JOURNAL OF FINANCIAL AND QUANTITATIVE ANALYSIS Vol. 57, No. 8, Dec. 2022, pp. 3048–3080

doi:10.1017/S0022109021000661

Agency Costs of Debt in Conglomerate Firms

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Abstract

I use an accounting reform to assess the agency cost of debt in diversified firms. Those firms that switch from single to multiple segments following the reform suffer a 12% increase in their bond spread when compared with their stand-alone peers. Consistent with lenders anticipating underinvestment and asset-substitution incentives, diversified firms with high cash-flow volatility across divisions suffer the highest increase in borrowing costs. I employ a novel approach that allows abstracting from unobservable characteristics that would otherwise influence the pricing of diversified firms' debt.

I. Introduction

This study exploits a change in segment accounting standards in order to examine the causal effect of corporate diversification on the cost of debt capital.[1] There have been several important attempts in the theoretical literature to investigate the relationship between firm diversification and corporate risk. Lewellen (1971) and Kim and McConnell (1977) develop models of the coinsurance benefits of diversification. Their model shows that the coinsurance effect across segments mitigates the risk of debt financing and enhances a firm's debt capacity.

I thank an anonymous referee and Paul H. Malatesta (the editor) for a careful and constructive review of the article. This article received useful comments by Tanja Artiga-Gonzales, Marc Deloof, Florian Heider, Elisabeth Kempf, Marie Lalanne, and Giovanna Nicodano. I also thank the participants in the finance seminars at SAFE (Goethe University), Tilburg University, Maastricht University, European Central Bank Financial Research Division, Vrije University Amsterdam, the University of Melbourne, and HEC-Montreal. I also thank the participants at the 2018 CICF conference, Ni Chenkai and Vojislav Maksimovic for acting as discussant, the participants at the 2017 EFA Annual Meeting, at the World Finance conference, and at the 2019 ESSFM (Corporate Finance Week) in Gernzensee. This research did not receive any specific grant from funding agencies in the public, commercial, or not-for-profit sectors. All errors are mine. The usual disclaimer applies.

[1] I use the terms "conglomerates," "diversified firm," and "multisegment firm" interchangeably to refer to companies that report multiple operating segments in the 10-K. Similarly, I use the terms "single-segment firm" and "stand-alone firm" interchangeably to refer to a firm that does not report multiple operating segments. Finally, I use the terms "segment units," "segments," "business units," and "operating units" interchangeably to refer to a business unit with separate financial reporting in the 10-K, and "restating diversified firms," "single-to-multisegment firms," and "switching firms" to refer to treated firms.

In their subsequent study, Gahlon and Stover (1979) cast doubt on the findings by Lewellen (1971) concerning the coinsurance benefits related to corporate diversification. The increased risk from excessive financial leverage may result in conglomerates losing what they have otherwise gained in debt capacity due to diversification. Myers (1977) and Flannery, Houston, and Venkaratan (1993) also question the presence of coinsurance benefits for diversified firms. These studies show that the pooling of segments with heterogeneous risk carries potential underinvestment costs. Better performing segments forgo good investment opportunities to compensate for poorly performing segments. This exacerbates the asset-substitution incentives across divisions and deteriorates the firms' risk profile.

Because corporate diversification has effects that both increase and decrease expected agency costs of debt, it is an empirical question whether diversification affects a firm's overall cost of borrowing. There are, however, few empirical studies on the pricing of debt of diversified firms. The main reason for this gap in the literature is that researchers cannot easily observe the initial formation of conglomerates and their subsequent allocation of debt across divisions.[2] The only study investigating the effect of firm diversification on the cost of capital by Hann, Ogneva, and Ozbas (2013) finds an inverse correlation between the cost of capital and diversification because of coinsurance benefits.

My article closes this gap in the literature by employing a quasi-natural experiment to test theories of the relationship between corporate diversification and firms' cost of borrowing. I employ a difference-in-difference method to analyze the effect of a policy reform (the introduction of the Statement of Financial Accounting Standards No. 131 (SFAS 131)) on the pricing of a sample of corporate bonds in the United States. The reform changes the definition of a business segment to reduce managerial discretion in the disclosure of financial information about the firm's business divisions. Following the reform, individual segment data are more disaggregated; it becomes more difficult to withhold the financial information of business units. More importantly, for present purposes, the reform offers a unique empirical setup, because it forces some firms to reveal their diversified structure for the first time.

I compare the change in borrowing cost for faux stand-alone firms, those newly revealed by the accounting reform to be conglomerates, to that of true stand-alone firms (those whose disclosed stand-alone status does not change with the reform). This comparison allows me to assess the costs and benefits of diversification when firms reveal their internal capital market for the first time. I find that firms that switch from one to multiple segments (my treatment sample) suffer a significant increase of 18 basis points (bps) in the bond spread relative to stand-alone firms. This estimate implies an average increase in the yield spreads of 12%, or an average increase in financing costs for conglomerate firms of $23 million for each bond issue.

[2]Villalonga (2004a) and Hoberg and Phillips (2010) emphasize the empirical definition of a conglomerate firm being driven by the industry classifications. Gomes and Livdan (2004) argue that there exists a self-selection problem due to worse performing segment units forming conglomerate firms.

To establish an economic explanation for my results, I also investigate how the treatment effect varies with firm characteristics. I find that treated firms with more significant differences in cash-flow volatility across segments suffer the largest increase in yield spreads after the reform. This finding is consistent with the theory of Flannery et al. (1993), which predicts that centralized borrowing by divisions with highly heterogeneous risk generates agency costs of debt, which can outweigh the benefit of coinsurance.

I also examine whether the detrimental effect of the reform is greater for firms facing tighter financial constraints. Because these firms benefit more from coinsurance (Hann et al. (2013)), and suffer more when agency problems arise, the effect of the reform on financially constrained firms is ambiguous. I use proxies for financial constraints including the Whited and Wu (2006) index and the speculative-grade debt rating to show that the bond's spreads of single-to-multisegment firms that are financially constrained increase up to 35 bps following the reform.

The findings are robust to alternative model specifications and measures of the cost of debt. I also test whether the increase in the cost of debt is due to an increased likelihood of product market competition (Botosan and Stanford (2005)) or to managerial self-dealing facilitated by opaque disclosures (Dechow, Sloan, and Sweeney (1995)). I do not find evidence to support these alternative explanations.

This article makes an important contribution to research on the effect of corporate diversification on firms' cost of debt. First, I contribute to the empirical literature on diversification and the cost of borrowing. Hann et al. (2013) find a negative correlation between the cost of capital and corporate diversification. This negative relationship is a result of the imperfect correlation of the cash flows of business units that, by helping the firm avoid financial distress, reduce its systematic risk (see Almeida and Philippon (2007); Gopalan, Nanda, and Seru (2007)). My contribution to this literature is a novel empirical strategy that addresses the endogeneity of conglomerate formation. Furthermore, it allows the testing of competing theories of the relationship between internal capital markets and the cost of borrowing (see Kim and McConnell (1977), Lewellen (1971), Myers (1977), Flannery et al. (1993)). I find that conglomerates have high costs of borrowing when revealing their agency problems for the first time.

