UK firms in the vicinity of the threshold. This estimated cost is quite similar to the implied cost of managing size to avoid a mandatory audit as well as the typical direct costs of an audit for private UK firms documented elsewhere (e.g., Kausar et al., 2016).

6. Conclusion

While studies generally suggest that competitive concerns lead managers to withhold disclosures (e.g., for highly profitable segments), few estimate either the proprietary costs these disclosures impose or the costs managers incur to withhold them (e.g., Huang et al., 2017; Bens et al., 2011; Berger and Hann, 2007; Botosan and Stanford, 2005; Harris, 1998). We complement this literature by examining the economic significance of proprietary costs among small European private firms for which general financial statement disclosure requirements increase at bright-line size thresholds. This setting allows us to identify the source of the costs firms incur to avoid disclosure—namely, the costs of size management—and also minimize concerns that disclosure avoidance could be due to other factors, such as agency costs, compliance costs, or capital market incentives. Staggered time-series shifts in the disclosure and audit thresholds set by regulators further lessen concerns about endogeneity. Thus our setting and empirical design allow us to triangulate evidence on the magnitude and prevalence of proprietary costs associated

first interval below the threshold, 27% (0.0010/0.0037) is in the second interval below, and 5% (0.0002/0.0037) is in the third interval below.

with fundamental financial disclosures in ways not possible in previous papers, including those that examine incremental determinants of proprietary costs among private firms (e.g., Bernard, 2016; Dedman and Lennox, 2009).

The results suggest that European private firms manage size downward at bright-line size thresholds that impose expanded disclosure—in particular, income statement disclosure—and external audit requirements. Our empirical estimates imply that at least 8% of firms that would otherwise be immediately above size thresholds manage size to avoid income statement disclosure, a rate similar to or even greater than that to avoid mandatory audits, which prior studies show are non-trivially costly for European private firms (e.g., Kausar et al., 2016). Cross-sectional tests and an analysis of the determinants of size management, together with prior archival and survey evidence, point to proprietary costs as an important driver of size management. We also estimate that the costs of public income statement disclosure are substantial enough to lead firms that manage size to sacrifice, on average, roughly 6.5% of their asset size, which corresponds to approximately 7%–9% of income.

Overall, the evidence suggests an important role for proprietary costs in practice. Managers of even small European firms appear to anticipate these costs and incur substantial operational and financial costs to avoid them. These findings complement the empirical literature that examines incremental determinants of proprietary costs and speak directly to the importance of these costs as a friction in disclosure theory, particularly as they arise from fundamental financial disclosures such as the income statement. The evidence also speaks directly to policymakers' concerns about the costs of regulations imposed on small firms (European Commission, 2010) and extends work in other areas that suggests bright-line size thresholds create an incentive to stay small (e.g., Gao et al., 2009).

Appendix A: Disclosure Requirements for European Private Firms

This appendix summarizes the disclosure requirements for private European limited liability firms below and above the small-medium disclosure threshold.

	<u>Below disclosure threshold</u>	<u>Above disclosure threshold</u>
Austria		
Balance Sheet	<p>Abbreviated format</p> <p>Firms can aggregate subcategories of items on the balance sheet. For instance, an abbreviated balance sheet does not provide information on components of intangible assets (e.g., self-developed intangible assets, goodwill) or inventories (e.g., raw materials, work in progress), and does not separately disclose current and long-term liabilities.</p>	<p>Expanded abbreviated format</p> <p>Firms are required to report subcategories of some balance sheet items (e.g., trade receivables, trade payables).</p>
Income Statement	No disclosure requirement	<p>Abbreviated format</p> <p>Firms can aggregate certain items (e.g., sales, increase or decrease in finished goods, own work capitalized, cost of materials) to gross profit.</p>
Other disclosures	Abbreviated notes	Expanded abbreviated notes; director's report
Belgium		
Balance Sheet	<p>Abbreviated format</p> <p>Firms can aggregate subcategories of items on the balance sheet. For instance, an abbreviated balance sheet does not provide information on components of inventories (e.g., raw materials, work in progress).</p>	<p>Full format</p> <p>No option to aggregate items</p>
Income Statement	<p>Abbreviated format</p> <p>Firms can aggregate certain items (e.g., sales, cost of materials) to gross profit. Information on items such as increase or decrease in finished goods and own work capitalized can be omitted.</p>	<p>Full format</p> <p>No option to aggregate items</p>
Other disclosures	Abbreviated notes	Full notes; director's report
Denmark		
Balance Sheet	<p>Abbreviated format</p> <p>Firms can aggregate subcategories of items on the balance sheet. For instance, an abbreviated balance sheet does not provide information on components of intangible assets (e.g., self-developed intangible assets, goodwill) or inventories (e.g., raw materials, work in progress), and does not separately disclose current and long-term liabilities.</p>	<p>Full format</p> <p>No option to aggregate items</p>
Income Statement	<p>Abbreviated format</p> <p>Firms can aggregate certain items (e.g., sales, cost of sales, other operating income) to gross profit.</p>	<p>Full format</p> <p>No option to aggregate items</p>
Other disclosures	Abbreviated notes	Full notes; director's report
Finland		
Balance Sheet	<p>Abbreviated format</p> <p>Firms can aggregate subcategories of items on the balance sheet. For instance, an abbreviated balance sheet does not provide information on components of intangible assets (e.g., self-developed intangible assets, goodwill) or inventories (e.g., raw materials, work in progress), and does not separately disclose current and long-term liabilities.</p>	<p>Full format</p> <p>No option to aggregate items</p>
Income Statement	<p>Full format</p> <p>No option to aggregate items</p>	<p>Full format</p> <p>No option to aggregate items</p>
Other disclosures	Expanded abbreviated notes	Full notes; cash flow statement; director's report

France		
	Abbreviated format	
Balance Sheet	Firms can aggregate subcategories of items on the balance sheet. For instance, an abbreviated balance sheet does not provide information on components of intangible assets (e.g., self-developed intangible assets, goodwill) or inventories (e.g., raw materials, work in progress), and does not separately disclose current and long-term liabilities.	Full format No option to aggregate items
Income Statement	Abbreviated format Firms can withhold information about few items (e.g., income from long-term transactions or cost of materials).	Full format No option to aggregate items
Other disclosures	Abbreviated notes	Full notes; director's report
Germany		
	Abbreviated format	
Balance Sheet	Firms can aggregate subcategories of items on the balance sheet. For instance, an abbreviated balance sheet does not provide information on components of intangible assets (e.g., self-developed intangible assets, goodwill) or inventories (e.g., raw materials, work in progress), and does not separately disclose current and long-term liabilities.	Expanded abbreviated format Firms are required to report subcategories of some balance sheet items (e.g., trade receivables, trade payables).
Income Statement	No disclosure requirement	Abbreviated format Firms can aggregate certain items (e.g., sales, increase or decrease in finished goods, own work capitalized, other operating income, cost of materials) to gross profit.
Other disclosures	Abbreviated notes	Expanded abbreviated notes; director's report
Ireland		
	Abbreviated format	
Balance Sheet	Firms can aggregate subcategories of items on the balance sheet. For instance, an abbreviated balance sheet does not provide information on components of intangible assets (e.g., self-developed intangible assets, goodwill) or inventories (e.g., raw materials, work in progress), and does not separately disclose current and long-term liabilities.	Full format No option to aggregate items
Income Statement	No disclosure requirement	Abbreviated format Firms can aggregate certain items (e.g., sales, cost of sales, other operating income) to gross profit.
Other disclosures	Abbreviated notes	Expanded abbreviated notes; director's report
Italy		
	Abbreviated format	
Balance Sheet	Firms can aggregate subcategories of items on the balance sheet. For instance, an abbreviated balance sheet does not provide information on components of intangible assets (e.g., self-developed intangible assets, goodwill) or inventories (e.g., raw materials, work in progress), and does not separately disclose current and long-term liabilities.	Full format No option to aggregate items
Income Statement	Abbreviated format Firms can aggregate certain items (e.g., increase or decrease in finished goods, increase or decrease of contract work capitalized).	Full format No option to aggregate items
Other disclosures	Abbreviated notes	Full notes; director's report