The article is also relevant to work on the effects of the SFAS 131 introduction on firm outcomes. Although the SFAS 131 requirements, and segment disclosure in general, have been studied extensively in the finance and accounting literature, few articles have looked at the effect of this reform on the firm's cost of borrowing. Herrmann and Thomas (2000) find that the application of the SFAS 131 induces more detailed segment disclosure, with a consequent reduction in the number of single-segment firms. Cho (2015) studies the relationship between segment disclosure and the efficiency of internal capital markets on the introduction of the SFAS 131. Berger and Hann (2003) study the effect of the reform on stock prices, finding that the diversification discount for these "hidden" conglomerates increases in the post-reform period. The only study investigating the effect of the reform on borrowing costs is that of Franco, Urcan, and Vasvari (2016). The authors find that more detailed segment reporting decreases the cost of borrowing for conglomerate firms, because it reduces the information asymmetry for lenders. As compared with their work, my article makes 2 distinct contributions: i) it analyzes firms that, at the time of the reform, have not been disclosed as conglomerates and ii) it addresses the empirical concern related to the endogeneity of conglomerate formation.

My study also complements the literature on corporate diversification and firm value. Following the early work of Coase (1937), several studies compare resource allocation in conglomerates and stand-alone firms to investigate how firm boundaries affect firm value and efficiency (see Lang and Stulz (1994), Berger and Ofek (1995), Rajan, Servaes, and Zingales (2000), Scharfstein and Stein (2002), Whited (2001), Campa and Kedia (2002), Villalonga (2004b), Hoang and Ruckes (2015), and Maksimovic and Phillips (2013)). The discussion in this literature mostly relates to the endogenous differences, in cash flows and investment policies, between conglomerates and stand-alone firms. My results align with Berger and Hann (2003), who identified that single-to-multisegment firms' value is discounted when agency costs are revealed to the market. Finally, the article relates to the empirical literature on the determinants of debt pricing (see Fama and French (1993); Collin-Dufresne, Goldstein, Martin (2001)). It shows that corporate diversification matters for debt valuation.

The remainder of the article is organized as follows: Section II describes the institutional setting, and Section III presents the empirical strategy, the data, and the variables used. Section IV reports the empirical results, whereas robustness is discussed in Section V. Conclusions follow. The Appendix provides the details of the variables used in the analysis.

II. The Segment Disclosure Reform

Obligations to report on business segments were established in the 1970s by the Financial Accounting Standard Board (FASB) in their Statement of Financial Accounting Standards No. 14 (SFAS 14), Financial Reporting for Segment and Business Enterprise. Under this standard, a company reveals information about revenues, assets, depreciation, and capital expenditure for each industry segment representing at least 10% of the firm's revenues. The definition of a segment in SFAS 14 follows the industry approach. This approach allows the managers to report the financial information of several segments collapsed into a single, very broadly defined industry segment.

Analysts widely criticized this standard for its definition of "industry," which gives managers extensive flexibility in deciding which segments to report. A report issued by the FASB in 1992 shows that 25% of the 6,935 public companies surveyed indicated that their business had more than 1 segment in the period from 1985 to 1991. Of the 1,035 companies with sales greater than $1 billion, 43% declared themselves single-segment firms under the SFAS 14 regulation.

The FASB issued the new regulation, SFAS 131, which came into effect at the end of Dec. 1997, to replace SFAS 14. This new regulation follows the "management approach" in identifying a segment. The SFAS 131 requires that a public company reports financial information about its operating segments identified on the basis of the firm's organizational chart and reporting hierarchy. Berger and Hann (2003) show that some of this information was not available to analysts before the reform. The underlying regulatory assumption is that

TABLE 1

Segment Disclosure After the Reform

Table 1 reports the 10-K segment disclosure of the International Shipholding Corporation, Inc., before (1997) and after (1998) the reform. The company operates a diversified fleet of U.S. and international flag vessels that provide international and domestic maritime transportation services under charters or contracts. Panel A reports the main financial ratios for each segment reported under the SFAS 14 standard, whereas Panel B reports the SIC code and the main financial ratios (sales, CAPEX, and EBITDA) of the firm segments upon the introduction of the Statement of Financial Accounting Standards No. 131. The unit of measure is US$ millions.

	SIC	SALES	EBITDA	CAPEX
Panel A. 1997				
International Shipholding Corp.	3,011	1,813	303.5	107.03
Panel B. 1998				
Liner services	3,011	194.568	15.037	19.41
Charter contracts	3,714	125.558	15.695	104.183
Contracts affairs	3,714	561.54	3.648	4.415
Other	3,011	7.868	2.435	3.005

management has superior information about the firm's internal structure that is relevant to external investors.

As a direct consequence of the SFAS 131,[3] a significant number of firms in the United States, around 20%, restated the numbers of segments (or divisions) they have, and disclosed more detailed financial information concerning these "new" units. Significantly, some firms changed their status from single to multiple segment firms, for the first time revealing themselves to the financial markets as conglomerates. Table 1 illustrates the substantial increase in the segment-related information disclosed to the market by a firm in my sample (International Shipholding Corp.) that changes its status from a single-to-multisegment firm. The company is a U.S. multinational corporation providing international and domestic maritime transportation services to commercial customers. Panel A of Table 1 sets out the financial statement for segments before 1998, and Panel B sets out the post-reform statement.

On the introduction of the SFAS 131, the firm under consideration discloses one business segment operating in the tire business, as defined in SIC code 3011. After 1998, the company discloses 4 segments: Liner Service, Charter Contracts, Contracts Affairs, and Other. These segments operate in 2 different industries: the tire and automotive industries (SIC codes 3011 and 3714). Panel B of Table 1 shows that the segment "Charter Contracts" requires noticeable capital investments, whereas the "Contracts Affairs" unit requires less for its operation than the cash flow it generates. The new segment information better reveals the extent of resource transfers between segments. If the firm issues debt before and after the reform, this new information provides a unique setup to investigate the costs and benefits, in terms of borrowing costs, of corporate diversification.

[3]A summary of the reform is available at https://fasb.org/Page/ShowPdf?path=aop_FAS131.pdf&title=FAS+131+%28AS+AMENDED%29&acceptedDisclaimer=true&Submit=. As defined in the FASB document, "operating segments are components of an enterprise about which separate financial information is available that is evaluated regularly by the chief operating decision maker in deciding how to allocate resources and in assessing performance." The underlying assumption of the regulator is that the management has superior information about the firm organization.

Segment Disclosure and Cost of Debt

There is a consensus in the accounting literature on the benefits of transparency and decreased monitoring costs associated with the introduction of the SFAS 131. Berger and Hann (2003) and others (see Botosan and Stanford (2005)) establish that reducing segment aggregation leads to improved informational content of accounting data. Franco et al. (2016) find that, because the reform increases transparency, it decreases the yield spreads of conglomerate firms (disclosed as such prior to the reform) up to 35 bps when they restated their segments' information after the introduction of the SFAS 131.

In general, post-reform transparency and monitoring improvements should be beneficial for firms' borrowing costs. However, this might not the case for firms that, to hide agency problems, do not disclose their diversification status. In an early work, Myers (1977) posits that diversification carries with it the costs of underinvestment. Pooling divisions with heterogeneous risk but centralized debt can induce healthy divisions to forgo valuable investment opportunities to compensate for the poor performance of other divisions. In turn, the heterogeneity of risk across segments creates incentives for asset substitution from healthy to riskier projects (see Flannery et al. (1993)), which worsens the risk profile of these conglomerates. Nagar, Nanda, and Wysocki (2003) show empirically that these agency costs are a factor preventing conglomerates from disclosing segment information.

Because the reform also reveals the coinsurance benefits of diversification (Lewellen (1971)), the net effect of these forces (agency costs vs. coinsurance benefits) is ambiguous. I posit that, if agency costs outweigh the coinsurance benefits, single-to-multisegment firms experience a higher cost of debt after the reform than comparable stand-alone firms. Furthermore, in line with Myers' (1977) theory, I expect single-to-multisegment firms with highly volatile cross-segment cash flows to suffer the larger increase in the cost of borrowing, compared with their stand-alone peers. I sum up my previous arguments as follows:

H1. Single-to-multisegment firms experience a higher cost of debt than comparable stand-alone firms, upon the introduction of the SFAS 131.

H1.1. The increase in the cost of debt is greater for single-to-multisegment firms with high volatility in the cash flows across the (newly revealed) segment units.

Other forms of agency costs that are detrimental to shareholders might have an ambiguous effect on bondholder wealth and need to be analyzed. The "corporate socialism" costs that are theorized in Rajan et al. (2000) provide one example. These costs arise when a CEO is unable to allocate funds across divisions efficiently. Managers of low-growth divisions tend to engage in rent-seeking activities and poach resources from those divisions with higher growth. In anticipation of this behavior, managers of opportunity-rich divisions make defensive investments in order to make it more difficult to poach any surplus. In a recent work, Hoang and Ruckes (2015) confirm that competition for capital budgets is only effective in increasing capital returns if divisions are perceived to be similar. Bondholders are not usually impacted by these inefficient, albeit defensive, investment decisions. Therefore, I expect such "corporate socialism" costs will not affect the debt pricing of the newly revealed conglomerates.

Another example of agency costs includes the costs of free cash flow (Jensen and Meckling (1976), Jensen (1986)). This strand of research considers corporate diversification a window of opportunity for opportunistic behaviors, including empire-building strategies and entrenchment (Stulz 1990). Specifically, the managers of cash-rich divisions tend to invest any extra cash arising from the pooling of the segments' cash flows in projects with a negative net present value (NPV). This allows them to increase their division's size and then enjoy the benefits and the power of running a bigger division (see Duchin and Sosyura (2013)). Unless these strategies have an extremely negative impact on the firm assets' value (and thus on the debt value), they usually do not affect the pricing of the debt.

There might be other factors preventing conglomerates from disclosing information about their investment policies. The existence of proprietary costs is one such factor (Harris (1998)). Providing that managers have some discretion in segment aggregation, Botosan and Stanford (2005) show that segment disclosure imposes costs on firms in the form of competitive harm. For example, it may be impossible to infer proprietary information where segment disclosure takes place by product line. Competitive harm is perceived as an increase in risk for bondholders and provides an alternative explanation for the change in yield spreads of conglomerates, upon the introduction of the SFAS 131.

Firms may also choose not to disclose segment information as a result of managers being opaque in relation to segment disclosure (Jones (1991)). For example, because prior segment disclosure regulation (SFAS 14) allows CEOs some flexibility in segment reporting, they might be tempted to smooth the income of poorly performing segments to meet the pre-reform earnings forecasts of analysts (see Burgstahler and Eames (2006)). I investigate these alternative economic channels in Section V.A.

III. Empirical Strategy and Data

The main dependent variable in my analysis is the firm's cost of borrowing, which I capture with the variable SPREAD, which is the offering yield spread of the bond at the time of issuance on the primary bond market. This is computed as the difference between the bond yield and the corresponding yield on treasury bonds with the same time to maturity. For robustness purposes, I use the bond YIELD, and I construct the variables EXCESS_SPREAD and EXCESS_YIELD, computed as the difference between the bond spread (yield) and the average spread (yield) of a portfolio of bonds in the same rating-maturity category (Bessembinder, Kahle, Maxwell, and Xu (2009)).

To capture the effect of the disclosure of segment-related information on the market price of corporate bonds issued by single-to-multisegment firms, I employ the empirical difference-in-difference estimation including covariates. The treatment effect is the obligation, after the introduction of the SFAS 131 reform, to report financial and descriptive information concerning the firm's operating segments. The variable AFTER captures the years following the end of 1997, when the reform came into effect.

As my treatment group, or treated firms, I identify all corporate bonds issued by firms issuing debt on the primary bond market that restated their structure as going from one to multiple segments after the reform. My control group comprises stand-alone firms that did not disclose a changed structure when the segment disclosure reform came into effect. The coefficient of interest is the one corresponding to the interaction term ln(SEG) × AFTER. This term is the product of ln(SEG), the natural logarithm of the number of segments of the firms in my sample, and AFTER, an indicator variable that takes the value of 1 in the years after the reform (1998 ahead), and 0 otherwise. I estimate a difference-in-difference regression of the following form:

$$\text{(1)} \qquad \text{YIELD\_SPREAD}_{bit} = \alpha + \beta_1 \text{LnSEG}_i \times \text{AFTER}_t + \lambda' X_{bit} + \mu_i + \gamma_t + \varepsilon_{bit},$$

where the dependent variable is the yield spread of bond b of firm i on the primary bond market issued at time t. I expect a positive sign for the coefficient ln(SEG) × AFTER if the debt-pricing benefits of firms that restate as diversified are lower than the associated costs. The vector **X** controls for standard bond and firm characteristics, as set out in Section III.B, and year fixed effects (γ_t). In all the estimations, I control for firm heterogeneity with firm fixed effects.[4]

To control for the effect of the agency costs on firms' cost of borrowing, I perform a triple-difference regression, where I employ several interaction terms that proxy for the agency costs category of interest, following the model:

$$\text{(2)} \qquad \text{YIELD\_SPREAD}_{bit} = \alpha + \beta_1 \text{LnSEG}_i \times \text{AFTER}_t + \beta_2 \text{LnSEG}_i \times \text{AFTER}_t \times \text{z}_i + \beta_3 \text{z}_i \times \text{AFTER}_t + \lambda' X_{bit} + \mu_i + \gamma_t + \varepsilon_{bit},$$

where **Z** is the vector of variables that proxy for the tested theory. Any alternate explanation based on omitted factors explaining the results should also explain why they are concentrated on specific subsamples.