Netherlands

	Abbreviated format
Balance Sheet	Firms can aggregate subcategories of items on the balance sheet. For instance, an abbreviated balance sheet does not provide information on components of intangible assets (e.g., self-developed intangible assets, goodwill) or inventories (e.g., raw materials, work in progress), and does not separately disclose current and long-term liabilities.
Income Statement	No disclosure requirement
Other disclosures	Abbreviated notes

Expanded abbreviated format
Firms are required to report subcategories of some balance sheet items (e.g., trade receivables, trade payables).
Abbreviated format
Firms can aggregate certain items (e.g., sales, increase or decrease in finished goods, own work capitalized, other operating income, cost of materials) to gross profit.
Expanded abbreviated notes; director's report

Spain

	Abbreviated format
Balance Sheet	Before 2008, firms could aggregate subcategories of items on the balance sheet. For instance, an abbreviated balance sheet did not provide information on components of intangible assets (e.g., self-developed intangible assets, goodwill). Since 2008, firms are required to report subcategories of some items (e.g., trade receivables, trade payables).
Income Statement	Abbreviated format Firms can withhold information about few subcategories of items (e.g., other operating expenses).
Other disclosures	Abbreviated notes; abbreviated statement of equity changes

Full format
No option to aggregate items
Abbreviated format
Firms can withhold information about few subcategories of items (e.g., other operating expenses).
Expanded abbreviated notes; cash flow statement; director's report; statement of equity changes

Sweden

	Abbreviated format
Balance Sheet	Firms can aggregate subcategories of items on the balance sheet. For instance, an abbreviated balance sheet does not provide information on components of intangible assets (e.g., self-developed intangible assets, goodwill) or inventories (e.g., raw materials, work in progress), and does not separately disclose current and long-term liabilities.
Income Statement	Abbreviated format Firms can aggregate certain items (e.g., increase or decrease in finished goods, own work capitalized, other operating income, cost of materials) to gross profit.
Other disclosures	Abbreviated notes

Full format
No option to aggregate items
Full format
No option to aggregate items
Full notes; cash flow statement; director's report

United Kingdom

	Abbreviated format
Balance Sheet	Firms can aggregate subcategories of items on the balance sheet. For instance, an abbreviated balance sheet does not provide information on components of intangible assets (e.g., self-developed intangible assets, goodwill) or inventories (e.g., raw materials, work in progress), and does not separately disclose current and long-term liabilities.
Income Statement	No disclosure requirement
Other disclosures	Abbreviated notes

Full format
No option to aggregate items
Abbreviated format
Before 2009, medium-sized firms could aggregate certain items (e.g., sales, cost of sales, other operating income) to gross profit. Since 2009, firms are required to report sales information.
Expanded abbreviated notes; director's report

Appendix B: Audit Requirements for European Private Firms

This appendix summarizes the audit requirements for private European limited liability firms below and above the small-medium audit threshold.

	<u>Below audit threshold</u>	<u>Above audit threshold</u>
Austria	No mandatory audit	Mandatory audit by certified auditors or certified accountants; while non-audit services (e.g., tax consulting, legal services) are allowed, bookkeeping services are prohibited.
Belgium	No mandatory audit	Mandatory audit by certified auditors; while non-audit services (e.g., tax consulting, legal services) are allowed, bookkeeping services are prohibited.
Denmark	Before 2006, all limited liability firms, regardless of size, had to be audited; since 2006, firms below the threshold are exempt from mandatory audit requirements.	Mandatory audit by certified auditors or certified accountants; non-audit services (e.g., tax consulting, legal services) are allowed. In certain circumstances, auditors can also provide bookkeeping services to audit clients.
Finland	Before 2008, all limited liability firms, regardless of size, had to be audited; since 2008, firms below the threshold are exempt from mandatory audit requirements.	Mandatory audit by certified auditors or non-certified auditors; auditors may provide non-audit services (e.g., tax consulting, legal services), subject to independence requirements. Bookkeeping services are not allowed.
France	No mandatory audit	Mandatory audit by certified auditors. Non-audit services (e.g., tax consulting, legal services) are generally not allowed.
Germany	No mandatory audit	Mandatory audit by certified auditors or certified accountants; while non-audit services (e.g., tax consulting, legal services) are allowed, bookkeeping services are prohibited.
Ireland	No mandatory audit	Mandatory audit by chartered accountants or certified accountants; non-audit services (e.g., tax consulting, legal services) are allowed. In certain circumstances, auditors can also provide bookkeeping services to audit clients.
Italy	No mandatory audit	Mandatory audit by firms' internal board of auditors (<i>Collegio Sindacale</i>) or certified auditors; internal board of auditors may provide administrative audit and non-audit services (e.g., tax consulting, legal services).
Netherlands	No mandatory audit	Mandatory audit by certified auditors or certified accountants; non-audit services (e.g., tax consulting, legal services) are allowed. In certain circumstances, auditors can also provide bookkeeping services to audit clients.
Spain	No mandatory audit	Mandatory audit by certified auditors or certified accountants; while non-audit services (e.g., tax consulting, legal services) are allowed, bookkeeping services are prohibited.
Sweden	Before 2011, all limited liability firms, regardless of size, had to be audited; since 2011, firms below the threshold are exempt from mandatory audit requirements.	Mandatory audit by certified auditors or certified accountants; non-audit services (e.g., tax consulting, legal services) are allowed. In certain circumstances, auditors can also provide bookkeeping services to audit clients.
United Kingdom	No mandatory audit	Mandatory audit by chartered accountants or certified accountants; non-audit services (e.g., tax consulting, legal services) are allowed. In certain circumstances, auditors can also provide bookkeeping services to audit clients.

Appendix C: Size Classification Thresholds and Source References

This appendix summarizes the small-medium size thresholds for the 12 sample countries between Jan. 1, 2003, and Dec. 31, 2011, and reports sources (e.g., the text of the laws) that contain information on the disclosure (Panel A) and audit threshold levels (Panel B) and the dates of the threshold changes. Dates listed are for firms' reporting end dates. Because our sample period starts Jan. 1, 2003, we list that date as the starting date in the "Since" column for all of the countries with audit and disclosure thresholds in effect as of Jan. 1, 2003 (i.e., this "Since" date does not mean that Jan. 1, 2003, was the date of the last change in the threshold before the start of the sample period). The number of employees refers to the average number of persons employed by the company during the fiscal year. For comparability across countries, we state all total assets and sales threshold levels in euro for all countries. We convert the total assets and sales thresholds set in local non-euro currencies (e.g., Danish krone or British pounds) to euro using the average exchange rate when the threshold levels were in effect; however, all underlying analyses are conducted in local currencies. The column "Source" includes a second reference when information on threshold levels and dates are not included in a single source file. Columns "Levels" and "Dates" provide information on the location of the levels of the thresholds and the dates of the threshold changes within the source file, respectively.

Panel A: Disclosure Thresholds

	Since:	Total assets	Sales	Employees	Source	Levels	Dates
Austria	Jan. 1, 2003	3,125,000	6,250,000	50	https://www.ris.bka.gv.at/Dokumente/BgblPdf/2000_61_1/2000_61_1.pdf	Page 1, Nr. 1 a	Page 1, Nr. 3 (2)
	Dec. 31, 2005	3,650,000	7,300,000	50	http://www.ris.bka.gv.at/Dokumente/BgblAuth/BGBLA_2004_I_161/BGBLA_2004_I_161.pdf	Page 1, Nr. 1a (a)	Page 4, Nr. 15 (11)
	Dec. 31, 2008	4,840,000	9,680,000	50	http://www.ris.bka.gv.at/Dokumente/BgblAuth/BGBLA_2008_I_70/BGBLA_2008_I_70.pdf	Page 1/2 Nr. 2 (a)	Page 8, Nr. 26 (18)
Belgium	Jan. 1, 2003	3,125,000	6,250,000	50	http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=2000021738&table_name=loi	Section II, Art. 2	Section V, Art. 6
	Dec. 31, 2004	3,650,000	7,300,000	50	http://www.nbb.be/doc/ba/jur/ent/code%20des%20societes.pdf	Page 5, Art. 15, § 1	Page 5, Art. 15, § 1
Denmark	Jan. 1, 2003	2,689,560	5,379,120	50	http://policy.mofcom.gov.cn/english/flaw!fetch.action?libcode=flaw&id=b461664c-d0b8-4286-9f82-242ff98e2e11&classcode=324	Part I, Chapter 1, Sec. 7 (2)	Part XI, Chapter 25, Sec. 165 (1)
	March 31, 2005	3,890,495	7,780,990	50	http://ec.europa.eu/internal_market/finances/docs/actionplan/transposition/denmark/d14.2-dk.pdf	Page 1, § 1, No. 5	Page 8, § 2, Sec. 1
	Aug. 31, 2009	4,833,504	9,667,008	50	https://www.retsinformation.dk/Forms/R0710.aspx?id=117640&exp=1	§ 1, No. 4	§ 2, Sec. 1
Finland	Jan. 1, 2003	3,125,000	6,250,000	50	https://www.finlex.fi/fi/laki/alkup/2001/20010629	Chapter 3, 9 §	Chapter 8, 5 §
	Dec. 31, 2005	3,650,000	7,300,000	50	https://www.finlex.fi/fi/laki/alkup/2004/20041304	Chapter 3, 9 §	Chapter 8, 6 §, No. 1
France	Jan. 1, 2003	267,000	534,000	10	http://legifrance.gouv.fr/affichCodeArticle.do?idArticle=LEGIARTI000006258333&cidTexte=LEGITEXT000005634379&dateTexte=20110110&oldAction=rechCodeArticle; http://www.cnde.fr/Module2.htm	Art. R123-200, No. 1	Sec. 2 A "L'Obligation est simplifiée" (second link)
	Dec. 31, 2010	1,000,000	2,000,000	20	http://www.legifrance.gouv.fr/affichTexte.do?cidTexte=JORFTEXT000023317763; http://blogonsdroit.blog.free.fr/index.php?post/2011/02/10/Pr%C3%A9sentation-simplifi%C3%A9-des-comptes	Art. 1er	Sec. "Nouveaux seuils" (second link)

Germany	Jan. 1, 2003	3,438,000	6,875,000	50	https://www.jurion.de/Gesetze/EuroBilG/1 ; https://www.jurion.de/Gesetze/EuroBilG/9	Art. 1, No. 1a (aa, bb)	Art. 9 (second link)
	Dec. 31, 2004	4,015,000	8,030,000	50	https://www.bgbl.de/xaver/bgbl/start.xav?start=%2F%2F*%5B%40attr_id%3D%27bgbl104s3166.pdf%27%5D#__bgbl__%2F%2F*%5B%40attr_id%3D%27bgbl104s3166.pdf%27%5D__1489414295520	Page 3166, No. 3a (aa, bb)	Page 3176, Art. 58 (1)
	Dec. 31, 2009	4,840,000	9,680,000	50	https://www.bgbl.de/xaver/bgbl/start.xav?startbk=Bundesanzeiger_BGBI&bk=Bundesanzeiger_BGBI&start=/*%255B@attr_id=%2527bgbl109s1102.pdf%2527%255D#__bgbl__%2F%2F*%5B%40attr_id%3D%27bgbl109s1102.pdf%27%5D__1489414407105	Page 1105, No. 19a (aa, bb)	Page 1118, Art. 66 (2)
Ireland	Jan. 1, 2003	1,904,607	3,809,214	50	http://www.irishstatutebook.ie/1993/en/si/0396.html	Part II, Reg. 4 (a, b)	Part I, Reg. 2 (1)
Italy	Jan. 1, 2003	3,125,000	6,250,000	50	http://gazzette.comune.jesi.an.it/2001/125/1.htm	Art. 1, No. 1 (a, b)	Art. 3
	Dec. 12, 2006	3,650,000	7,300,000	50	http://gazzette.comune.jesi.an.it/2006/276/1.htm ; http://www.appuntieconomia.it/alpha-test-temi-svolti-esame-di-stato-economia-commercialist/il-bilancio-abbreviato-bilancio-consolidato.html	Art. 1, No. 1 (a, b)	Sec. "Decorrenza dei nuovi limiti" (second link)
	Nov. 21, 2009	4,400,000	8,800,000	50	http://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2008;173 ; http://www.tuttocamere.it/files/dirsoc/SRL_Nomina_Collegio_Sindacale_CN_DCEC.pdf	Art. 1, No. 4 (1, 2)	Page 3/4, Sec. "La decorrenza dei nuovi limiti" (second link)
Netherlands	Jan. 1, 2003	3,500,000	7,000,000	50	http://parlis.nl/pdf/kamerstukken/KST57382.pdf	Page 7, Art. IV, Column H, Nr. 5a, b	Page 10, Art. XI
	Dec. 31, 2004	3,650,000	7,300,000	50	https://zoek.officielebekendmakingen.nl/stb-2004-54.html	Artikel 1	Artikel 4
	Dec. 31, 2006	4,400,000	8,800,000	50	https://zoek.officielebekendmakingen.nl/stb-2006-474.html	Artikel 1	Artikel 3
Spain	Jan. 1, 2003	2,373,998	4,747,996	50	https://www.boe.es/boe/dias/1998/12/24/pdfs/A43557-43601.pdf ; http://pdfs.wke.es/4/7/8/8/pd0000014788.pdf	Page 43577, Sec. "Cuarta Parte," I No. 4a (1a) Page 12, Table 1 (second link)	Page 43558, Sec. "Entrada en vigor"
	Dec. 31, 2008	2,850,000	5,700,000	50	http://www.boe.es/boe_gallego/dias/2007/11/20/pdfs/A00003-00152.pdf	Page 44, Reg. 4a, 1(a)	Page 8, "Entrada en vigor"
Sweden	Dec. 31, 2007	2,582,500	5,165,000	50	http://www.notisum.se/rnp/sls/sfs/20060871.pdf	Page 1, 1 kap., 3 §, No. 3 (a, b, c)	Page 9, last sentence
	Oct. 31, 2011	4,408,000	8,816,000	50	http://www.lagboken.se/Views/Pages/GetFile.aspx?portalId=56&cat=59924&docId=638648&propId=5	Page 1, 1 kap., 3 §, No. 4 (a, b, c)	Page 2, last sentence
United Kingdom	Jan. 1, 2003	2,024,120	4,048,240	50	http://www.legislation.gov.uk/ukSI/1992/2452/regulation/5/made ; http://www.legislation.gov.uk/ukSI/1992/2452/regulation/1/made	Reg. 5 (3)	Reg. 1 (second link)
	Jan. 30, 2004	3,944,080	7,888,160	50	http://www.legislation.gov.uk/ukSI/2004/16/pdfs/ukSI_20040016_en.pdf	Page 1, Reg. 2, 2 (a, b)	Page 1, Reg. 1 (2), 7 (1)
	April 5, 2009	3,755,520	7,488,000	50	http://www.legislation.gov.uk/ukSI/2008/393/pdfs/ukSI_20080393_en.pdf	Page 2, Part 2, Reg. 3, 1 (a, b)	Page 1, Part 1, Reg. 2 (1, 2)