For this empirical strategy to work, the assignment to the treatment group should be exogenous. The reform considered here imposes a mandatory change in disclosure. It is thus unlikely that single-to-multisegment firms will fail to disclose their segment units after the reform, as shown in Cho (2015). Nevertheless, Section V.C presents an alternative version of equation (1) that accounts for the possibility that firms strategically decide to remain stand-alone firms.

A. Proxies for Agency Costs and Coinsurance Benefits

To assess the severity of the agency problems faced by diversified firms, I construct measures for the relevant agency costs based on the existing literature. First, I use the cross-segment volatility of cash flows as a measure of the variability in operating risk across segment units. This variable proxies for the likelihood of underinvestment and asset-substitution problems theorized in Myers (1977). For each year and industry category (marked by its 3-digit SIC code) in my sample, I construct the asset-weighted average of the time-series standard deviations of quarterly cash flow, computed as earnings before interest, tax, depreciation, and

[4]Note that firm fixed effects absorb the coefficient ln(SEG), whereas year fixed effects absorb the coefficient AFTER. In all the estimations, the standard errors are clustered at the firm-quarter level. In the robustness tests, I also employ alternative types of clustering.

amortization (EBITDA) of assets, over the 20 quarters prior to the bond issuance, scaled by total assets. I then assign to each segment the corresponding industry cash-flow volatility, according to the closest SIC code. Finally, I compute the standard deviation of these segments' cash-flow volatilities after the reform to assess the variability of the operating risk across segment units.[5]

To measure the corporate socialism effect discussed in Rajan et al. (2000), I use the variability of cross-segment growth options in the first year after the reform. High variability in the growth opportunities of the new segments would stimulate defensive investments by high-growth divisions. This variability is computed as the standard deviation of the market-to-book value of the segments over 20 quarters prior to the bond issuance (see Kolasinski (2009)). Because it is not possible to observe a divisions' market-to-book value, I assign to each segment the average market-to-book value in the corresponding industry, according to the closest SIC code. To control for the firm's investment opportunities, I use firms' market-to-book value in the pre-reform period. Finally, I construct the variable NETCASH as the difference between cash flow minus capital expenditures (scaled by firms' assets), which acts as a proxy for the free-cash-flow hypothesis (Jensen (1986)).

To measure the coinsurance benefits, I use the cross-segment cash-flow correlation of single-to-multisegment firms. Following Hann et al. (2013) and many others, the construction of this variable follows two stages. First, the industry cash flows are the residuals from a regression of the average industry cash flow of stand-alone firms on the markets' (average) cash flow and on Fama and French (1993) factors. Next, I estimate pairwise industry correlations using the prior 5-year (or 3 years, when missing) industry cash flows, for each year in the sample. I impute the industry pairwise correlation according to the SIC code to the segment pairs, and I compute a correlation measure for firm i in year t with n number of segments as follows:

$$\text{CFCORR}_{it(n)} = \sum_{p=1}^{N}\sum_{q=1}^{N} w_{ip(j)} w_{iq(k)} \times \text{CORR}_{jk}[t-5, t-1](j,k), \tag{3}$$

where $w_{ip(j)}$ are the weights (segments' sales over total firm sales) of segment p of firm i operating in industry j, and $\text{CORR}_{([t-5,t-1](j,k))}$ is the correlation of industry cash flows between industries j and k over the 5-year period before year t. A high correlation of segment cash flows proxies for a lower coinsurance across segment units; at the maximum level are stand-alone firms, which have 0 coinsurance and a correlation equal to 1.

B. Data and Sample

I use the Mergent Fixed Income Securities Database (FISD) to identify all bonds issued between 1995 and 2000 on the primary U.S. bond market. First, I exclude firms that issue bonds only before or only after the reform. Relevant

[5]In the robustness section of the Supplementary Material, following Berger and Hann (2007), I also construct a measure of the contagion costs across segments with different operating risk, computed as the number of segments that disclose financial losses at the time of the introduction of SFAS 131.

https://doi.org/10.1017/S0022109021000661 Published online by Cambridge University Press

bond characteristics include time to maturity (logarithm of months to maturity), the presence of covenants or a call option (Y/N), the logarithm of the bond amount, and debt seniority. I control for differences in default risk using the average of Moody's, S&P's, and Fitch credit ratings (RATING). Following the approach in the literature, I exclude bonds issued by financial and utility firms, asset-backed securities, subsidiary bonds, convertibles, floating-rate bonds, bonds with missing rating information, and bonds with a time to maturity of over 50 years (see Bessembinder et al. (2009)).

For each bond issuer in my sample, I also retrieve the consolidated financial ratios from Compustat North America for the fiscal year before a given bond issuance. Following previous studies that analyze the effect of segment disclosure on the yield spreads (Franco et al. (2016)), I include in my analysis firm LEVERAGE, SIZE, return on assets (ROA), the market-to-book ratio (MKBK), and firm operating risk (OPRISK). The latter is calculated over the 5 years prior to the bond issuance. I also include the variable LOSS, an indicator variable that equals 1 if firm EBIT is negative in the year before the bond issue (and 0 otherwise). The Appendix provides the complete distribution of the variables used in the analysis, together with their definitions.

Using the Compustat Historical Segment data set, I identify firms that moved from single to multiple segment structure on the introduction of the SFAS 131. This database provides detailed financial information for each of a diversified firm's segments. Following previous studies (see Berger and Hann (2003), Cho (2015)), I exclude firms operating in the financial service industries (SIC codes between 6000 and 6999) and regulated utility industries (SIC codes between 4900 and 4999). Furthermore, I exclude from the restated firms those where there is a difference more than 1% between their historical sales in Compustat and the sum of the sales of the firm's segments. I also remove firm-year observations for which there is information missing on either segments' sales or applicable SIC codes.