Panel B: Audit Thresholds

	Since:	Total assets	Sales	Employees	Source	Levels	Dates
Austria	Jan. 1, 2003	3,125,000	6,250,000	50	https://www.ris.bka.gv.at/Dokumente/BgblPdf/2000_61_1/2000_61_1.pdf	Page 1, Nr. 1 a	Page 1, Nr. 3 (2)
	Dec. 31, 2005	3,650,000	7,300,000	50	http://www.ris.bka.gv.at/Dokumente/BgblAuth/BGBLA_2004_I_161/BGBLA_2004_I_161.pdf	Page 1, Nr. 1a (a)	Page 4, Nr. 15 (11)
	Dec. 31, 2008	4,840,000	9,680,000	50	http://www.ris.bka.gv.at/Dokumente/BgblAuth/BGBLA_2008_I_70/BGBLA_2008_I_70.pdf	Page 1/2 Nr. 2 (a)	Page 8, Nr. 26 (18)
Belgium	Jan. 1, 2003	3,125,000	6,250,000	50	http://www.ejustice.just.fgov.be/cgi_loi/change_lg.pl?language=fr&la=F&cn=2000021738&table_name=loi	Section II, Art. 2	Section V, Art. 6
	Dec. 31, 2004	3,650,000	7,300,000	50	http://www.nbb.be/doc/ba/jur/ent/code%20des%20societes.pdf	Page 5, Art. 15, § 1	Page 5, Art. 15, § 1
Denmark	Dec. 31, 2006	201,338	402,676	12	https://www.retsinformation.dk/Forms/r0710.aspx?id=27278	§ 1, No. 50, § 135 (1, 2, 3)	§ 4, Sec. 3
	Dec. 31, 2011	538,052	1,076,104	12	http://www.fsr.dk/~media/Files/FSR/Nyheder%20og%20presse/Politiske%20maerkesager/lovforslag%20om%20ndring%20af%20RL.ashx	Page 1, § 1, No. 1	Page 2, § 3, Sec. 1
Finland	June 30, 2008	100,000	200,000	3	http://www.finlex.fi/fi/laki/kaannokset/2007/en20070459.pdf	Page 2, Chapter 2, Sec. 4, 2 (1, 2, 3)	Page 21, Chapter 11, Sec. 56 (1)
France	Jan. 1, 2003	1,550,000	3,100,000	50	http://www.legifrance.gouv.fr/affichTexteArticle.do;jsessionid=53EF9C4E956F43FCDB8BAE8AF3A22AD3.tpdila14v_3?cidTexte=JORFTEXT000000674772&idArticle=LEGIARTI000006339916&dateTexte=20150717&categorieLien=id#LEGIARTI000006339916	Art. 12	Art. 12
Germany	Jan. 1, 2003	3,438,000	6,875,000	50	https://www.jurion.de/Gesetze/EuroBilG/1; https://www.jurion.de/Gesetze/EuroBilG/9	Art. 1, No. 1a (aa, bb)	Art. 9 (second link)
	Dec. 31, 2004	4,015,000	8,030,000	50	https://www.bgbl.de/xaver/bgbl/start.xav?start=%2F%2F%5B%40attr_id%3D%27bgbl104s3166.pdf%27%5D#__bgbl__%2F%2F%5B%40attr_id%3D%27bgbl104s3166.pdf%27%5D__1489414295520	Page 3166, No. 3a (aa, bb)	Page 3176, Art. 58 (1)
	Dec. 31, 2009	4,840,000	9,680,000	50	https://www.bgbl.de/xaver/bgbl/start.xav?startbk=Bundesanzeiger_BGBI&bk=Bundesanzeiger_BGBI&start=//%255B@attr_id=%2527bgbl109s1102.pdf%2527%255D#__bgbl__%2F%2F%5B%40attr_id%3D%27bgbl109s1102.pdf%27%5D__1489414407105	Page 1105, No. 19a (aa, bb)	Page 1118, Art. 66 (2)
Ireland	Jan. 1, 2003	1,904,607	317,434	50	http://www.irishstatutebook.ie/pdf/1999/en.act.1999.0030.pdf; http://debates.oireachtas.ie/dail/2003/02/18/00083.asp	Page 25, Part III, Reg. 32, 3a (ii, iii, iv)	2nd Paragraph (second link)
	June 30, 2005	1,904,607	1,500,000	50	http://www.irishstatutebook.ie/pdf/2003/en.act.2003.0044.pdf; http://www.fdc.ie/auditing.html	Page 64, Part IV, Reg. 53 (b)	2nd Paragraph (second link)
	Feb. 24, 2007	3,650,000	7,300,000	50	http://www.irishstatutebook.ie/pdf/2006/en.act.2006.0041.pdf; http://www.ksapre.com/offshore-company-formation/ireland/	Page 12, Part II, Reg. 9, 1b (i, ii)	Sec. "(f) Accounting and auditing requirements" (second link)

Italy	Jan. 1, 2003	3,125,000	6,250,000	50	http://gazzette.comune.jesi.an.it/2001/125/1.htm	Art. 1, No. 1 (a, b)	Art. 3
	Dec. 12, 2006	3,650,000	7,300,000	50	http://gazzette.comune.jesi.an.it/2006/276/1.htm ; http://www.appuntieconomia.it/alpha-test-temi-svolti-esame-di-stato-economia-commercialist/il-bilancio-abbreviato-bilancio-consolidato.html	Art. 1, No. 1 (a, b)	Sec. "Decorrenza dei nuovi limiti" (second link)
	Nov. 21, 2009	4,400,000	8,800,000	50	http://www.normattiva.it/uri-res/N2Ls?urn:nir:stato:decreto.legislativo:2008;173 ; http://www.tuttocamere.it/files/dirsoc/SRL_Nomina_Collegio_Sindacale_CN_DCEC.pdf	Art. 1, No. 4 (1, 2)	Page 3/4, Sec. "La decorrenza dei nuovi limiti" (second link)
Netherlands	Jan. 1, 2003	3,500,000	7,000,000	50	http://parlis.nl/pdf/kamerstukken/KST57382.pdf	Page 7, Art. IV, Column H, Nr. 5a, b	Page 10, Art. XI
	Dec. 31, 2004	3,650,000	7,300,000	50	https://zoek.officielebekendmakingen.nl/stb-2004-54.html	Artikel 1	Artikel 4
	Dec. 31, 2006	4,400,000	8,800,000	50	https://zoek.officielebekendmakingen.nl/stb-2006-474.html	Artikel 1	Artikel 3
Spain	Jan. 1, 2003	2,373,998	4,747,996	50	https://www.boe.es/boe/dias/1998/12/24/pdfs/A43557-43601.pdf ; http://pdfs.wke.es/4/7/8/8/pd0000014788.pdf	Page 43577, Sec. "Cuarta Parte," I No. 4a (1a) Page 12, Table 1 (second link)	Page 43558, Sec. "Entrada en vigor"
	Dec. 31, 2008	2,850,000	5,700,000	50	http://www.boe.es/boe_gallego/dias/2007/11/20/pdfs/A00003-00152.pdf	Page 44, Reg. 4a, 1(a)	Page 8, "Entrada en vigor"
Sweden	Oct. 31, 2011	165,300	330,600	3	http://www.lagboken.se/Views/Pages/GetFile.ashx?portalId=56&cat=59924&docId=638084&propId=5	Page 3, 9 kap., 1 §, No. 1-3	Page 7/8, 32 kap., 3 §, No. 1
United Kingdom	Jan. 1, 2003	2,030,980	1,450,700	50	http://www.legislation.gov.uk/uksi/2000/1430/pdfs/uksi_20001430_en.pdf	Page 1, Reg. 2 (2)	Page 1, Reg. 1 (2)
	March 30, 2004	3,937,360	7,874,720	50	http://www.legislation.gov.uk/uksi/2004/16/pdfs/uksi_20040016_en.pdf	Page 1, Reg. 2, 2 (a, b)	Page 3, Reg. 1 (2), 7 (4)
	April 5, 2009	3,755,520	7,488,000	50	http://www.legislation.gov.uk/uksi/2008/393/pdfs/uksi_20080393_en.pdf	Page 2, Part 2, Reg. 3, 1 (a, b)	Page 1, Part 1, Reg. 2 (1, 2)

Appendix D: Empirical Methodology to Estimate Size Sacrificed

We first model the effects of income statement disclosure requirements and external audit requirements on 40 bins, each of 2% width, in the vicinity of the size threshold. We use only the 20 bins below and 20 bins above the threshold to avoid the influence of unusual distributional properties in the extremes of the distribution. This approach is a simple extension of the logit model in Eq. (1) to the following multinomial logit:

$$(3) \text{ Bin } (j)_{i,t} = \gamma_{0j} + \gamma_{1j} * \text{Income statement disclosure}_{i,t} + \gamma_{2j} * \text{External audit}_{i,t} + \varepsilon_{i,t}$$

where $j = \{-19, \dots, -1, +1, \dots, +20\}$ and bin $j = -20$ serves as the base. The dependent variable is the location of the firm-year observation among the 40 bins in the vicinity of the assets threshold; the independent variables are indicator variables as defined above. We use the parameter estimates for Eq. (3) to estimate the density of the assets distribution, conditional on (1) the presence of income statement disclosure requirements at the threshold but not external audit requirements and, separately, (2) the presence of external audit requirements at the threshold but not income statement disclosure requirements.

Next we compare the multinomial estimated size distributions to size distributions constructed to approximate the counterfactual case of no size management. Specifically, we estimate the density of the size distribution expected in the bins in the vicinity of the size threshold, under the counterfactual assumption of no size management, following the empirical approach of Kleven and Waseem (2013). The expected density in the bins in the vicinity of the threshold is interpolated from the multinomial estimated density in the remainder of the distribution based on the following fifth-order polynomial approximation:

$$(4) \text{ Density (bin } j) = \sum_{k=0}^5 \theta_k * \text{Assets midpoint}_j^k + \text{Intercept shifters for affected intervals} + \varepsilon_j$$

where the dependent variable is the multinomial estimated density of each bin (again, each of 2% width). Assets midpoint is the midpoint of each bin as a percentage of the threshold—for example, 0.99 for the bin immediately below the threshold and 1.05 for the third bin above the threshold. The intercept shifters are indicator variables for the bins conjectured to be affected by size management, where the range of affected bins is estimated as explained below. These indicator variables ensure the estimated coefficients on the assets midpoint variables ($\sum_{k=1}^5 \theta_k$) are independent of size management in the affected bins. We then estimate the counterfactual distribution as the predicted values of Eq. (4), based on just the polynomial approximation terms, i.e., excluding the intercept shifters for the affected intervals. Thus the estimated counterfactual distribution for the intervals in the vicinity of the threshold affected by size management is smooth.

The range of bins affected by size management is unknown, so we estimate the range via an iterative process based on the following intuition. If firms manage the size variable from bins immediately above the threshold to bins immediately below it, then the excess number of observations below in the observed distribution should equal the deficiency in the number of observations above. We fix the lower bound of the range at the left endpoint of the bin where the shape of the distribution appears to change due to size management. (Ex post, we validate the subjective choice of the lower bound by ensuring the difference between the multinomial estimated density and the counterfactual density is not consistently positive for multiple bins immediately below the lower bound.) We initially set the upper bound at the right endpoint of the first bin above the threshold and then estimate the counterfactual distribution using Eq. (4), iteratively expanding the upper bound of the range to the right endpoint of the next bin until the deficiency above the threshold approximates, within 10%, the excess below the threshold. For both the estimates of size sacrificed due to income statement disclosure requirements and the estimates of size sacrificed due to external audit requirements, this process results in an estimated range of affected bins that comprises nine bins, the three bins immediately below and the six bins immediately above the threshold. Thus we report results for Eq. (4) estimated with nine intercept shifter terms corresponding to these nine affected intervals.

Panel A below presents the results of this analysis for the case of income statement disclosure requirements, while Panel B presents results for the case of external audit requirements. For both panels, we compare the multinomial estimated densities in the nine affected bins to the counterfactual estimates and then translate these into estimates of the average amount of assets sacrificed to manage size downward. For purposes of calculating the weighted average number of bins managed, the counterfactual density for bin six (marked \wedge) is reset so that the sum of the differences above versus below the threshold in the excluded interval is exactly zero. We assume that the average movement from one bin to the next equals the bin width, 2% of the size threshold. The average number of bins managed estimates the average number of bins each size manager manages downward, based on the proportions of excess observations in the bins below the threshold. For example, 1.39, the average number of bins managed by firms moving from the bin immediately above the threshold (see Panel A), equals $(0.0025/0.0037)*1 \text{ bin} + (0.0010/0.0037)*2 \text{ bins} + (0.0002/0.0037)*3 \text{ bins}$. The weighted-average bins managed is the average number of bins managed weighted by the proportion of observations managing size downward from that bin relative to the number of observations managed from all bins above the threshold. For example, 0.50, the component of the weighted-average for firms moving from the bin immediately above the threshold, equals $(0.0013/0.0037)*1.39 \text{ bins}$.

Panel A: Size Sacrificed to Avoid Income Statement Disclosure Requirements

Bin relative to threshold	Multinomial estimated density	Counterfactual density	Difference	Average number of bins managed	Weighted-average bins managed
-3	0.0249	0.0247	0.0002		
-2	0.0248	0.0238	0.0010		
<u>-1</u>	<u>0.0255</u>	<u>0.0230</u>	<u>0.0025</u>		
1	0.0209	0.0223	-0.0013	1.39	0.50
2	0.0209	0.0215	-0.0006	2.39	0.41
3	0.0203	0.0208	-0.0005	3.39	0.45
4	0.0198	0.0201	-0.0003	4.39	0.37
5	0.0191	0.0195	-0.0004	5.39	0.51
6	0.0187	0.0193 [^]	-0.0006	6.39	<u>1.01</u>
					3.24 bins

Panel B: Size Sacrificed to Avoid External Audit Requirements

Bin relative to threshold	Multinomial estimated density	Counterfactual density	Difference	Average number of bins managed	Weighted-average bins managed
-3	0.0245	0.0241	0.0004		
-2	0.0234	0.0232	0.0002		
<u>-1</u>	<u>0.0233</u>	<u>0.0223</u>	<u>0.0010</u>		
1	0.0211	0.0215	-0.0005	1.64	0.48
2	0.0205	0.0208	-0.0002	2.64	0.40
3	0.0196	0.0200	-0.0004	3.64	0.98
4	0.0191	0.0193	-0.0003	4.64	0.79
5	0.0185	0.0187	-0.0001	5.64	0.42
6	0.0179	0.0180 [^]	-0.0001	6.64	<u>0.28</u>
					3.35 bins

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Figure 1

Total Assets for UK Private Firms by Sub-period.

This figure presents distributions of total assets for private limited liability firms in the UK separately for three sub-periods (see Table 2). In Panels A–C, the superimposed vertical lines demarcate the active, or in-force, size threshold between small and medium classification. In Panels D–F, the superimposed vertical lines demarcate the previous, or no longer in-force, size threshold between small and medium classification. For this figure only, we present amounts in local currency (British pounds), rather than euro, so the active threshold in sub-period t is stated at the same level as the previous threshold in sub-period $t+1$ (i.e., so differences in exchange rates in different sub-periods do not affect the graphs). Bin sizes are 2% of the threshold. The y-axis is rescaled for each sub-period for easier comparison. The SD statistics are left standardized difference test statistics as defined by Burgstahler and Chuk (2015). ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