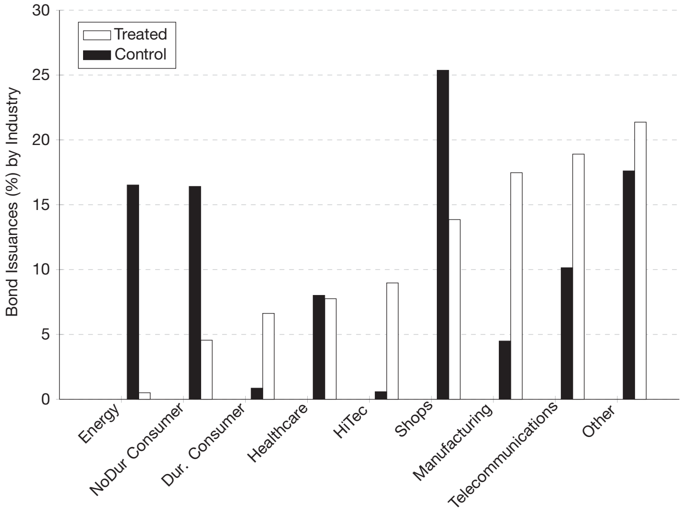
Following the modifications described, there are 722 bond-date observations remaining. Of these, 296 bonds were issued by firms reporting multiple industry segments after 1997 and only one before that. Also included in the sample are 426 bonds issued by stand-alone firms from 1995 to 2000. There is an average of 5 bond issuances for each firm in the sample. During the sample period, single-to-multisegment firms issue $75 billion in debt representing 38% of all debt issued by the conglomerate organizations in the same period ($193 billion). Figure 1 shows that firms in the treatment and in the control sample operate in all industries and thus are a good representation of the population of firms issuing debt on the U.S. primary bond market.

Table 2 provides further details on the firms in my sample. Panel A reports the bond and firm characteristics of those included in the treatment and control groups for the period 1995–1997, prior to the SFAS 131 reform. Panel B reports the bond and firm characteristics of treatment and control firms after the reform, for the period 1998–2000. For each variable, column 1 reports the number of bonds issued, whereas columns 2 and 3 report the mean of the distribution for the treatment and control groups. Column 4 reports the difference in the mean values in the treatment and control groups, and the *t*-statistic is reported in column 5.

FIGURE 1

Industries of Bond Issues by Firm Type

Figure 1 reports the bond percentage issues (on the y-axis) of single-to-multisegment firms (treated) and stand-alone firms (control), for each industry category. I report the 12 Fama–French industry definition on the x-axis, whereas the y-axis reports the percentage of bond issues across the overall sample, from 1995 to 2000. For each firm category (e.g., all single-to-multisegment firms), I divide the amount of bonds issued in a single industry by the total amount of bonds issued to all the industries across years. The data on single-to-multisegment firms are retrieved from Compustat Historical Segment data set, merged with the Mergent Fixed Income Securities Database data set. The sample consists of all nonfinancial (SIC codes 60–69) and nonutility (SIC code 49) treated and control firms in 1998.



Panel A of Table 2 shows that the bonds in the treatment and control groups have similar characteristics, as none of the t-tests is significant. The table indicates that, in relation to firm characteristics, the firms in the treatment group show a lower financial-leverage ratio than their stand-alone peers. Provided that prior studies (Berger and Ofek (1995)) report that diversified firms have higher leverage ratios than their focused peers, it might signal a lower debt capacity of the treated firms in my sample (see Myers (1977)). The difference in the market-to-book ratio of the 2 groups is only slightly significant, and the data do not reveal any noticeable difference in bond or firm characteristics for the treatment and control groups before the reform.

Panel B of Table 2 reports the post-reform characteristics of the firms and bonds in the sample. First, the average increase in segments for firms in the sample is from 1 to 3, with the restated firms having a minimum of 2 segments and a maximum of 6 segments (Table A.1). The bonds of firms disclosing as conglomerates have a 52-bps higher yield spread and a shorter time to maturity than in the pre-reform period. The leverage of these firms increases with respect to the pre-reform period by 4%, but it is lower than their stand-alone peers if compared with the pre-reform period. Consistent with the results of Berger and Hann (2003) that diversified firms are discounted after the reform, the market-to-book value of single-to-multisegment firms decreases after the introduction of the reform.

TABLE 2

Univariate Statistics of Bond Issuances and Bond Issuers

Table 2 shows the summary statistics of my analysis for treated and control firms. The treatment effect is the obligation to disclose the real number of segments after the reform. Panel A reports differences across bond and firm characteristics before the reform, whereas Panel B reports differences after the reform. The sample includes bonds issued on the U.S. primary bond market, from 1995 to 2000, by all nonfinancial (SIC codes 60–69) and nonutility (SIC code 49) treated and control firms. Data on bond issues are from the Mergent Fixed Income Securities Database, and accounting data are from Compustat. All variables are defined in the Appendix. Firms that restate from one to multiple segments in 1998 compose the treatment group, and stand-alone firms compose the control group. For each variable, columns 2 and 3 report the mean of treated and control groups, column 4 the difference mean test, and the *t*-statistic is in column 5. The tests of differences in means between diversified and single-segment firms are based on univariate OLS regressions where each firm's characteristic is regressed on a "treated" dummy, and standard errors are clustered at the firm level. The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

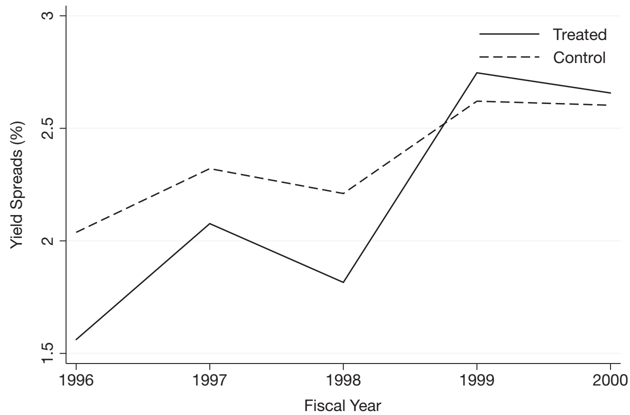
		Mean			
	Obs.	Treated	Control	Diff.	*t*-Stat
	1	2	3	4	5
Panel A. 1995–1997					
YIELD_SPREAD (%)	419	1.167	1.217	−0.051	(−0.248)
RATING (AAA = 22, D = 1)	419	14.951	14.373	0.579	(0.773)
COVENANTS (Y/N)	419	0.488	0.471	0.017	(0.165)
TIME_TO_MATURITY	419	4.891	4.761	0.130	(1.100)
SIZE	419	8.286	8.009	0.276	(0.797)
ROA	419	0.039	0.048	−0.009	(−0.413)
LEVERAGE	419	0.289	0.331	−0.042	(−1.442)
MARKET_TO_BOOK_RATIO	419	1.982	1.635	0.347*	(1.835)
OPRISK	419	0.061	0.024	0.037	(1.337)
NETCASH	419	−0.029	−0.021	−0.007	(−0.182)
MARKET_TO_BOOK_RATIO (MB)	419	2.201	1.740	0.460	(1.481)
WHITED_WU_INDEX (WW)	419	−0.368	−0.349	−0.019	(−1.004)
SPECULATIVEGRADE (SPEC)	419	0.537	0.561	−0.024	(−0.180)
Earnings Management					
CASH_ADJUSTED_ACCRUALS (CACF)	419	−0.086	−0.053	−0.033	−0.763
ACCRUAL_BASED_MODELS (RCA)	419	0.086	0.052	0.034	1.597
EARNSMOOTH	419	0.989	1.111	−0.122	−0.489
NOEARNSURPRISE	419	0.311	0.180	0.131	1.552
Panel B. 1998–2000					
YIELD_SPREAD (%)	303	1.682	2.029	−0.351	(−1.344)
RATINGS (AAA = 22, D = 1)	303	14.811	13.737	1.074	(1.639)
COVENANTS (Y/N)	303	0.455	0.637	−0.183	(−1.491)
TIME_TO_MATURITY	303	4.795	4.816	−0.021	(−0.233)
NUMBER_SEGMENTS	303	2.955	1.000	1.963***	(8.513)
SIZE	303	8.357	8.416	−0.156	(−1.110)
ROA	303	0.038	0.025	0.013	(0.986)
LEVERAGE	303	0.329	0.384	−0.055*	(−3.27)
MARKET_TO_BOOK_RATIO	303	2.033	1.669	0.410	(1.630)
OPRISK	303	0.028	0.043	−0.015	(−1.74)
Segment Level	Obs.	Mean	Std. Dev.	Min	Max
SD(CASH_FLOW) (%)	132	4.688	10.83	0	81.67
SB(MB) (%)	132	34.67	38.17	0	100
CASH_FLOW_CORRELATION (%)	132	90.94	26.52	−81.91	100