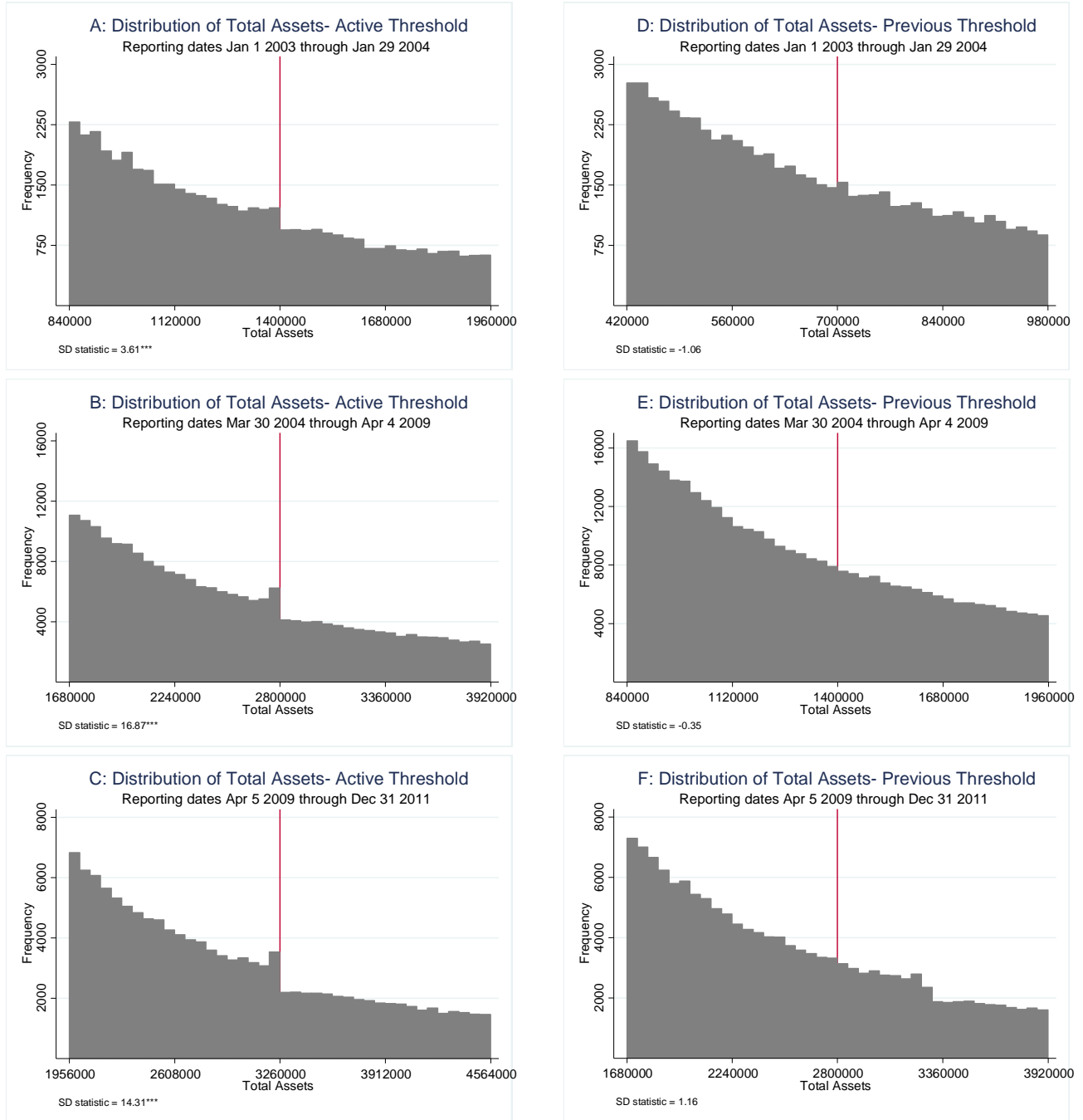


Figure 2

Pooled Total Assets at Coinciding Disclosure and Audit Thresholds.

This figure presents distributions of total assets for private limited liability firms in Germany, Italy, Spain, and the UK in periods when the disclosure and audit thresholds coincide. Superimposed vertical lines demarcate the size threshold between small and medium classification. The SD statistics are the left standardized difference test statistics as defined by Burgstahler and Chuk (2015). Bin size is 2% of the threshold. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

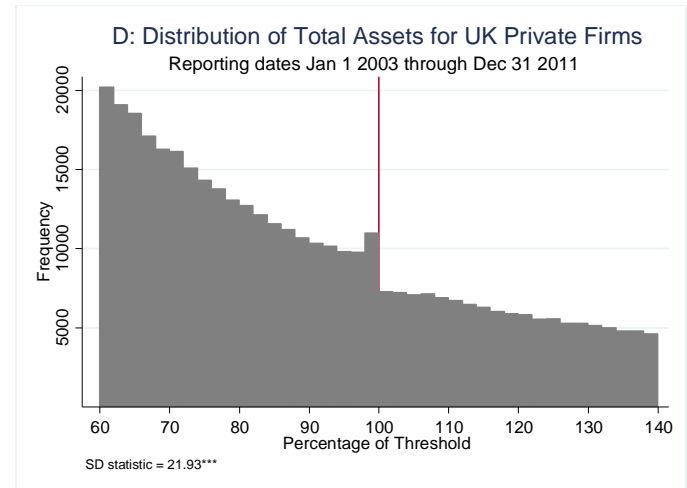
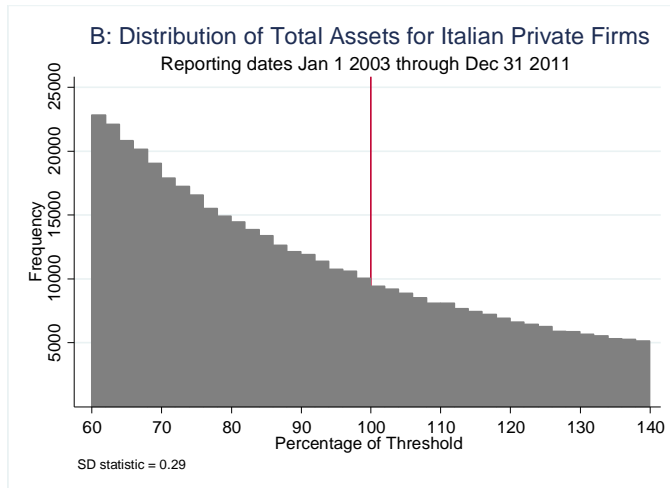
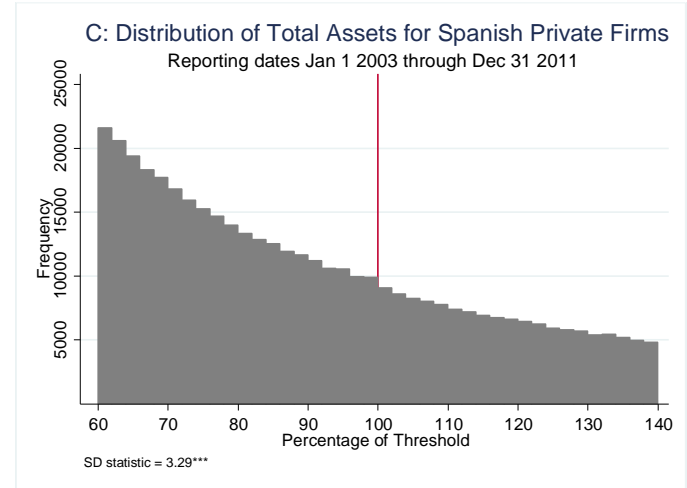
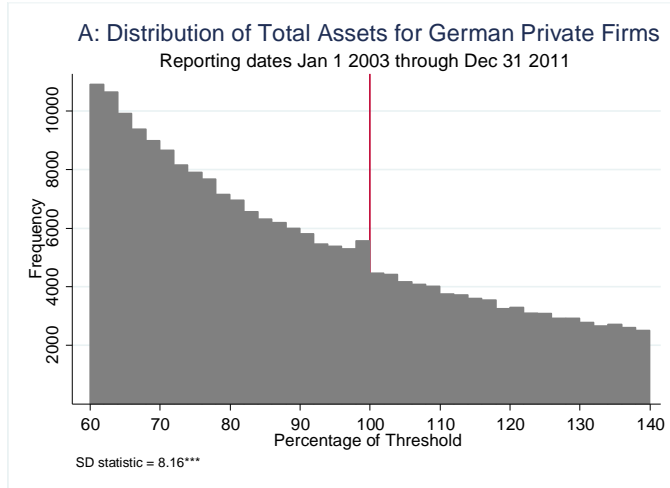


Table 1

Disclosure Requirements for European Private Firms.

This table summarizes the disclosure requirements for private European limited liability firms below and above the small-medium disclosure threshold. Abbreviated format disclosures, expanded abbreviated format disclosures, and full format disclosures are differentiated by the level of detail each presents. See Appendix A for a more complete description of disclosure requirements by country.

		<u>Below disclosure threshold</u>	<u>Above disclosure threshold</u>
Austria	Balance Sheet	Abbreviated format	Expanded abbreviated format
	Income Statement	No disclosure requirement	Abbreviated format
	Other disclosures	Abbreviated notes	Expanded abbreviated notes; director's report
Belgium	Balance Sheet	Abbreviated format	Full format
	Income Statement	Abbreviated format	Full format
	Other disclosures	Abbreviated notes	Notes; director's report
Denmark	Balance Sheet	Abbreviated format	Full format
	Income Statement	Abbreviated format	Full format
	Other disclosures	Abbreviated notes	Notes; director's report
Finland	Balance Sheet	Abbreviated format	Full format
	Income Statement	Full format	Full format
	Other disclosures	Expanded abbreviated notes	Notes; director's report; cash flow statement
France	Balance Sheet	Abbreviated format	Full format
	Income Statement	Abbreviated format	Full format
	Other disclosures	Abbreviated notes	Notes; director's report
Germany	Balance Sheet	Abbreviated format	Expanded abbreviated format
	Income Statement	No disclosure requirement	Abbreviated format
	Other disclosures	Abbreviated notes	Expanded abbreviated notes; director's report
Ireland	Balance Sheet	Abbreviated format	Full format
	Income Statement	No disclosure requirement	Abbreviated format
	Other disclosures	Abbreviated notes	Expanded abbreviated notes; director's report
Italy	Balance Sheet	Abbreviated format	Full format
	Income Statement	Abbreviated format	Full format
	Other disclosures	Abbreviated notes	Notes; director's report
Netherlands	Balance Sheet	Abbreviated format	Expanded abbreviated format
	Income Statement	No disclosure requirement	Abbreviated format
	Other disclosures	Abbreviated notes	Expanded abbreviated notes; director's report
Spain	Balance Sheet	Abbreviated format	Full format
	Income Statement	Abbreviated format	Abbreviated format
	Other disclosures	Abbreviated notes	Expanded abbreviated notes; director's report; cash flow statement
Sweden	Balance Sheet	Abbreviated format	Full format
	Income Statement	Abbreviated format	Full format
	Other disclosures	Abbreviated notes	Notes; director's report; cash flow statement
United Kingdom	Balance Sheet	Abbreviated format	Full format
	Income Statement	No disclosure requirement	Abbreviated format
	Other disclosures	Abbreviated notes	Expanded abbreviated notes; director's report

Table 2

Size Classification Thresholds by Country and Period.

This table summarizes the small-medium size thresholds for the 12 sample countries between Jan. 1, 2003, and Dec. 31, 2011. Dates listed are for firms' reporting end dates. Because our sample period starts Jan. 1, 2003, we list that date as the starting date in the "Since" column for all of the countries with audit and disclosure thresholds in effect as of Jan. 1, 2003 (i.e., this "Since" date does not mean that Jan. 1, 2003, was the date of the last change in the threshold before the start of the sample period). The number of employees refers to the average number of persons employed by the company during the fiscal year. For comparability across countries, we state all total assets and sales threshold levels in euro for all countries. We convert the total assets and sales thresholds set in local, non-euro currencies (e.g., Danish krone) to euro using the average exchange rate when the threshold levels were in effect; however, all underlying analyses are conducted in local currencies. Audit threshold amounts that do not coincide with disclosure thresholds are bolded and italicized. The non-bold but different assets and sales threshold levels shown in Panels A and B for the UK before April 5, 2009, are because the disclosure thresholds shifted two months earlier than the audit thresholds in 2004, a minor timing mismatch that results in a different average exchange rate.

	Panel A: Disclosure Thresholds				Panel B: Audit Thresholds			
	Since:	<u>Total assets</u>	<u>Sales</u>	<u>Employees</u>	Since:	<u>Total assets</u>	<u>Sales</u>	<u>Employees</u>
Austria	Jan. 1, 2003	3,125,000	6,250,000	50	Jan. 1, 2003	3,125,000	6,250,000	50
	Dec. 31, 2005	3,650,000	7,300,000	50	Dec. 31, 2005	3,650,000	7,300,000	50
	Dec. 31, 2008	4,840,000	9,680,000	50	Dec. 31, 2008	4,840,000	9,680,000	50
Belgium	Jan. 1, 2003	3,125,000	6,250,000	50	Jan. 1, 2003	3,125,000	6,250,000	50
	Dec 31, 2004	3,650,000	7,300,000	50	Dec. 31, 2004	3,650,000	7,300,000	50
Denmark	Jan. 1, 2003	2,689,560	5,379,120	50	Dec. 31, 2006	<i>201,338</i>	<i>402,676</i>	<i>12</i>
	March 31, 2005	3,890,495	7,780,990	50	Dec. 31, 2011	<i>538,052</i>	<i>1,076,104</i>	<i>12</i>
	Aug. 31, 2009	4,833,504	9,667,008	50				
Finland	Jan. 1, 2003	3,125,000	6,250,000	50	June 30, 2008	<i>100,000</i>	<i>200,000</i>	<i>3</i>
	Dec. 31, 2005	3,650,000	7,300,000	50				
France	Jan. 1, 2003	267,000	534,000	10	Jan. 1, 2003	<i>1,550,000</i>	<i>3,100,000</i>	<i>50</i>
	Dec. 31, 2010	1,000,000	2,000,000	20				
Germany	Jan. 1, 2003	3,438,000	6,875,000	50	Jan. 1, 2003	3,438,000	6,875,000	50
	Dec. 31, 2004	4,015,000	8,030,000	50	Dec. 31, 2004	4,015,000	8,030,000	50
	Dec. 31, 2009	4,840,000	9,680,000	50	Dec. 31, 2009	4,840,000	9,680,000	50
Ireland	Jan. 1, 2003	1,904,607	3,809,214	50	Jan. 1, 2003	1,904,607	<i>317,434</i>	50
					June 30, 2005	1,904,607	<i>1,500,000</i>	50
					Feb. 24, 2007	<i>3,650,000</i>	<i>7,300,000</i>	50
Italy	Jan. 1, 2003	3,125,000	6,250,000	50	Jan. 1, 2003	3,125,000	6,250,000	50
	Dec. 12, 2006	3,650,000	7,300,000	50	Dec. 12, 2006	3,650,000	7,300,000	50
	Nov. 21, 2009	4,400,000	8,800,000	50	Nov. 21, 2009	4,400,000	8,800,000	50
Netherlands	Jan. 1, 2003	3,500,000	7,000,000	50	Jan. 1, 2003	3,500,000	7,000,000	50
	Dec. 31, 2004	3,650,000	7,300,000	50	Dec. 31, 2004	3,650,000	7,300,000	50
	Dec. 31, 2006	4,400,000	8,800,000	50	Dec. 31, 2006	4,400,000	8,800,000	50
Spain	Jan. 1, 2003	2,373,998	4,747,996	50	Jan. 1, 2003	2,373,998	4,747,996	50
	Dec. 31, 2008	2,850,000	5,700,000	50	Dec. 31, 2008	2,850,000	5,700,000	50
Sweden	Dec. 31, 2007	2,582,500	5,165,000	50	Oct. 31, 2011	<i>165,300</i>	<i>330,600</i>	<i>3</i>
	Oct. 31, 2011	4,408,000	8,816,000	50				
United Kingdom	Jan. 1, 2003	2,024,120	4,048,240	50	Jan. 1, 2003	2,030,980	<i>1,450,700</i>	50
	Jan. 30, 2004	3,944,080	7,888,160	50	March 30, 2004	3,937,360	7,874,720	50
	April 5, 2009	3,755,520	7,488,000	50	April 5, 2009	3,755,520	7,488,000	50

Table 3

Sample Selection Procedure.

This table summarizes the steps of the sample selection process. Panel A shows the attrition of unique firm-year observations available at all levels of the size distributions. Panel B shows the attrition of size-variable observations (each firm-year observation can have up to three size-variable observations).