Table 2 also reports on the segment-level variables for the single-to-multi-segment firms, together with some differences in proxies for firms' earning management between treatment and control groups. The variability of cross-segment cash flow differs across conglomerates and ranges from 5% to 81% upon the introduction of the reform. Similarly, an average of 39% of the volatility of growth options across segments suggests that there is a high degree of variability in the investment opportunities available to newly disclosed segments. Finally, the correlation mean across segments' cash flows is approximately 90%, which suggests limited coinsurance benefits for the single-to-multisegment firms after the reform.

FIGURE 2

Parallel Trends

Figure 2 reports the average mean of the yield SPREAD of the bonds of treated and control groups 2 years before after the reform (1998). On the *x*-axis, I report the year of the bond issue, whereas on the *y*-axis, I report the average spreads across all bonds issued by firm category. The treatment effect is the obligation to disclose the real number of segments after the reform. The treated group is composed of firms that switch from stand-alone to conglomerate after the reform, whereas the control group is composed of stand-alone firms. The sample consists of all nonfinancial (SIC codes 60–69) and nonutility (SIC code 49) firms, from 1995 to 2000. Data on the yield spreads are retrieved from the Mergent Fixed Income Securities Database.



As is standard in the literature for studies utilizing the difference-in-difference method, I examine whether the trends in bond issuance yield spreads before the reform are different for the treatment (treated) and control groups. Figure 2 is a graphic report of the yield-spread trends for the 2 groups before and after 1998. The figure shows that the yields' trends of the 2 groups are statistically indistinguishable from each other. For my analysis to be valid, I must assume that the trends in the 2 groups would have remained the same from before to after the reform, if not for the segment disclosure rule change. Although this assumption is non-testable, my failure to find any differences in the trends before the rule change suggests this assumption is likely to hold.

IV. Empirical Results

In this section, I present my main findings on the effect of the reform on the cost of debt for single-to-multisegment firms. Table 3 compares the cost of debt for the treated firms that disclose as single-to-multisegment firms and true single-segment firms (control group). I report the results from the full sample in columns 1 and 2. In column 1, I control for bond characteristics only. In column 2, I also control for the listed firm characteristics. To provide a gauge of the sensitivity of the results to sample attrition, column 3 reports the results from the constant sample (i.e., excluding firms that first entered the bond market in the 2 years prior to the accounting change).

The coefficient ln(SEG) × AFTER is statistically and economically significant for all estimations. A unit change in the ln(SEG) of single-to-multisegment firms (columns 2 and 3) implies an increase in the yield spread of 18 bps, representing 12% of my sample's average-yield spread of 148 bps (see Table A.1).

TABLE 3

Cost of Debt of Single-to-Multisegment Firms After the Reform

Table 3 reports the estimates of equation (1), where the dependent variable is the yield spread of bond issues on the U.S. primary bond market, from 1995 to 2000 (bond-date frequency). Data on bond issues are from the Mergent Fixed Income Securities Database, and accounting data are from Compustat. The treatment effect is the obligation for nonfinancial (SIC codes 60–69) and nonutility (SIC code 49) firms to disclose the real number of segments after the introduction of the Statement of Financial Accounting Standards No. 131. Firms that restate from one to multiple segments in 1998 compose my treated group, and stand-alone firms compose my control group. Column 1 reports the results without controlling for firm characteristics, whereas in column 2, I control for firm variables, and in column 3, I exclude entrant firms (in the bond market) straight before the reform. The variable ln(SEG) × AFTER takes the value of the logarithm of the number of segments in years after the reform, and 0 otherwise. The vector **X** includes the set of control variables listed in the table. SIZE is the logarithm of total assets. LEVERAGE is the book value of debt divided by the sum of book value of debt and market capitalization. Market-to-book (MKBK) is the market value of equity divided by the book value of equity. LOSS is an indicator variable equal to 1 when the firm has negative EBIT, and OPRISK is the standard deviation of firm cash flow over the last 20 quarters. In all specifications, I include bond issuer and year fixed effects. The standard errors are clustered at the firm-quarterly level. The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: SPREAD		
			Constant Sample
	1	2	3
ln(SEG) × AFTER	0.136*	0.179**	0.180**
	(1.73)	(2.35)	(2.16)
RATING	−4.395***	−3.674***	−2.556*
	(−6.11)	(−4.61)	(−1.87)
LNMAT	0.127***	0.131***	0.128***
	(3.74)	(3.67)	(3.06)
AMOUNT	−0.020	−0.018	−0.023
	(−1.09)	(−1.08)	(−1.05)
SENIOR	−0.375**	−0.348**	−0.211
	(−2.11)	(−2.12)	(−1.04)
CALL	0.123	0.125	0.154**
	(1.47)	(1.55)	(2.34)
SIZE		−0.083	−0.0292
		(−0.68)	(−0.23)
LEVERAGE		0.548	1.014
		(0.95)	(1.19)
ROA		−0.757	−1.076**
		(−1.85)	(−2.91)
MKBK		−0.259**	−0.258**
		(−3.06)	(−2.92)
AGE		−0.249	−0.412
		(−0.64)	(−1.03)
LOSS		0.227	0.663
		(0.54)	(1.87)
OPRISK		0.768	0.006
		(0.75)	(0.00)
Year FE	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes
No. of obs.	722	722	595
Adj. R^2	0.865	0.871	0.847

The average number of segments for firms in the treatment group changes from 1 to 3. This implies an average increase in borrowing costs of 19.50 bps and an average increase of $25 million for each new bond issuance by single-to-multisegment firms. This effect is economically relevant, and the results suggest that firms forced to disclose their internal capital market suffer a substantial increase in the cost of debt. It also confirms that the information disclosed is considered valuable by external investors (Berger and Hann (2003)).

To investigate the effect of agency costs on the debt pricing of firms, I perform a triple-difference regression. I observe the interaction of the main variable of interest, ln(SEG) × AFTER, with the standardized variables that are proxies for

TABLE 4

Agency Costs of Debt of Single-to-Multisegment Firms

Table 4 reports the estimates of equation (1), where the dependent variable is the yield spread of bond issues on the U.S. primary bond market, from 1995 to 2000 (bond-date frequency). Data on bond issues are from the Mergent Fixed Income Securities Database, and accounting data are from Compustat. The treatment effect is the obligation for nonfinancial (SIC codes 60–69) and nonutility (SIC code 49) firms to disclose the real number of segments after the introduction of the Statement of Financial Accounting Standards No. 131. Firms that restate from one to multiple segments in 1998 compose my treated group, and stand-alone firms compose my control group. The variable ln(SEG) × AFTER takes the value of the logarithm of the number of segments in years after the reform, and 0 otherwise. In each column, I report the interaction term with standardized version of the variables that proxy for the agency costs: i) the net cash-flow ratio (cash flow minus capital expenditures), ii) the standard deviation of the segments' cash flows, iii) the market-to-book value, and iv) the standard deviation of the segments' market-to-book value. The details of the variable construction are in the Appendix. The vector **X** includes the set of control variables used throughout, and bond issuer and year fixed effects. In all specifications, the standard errors are clustered at the firm-quarterly level. The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: SPREAD			
	1	2	3	4
ln(SEG) × AFTER	0.138 (1.02)	0.108 (1.48)	0.183** (2.29)	0.345*** (3.20)
ln(SEG) × AFTER × NETCASH	0.158 (0.59)			
ln(SEG) × AFTER × SD(CF)		0.280** (2.22)		
ln(SEG) × AFTER × MKBK			−0.079 (−0.69)	
ln(SEG) × AFTER × SD(MKBK)				−0.104 (−1.70)
NETCASH × AFTER	−0.112 (−1.46)			
SD(CFVOL) × AFTER		−0.331** (−2.48)		
MKBK × AFTER			0.094 (1.19)	
SD(MKBK) × AFTER				−0.014 (−0.41)
t-Test (triple inter.)	0.38	5.91	0.50	2.60
p-Value	(0.544)	(0.023)	(0.486)	(0.120)
Firm controls	Yes	Yes	Yes	Yes
Bond controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
No. of obs.	722	722	722	722
Adj. R^2	0.872	0.874	0.872	0.875

the agency cost of debt for conglomerates. Table 4 reports the results. To illustrate, column 1 reports the coefficient for firms with high levels of net cash flow (cash flow minus capital expenditures), which acts as a proxy for the free-cash-flow hypothesis (Jensen (1986)). Column 2 reports the coefficient for the standard deviation of segment operating risk, which is a proxy for the asset-substitution cost hypothesized in Myers (1977) and Flannery et al. (1993). Column 3 reports the interaction coefficient of the treated firms with the market-to-book value. This variable proxies for the growth opportunities affecting firm debt pricing before the reform. Finally, column 4 reports the interaction coefficient of the treated firms with the variability of growth opportunities across segments, which is a measure of the corporate socialism effect on the firm's cost of borrowing (see Rajan et al. (2000)).

As shown in column 2 of Table 4, the triple-interaction coefficient is statistically and economically significant for diversified firms with a high standard deviation in the variability of their cross-segment cash flow. These findings are consistent with the SFAS 131 reform making bondholders aware of managers'

https://doi.org/10.1017/S0022109021000661 Published online by Cambridge University Press

incentives to mask segments that introduce high operational risk. This is a result predicted by Myers (1977). The point estimate on the triple interaction implies that the unit treatment effect of the reform on the cost of debt is increased by 28 bps when the dispersion in segment risk is increased by 1 standard deviation. This result assumes that bondholders are aware of the inefficient functioning of the newly revealed business units and adjust the cost of debt accordingly.

Column 1 of Table 4 shows that free-cash-flow incentives are not relevant to bondholders. This result suggests that there is no fear on the part of outside investors that expropriation from single-to-multisegment firms creates a free-cash-flow problem (Jensen (1986)). Similarly, the triple interactions set out in column 3 suggest that corporate socialism is, on average, beneficial to bondholders (negative sign) but statistically irrelevant in this setting; the results of the *t*-test indicate that the coefficient is not significantly different from 0. Overall, the triple difference-in-difference estimation suggests that bondholders fear expropriation from single-to-multisegment firms with high volatility in the financial risk of their segments.

Hann et al. (2013) find that coinsurance benefits outweigh the integration costs of conglomerate firms. I thus expect the detrimental effect of the reform to be exacerbated for treated firms with a low degree of coinsurance across the new segments. In addition, the favorable business-cycle conditions at the time of the reform likely make the benefits of coinsurance less valuable than they would be in a period of financial distress (Kuppuswamy and Villalonga (2015)).

To control for this effect, I construct the variable COINSURANCE as the inverse of the segments' cash-flow correlation. I add the variable COINSURANCE × AFTER to the baseline estimation to control for both the change in the number of segments and the coinsurance effect. I also estimate the baseline model with the variable TREATED × AFTER, an indicator variable equal to 1 for single-to-multisegment firms after the reform. The results following these adjustments are reported in Table 5.

Consistent with past findings of a negative relationship between coinsurance and the cost of capital (Hann et al. 2013), the coefficient COINSURANCE × AFTER is negative and equal to 0.9 bps but not statistically significant after controlling for observable firm characteristics. Although there are coinsurance benefits for firms that disclose as diversified after the reform (Franco et al. (2016)), these are insufficient to compensate for the increased agency costs of debt for the treated firms.

Segment Disclosure and Financial Constraints

Many studies stress the role played by the quality of disclosure in mitigating financing constraints in external capital markets (Healy and Palepu (2001);). Previous studies have found that conglomerates enjoy fewer financial constraints than their stand-alone peers (Kupusmani and Villalonga (2015)), making them more able to invest in periods of financial distress.