Panel A: Firm-Year Observations

	<u>Austria</u>	<u>Belgium</u>	<u>Denmark</u>	<u>Finland</u>	<u>France</u>	<u>Germany</u>	<u>Ireland</u>	<u>Italy</u>	<u>Netherlands</u>	<u>Spain</u>	<u>Sweden</u>	<u>UK</u>	<u>Total</u>
Single account firm-year observations within the sample period	679,782	2,794,715	824,553	957,658	6,947,687	5,780,829	843,775	5,939,260	4,051,965	5,380,630	2,066,215	10,362,042	46,629,111
<i>Less: public firms, firms in finance, insurance, and public administration, non-limited liability firms, and firms using IFRS</i>	<u>-67,658</u>	<u>-1,342,210</u>	<u>-243,115</u>	<u>-57,511</u>	<u>-2,622,321</u>	<u>-1,082,671</u>	<u>-306,118</u>	<u>-1,625,698</u>	<u>-425,002</u>	<u>-703,951</u>	<u>-51,686</u>	<u>-863,331</u>	<u>-9,391,272</u>
Selected unique firm-years available	612,124	1,452,505	581,438	900,147	4,325,366	4,698,158	537,657	4,313,562	3,626,963	4,676,679	2,014,529	9,498,711	37,237,839

Panel B: Size-Variable Observations

Available observations within 2% of active or inactive thresholds	10,804	3,348	14,206	13,240	158,943	51,422	4,403	84,618	35,159	56,716	11,927	83,194	527,980
<i>Less: observations due to violation of assumption of data smoothness</i>	<u>-3,779</u>	<u>-0</u>	<u>-0</u>	<u>-727</u>	<u>-0</u>	<u>-17,081</u>	<u>-0</u>	<u>-0</u>	<u>-2,727</u>	<u>-0</u>	<u>-0</u>	<u>-0</u>	<u>-24,314</u>
Baseline sample of available observations	7,025	3,348	14,206	12,513	158,943	34,341	4,403	84,618	32,432	56,716	11,927	83,194	503,666

Table 4

Cross-Country Size Management Regressions: Baseline Specification.

This table presents the results of estimating Eq. (1) using a logit model. The dependent variable equals one if the observation is in the bin immediately below the threshold and zero if the observation is in the bin immediately above, where bin size is 2% of the threshold. Expanded disclosure equals one if expanded public disclosure requirements are imposed at the threshold to which the observation is adjacent and zero otherwise. External audit equals one if a mandatory audit requirement is imposed at the threshold to which the observation is adjacent and zero otherwise. Z-statistics, shown in parentheses, are calculated using standard errors clustered by country-size variable-year. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

MODEL	Prediction	1	2	3	4	5
Expanded disclosure	(+)	0.033*** (3.58)	0.033*** (3.27)	0.031*** (3.07)	0.028** (2.34)	0.027** (2.29)
External audit	(+)	0.145*** (8.79)	0.153*** (9.50)	0.154*** (9.33)	0.144*** (7.51)	0.132*** (6.46)
Constant		0.028*** (6.71)	0.072*** (10.28)	0.072*** (9.93)	0.076*** (8.50)	0.030*** (6.82)
Country-year fixed effects?		No	Yes	Yes	Yes	No
Exclude thresholds that impose sales and employee count disclosure?		No	No	Yes	Yes	Yes
Only include assets thresholds?		No	No	No	Yes	Yes
<i>Pseudo R</i> ²		0.001	0.001	0.001	0.001	0.001
<i>N</i>		503,666	503,666	490,508	349,775	349,775

Table 5

Cross-Country Size Management Regressions: Disclosure Decomposition.

This table presents the results of estimating a variant of Eq. (1) using a logit model. The dependent variable equals one if the observation is in the bin immediately below the threshold and zero if the observation is in the bin immediately above, where bin size is 2% of the threshold. Income statement disclosure equals one if income statement disclosure is required above the threshold to which the observation is adjacent but not below and zero otherwise. Cash flow statement disclosure equals one if cash flow statement disclosure is required above the threshold to which the observation is adjacent but not below and zero otherwise. Other disclosure equals one if expanded public disclosure requirements other than cash flow statement or income statement disclosure are imposed at the threshold to which the observation is adjacent and zero otherwise. External audit equals one if a mandatory audit requirement is imposed at the threshold to which the observation is adjacent and zero otherwise. Z-statistics, shown in parentheses, are calculated using standard errors clustered by country-size variable-year. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

MODEL	Prediction	1	2	3	4	5
Income statement disclosure	(+)	0.124*** (3.83)	0.091** (2.55)	0.094** (2.50)	0.134*** (3.57)	0.160*** (4.53)
Cash flow statement disclosure	(+)	0.011 (0.40)	0.020 (0.66)	0.021 (0.68)	-0.012 (-0.57)	-0.022 (-1.38)
Other disclosure	(+)	0.015* (1.89)	0.014* (1.75)	0.013 (1.54)	-0.003 (-0.29)	-0.002 (-0.18)
External audit	(+)	0.106*** (7.29)	0.126*** (7.59)	0.127*** (7.65)	0.094*** (6.52)	0.071*** (5.26)
Constant		0.033*** (9.00)	0.062*** (5.84)	0.060*** (5.39)	0.058*** (4.85)	0.037*** (9.96)
Country-year fixed effects?		No	Yes	Yes	Yes	No
Exclude thresholds that impose sales and employee count disclosure?		No	No	Yes	Yes	Yes
Only include assets thresholds?		No	No	No	Yes	Yes
<i>Pseudo R</i> ²		0.001	0.001	0.001	0.001	0.001
<i>N</i>		503,666	503,666	490,508	349,775	349,775

Table 6

Determinants of Size Management.

This table presents the results of estimating Eq. (2) using a logit model. The sample is restricted to UK firm-year observations with fiscal years ending 2003–2011. For this analysis, we exclude firms above the threshold that do not disclose income statement information as well as firms below the threshold that do. The dependent variable is measured in year t . The independent variables in levels are measured in year $t-1$. The independent variables in changes are measured between $t-2$ and $t-1$. The dependent variable equals one if the observation is in the bin immediately below the threshold and zero if the observation is in the bin immediately above, where bin size is 2% of the threshold. Change in firm equity equals the change in total equity of the firm, scaled by total assets. Assets growth equals the change in total assets, scaled by total assets. Noncurrent liabilities equal the noncurrent liabilities of the firm, scaled by total assets. The proportion below threshold for peers equals the mean of the dependent variable for firms in the same industry (three-digit NAICS) and year, excluding the firm itself. Herfindahl index is formed by four-digit NAICS and is constructed using total assets of UK firms with publicly disclosed financial statements. Market share of public rivals equals the percentage of total assets in the four-digit NAICS industry held by public firms. Intangibility equals intangible assets, scaled by total assets. Year incorporated equals the year in which the firm was formed. Inventory intensity equals the inventory of the firm, scaled by total assets. Number of shareholders equals the number of shareholders reported on Amadeus as of January 2012. Fixed asset intensity equals the total fixed assets of the firm, scaled by total assets. All continuous variables are winsorized at the 5% and 95% levels to mitigate the effects of outliers. Z-statistics, shown in parentheses, are calculated using heteroskedastic-consistent Huber-White standard errors. ***, **, and * denote statistical significance at the 1%, 5%, and 10% levels, respectively.

Model	Prediction	1	2	3	4
Change in firm equity	(+)	0.696*** (2.58)	1.187*** (4.09)	1.144*** (3.94)	1.166*** (4.02)
Assets growth	(+)	0.188** (2.19)	0.216** (2.29)	0.212** (2.19)	0.218** (2.30)
Noncurrent liabilities	(+)	0.766*** (6.78)	0.448*** (3.41)	0.396*** (2.87)	0.448*** (3.38)
Proportion below threshold for peers	(+)				0.743*** (3.09)
Herfindahl index	(?)		-1.863*** (-2.84)	0.750 (0.74)	-1.808*** (-2.71)
Market share of public rivals	(?)		0.757 (1.62)	-0.820 (-1.16)	0.630 (1.34)
Intangibility	(+)		-2.134 (-1.14)	-0.458 (-0.23)	-2.190 (-1.16)
Year incorporated	(+)		0.004** (2.06)	0.006*** (2.87)	0.004* (1.94)
Inventory intensity	(?)		0.741*** (5.23)	0.636*** (3.86)	0.740*** (5.19)
Number of shareholders	(?)		0.200*** (8.98)	0.191*** (8.50)	0.196*** (8.80)
Fixed assets intensity	(?)		0.840*** (8.81)	0.687*** (6.24)	0.826*** (8.59)
Constant	(?)	0.972*** (28.18)	-7.891** (-2.00)	-11.409*** (-2.63)	-7.891** (-1.99)
Year and industry (three-digit NAICS) fixed effects?		No	No	Yes	No
<i>Pseudo R</i> ²		0.008	0.0402	0.0786	0.0415
<i>N</i>		7,944	7,147	7,104	7,123