In my setup, the effect of the reform on financially constrained firms is ambiguous. If segment disclosure also reveals agency problems, these are likely to be larger for financially constrained firms. In this case, I expect that the

https://doi.org/10.1017/S0022109021000661 Published online by Cambridge University Press

TABLE 5

Coinsurance Benefits of Single-to-Multisegment Firms

Table 5 reports the estimates of equation (1), where the dependent variable is the yield spread of bond issues of all nonfinancial (SIC codes 60–69) and nonutility (SIC code 49) treated and control firms that issue bonds (bond-date frequency) on the U.S. primary bond market, from 1995 to 2000. Data on bond issues are from the Mergent Fixed Income Securities Database, and accounting data are from Compustat. The treatment effect is the obligation to disclose the real number of segments after the reform. Firms that restate from one to multiple segments in 1998 compose my treated group, and stand-alone firms compose my control group. The variable ln(SEG) × AFTER takes the value of the logarithm of the number of segments in years after the reform, and 0 otherwise. The variable TREATED × AFTER is an indicator variable equal to 1 for single-to-multisegment firms after the reform. The variable COINS × After is the coinsurance (inverse of the segment cash-flow correlation) of the treated firms after the reform. Column 3 reports the results from the constant sample (i.e., excluding firms who only entered the bond market in the 2 years prior to the accounting change). The vector **X** includes the set of control variables used throughout, and bond issuer and year fixed effects. In all specifications, the standard errors are clustered at the firm-quarterly level. The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: SPREAD				
	1	2	3	4	5
ln(SEG) × AFTER	0.132	0.176**	0.176**		
	(1.604)	(2.365)	(2.245)		
TREATED × AFTER				0.166	0.216*
				(1.453)	(1.823)
COINSURANCE × AFTER	−0.015**	−0.008	−0.010	−0.016**	−0.009
	(−2.825)	(−1.197)	(−1.308)	(−3.138)	(−1.359)
Bond controls	Yes	Yes	Yes	Yes	Yes
Firm controls	No	Yes	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes	Yes
No. of obs.	722	722	595	722	722
Adj. R^2	0.865	0.871	0.847	0.865	0.871

detrimental effect of the SFAS 131 on the cost of borrowing for single-to-multi-segment firms is more severe for those firms that were already financially constrained before the reform. However, the reform also reveals the degree of coinsurance across segments. Because the coinsurance benefits are stronger for more financially constrained firms (see Hann et al. (2013)), the higher the (revealed) coinsurance across segments, the lower the detrimental effect of the reform on bond spreads of single-to-multisegment firms that are financially constrained before the reform.

To test these insights, I estimate a triple-difference model in which the variables that are proxies for financial constraints interact with my main variable, ln(SEG) × AFTER. I use 2 measures as proxies for firms' financial constraints. These measures are the Whited and Wu (2006) index of financial constraints (WW) and whether or not firms have a speculative-grade S&P debt rating (SPEC) as in Campello, Graham, and Harvey (2010). My independent variable is the interaction between the main variable ln(SEG) × AFTER and the standardized measure of financial constraints. I report the results in Table 6.

The coefficient ln(SEG) × AFTER is statistically and economically significant for treated firms (single-to-multisegment firms) with financial constraints before the reform. The coefficient in columns 1 and 2 of Table 6 shows an increase of 21 bps in the cost of debt for single-to-multisegment firms with financial constraints. The point estimate of the interaction coefficient ln(SEG) × AFTER × SPEC implies that a unit treatment effect of the reform on the cost of debt is 38 bps greater (relative to investment-grade firms) for firms that have speculative credit ratings. This suggests that single-to-multisegment firms that are financially constrained suffer more from revealing agency problems following the introduction of the SFAS 131.

TABLE 6

Financing Constraints of Single-to-Multisegment Firms

Table 6 reports the estimates of equation (2), where the dependent variable is the yield spread of bond issues of all nonfinancial (SIC codes 60–69) and nonutility (SIC code 49) treated and control firms that issue bonds (bond-date frequency) on the U.S. primary bond market, from 1995 to 2000. Data on bond issues are from the Mergent Fixed Income Securities Database, and accounting data are from Compustat. The treatment effect is the obligation to disclose the real number of segments after the reform. Firms that restate from one to multiple segments in 1998 compose my treated group, and stand-alone firms compose my control group. The variable ln(SEG) × AFTER takes the value of the logarithm of the number of segments in years after the reform, and 0 otherwise. In columns 1 and 2, I run a triple-difference regression when I interact the standardized proxy for financial constraints WW (Whited and Wu (2006)) with the variable ln(SEG) × AFTER. In columns 3 and 4, I use the variable SPEC, which is an indicator variable equal to 1 if the bond has speculative grade before the reform. The vector **X** includes the set of control variables used throughout, and bond issuer and year fixed effects. In all specifications, the standard errors are clustered at the firm-quarterly level. The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: SPREAD			
	1	2	3	4
ln(SEG) × AFTER	0.238**	0.246**	−0.081	−0.021
	(2.49)	(2.37)	(−0.81)	(−0.25)
ln(SEG) × AFTER × WW	0.210**	0.150		
	(2.11)	(1.44)		
ln(SEG) × AFTER × SPEC			0.388**	0.338*
			(2.15)	(1.87)
WW × AFTER	0.053	0.042		
	(0.66)	(0.46)		
SPEC × AFTER			–	–
t-Test (triple inter.)	4.43	2.16	4.61	3.37
p-Value	(0.046)	(0.155)	(0.042)	(0.079)
Bond controls	Yes	Yes	No	Yes
Firm controls	No	Yes	No	Yes
Year FE	Yes	Yes	Yes	Yes
No. of obs.	722	722	722	722
Adj. R^2	0.870	0.874	0.869	0.874

V. Robustness

In this section, I present some additional tests to control for confounding factors contemporaneous with the reform, and I test some alternative explanations for my results. The Supplementary Material sets out extensive robustness tests performed on the model specifications, alternative samples, and firm events that might bias the results.

I link my results to existing studies by testing the reform's effect on the total sample of conglomerate firms, following Franco et al. (2016). The reform reduces information asymmetry, and the study finds that because of the increased disclosure of segment information, the introduction of the SFAS 131 reduces the cost of debt for conglomerates, already disclosing as diversified before the reform, that increase the segment information after the reform. The results of the testing on the total sample of conglomerates and stand-alone firms are reported in Table 7.

The dependent variable is the bond-yield SPREAD, and the main independent variable is the number of segments for all firms for the period 1995–2000 (ln (SEG)). In column 2 of Table 7, I report a similar estimation for the period before the reform (1995–1997), and in column 3, I report the estimation for the period after the reform (1998–2000). Finally, in column 4, I report the estimates of the difference-in-difference model of equation (3) with a new treatment sample. The new treatment sample comprises those conglomerate firms already disclosing as such before the reform that change their segment numbers after the reform.

TABLE 7

Cost of Debt After Reform: Conglomerates Versus Stand-Alone Firms

Table 7 reports the estimates of the following form:

$$y_{bit} = \alpha + \beta \text{NUMSEG}_{it} + \lambda X_{bit} + \gamma_t + \varepsilon_{bit},$$

where the dependent variable is the yield spread of bond issues of all nonfinancial (SIC codes 60–69) and nonutility (SIC code 49) conglomerate and stand-alone firms that issue bonds (bond-date frequency) on the U.S. primary bond market, from 1995 to 2000. Data on bond issues are from the Mergent Fixed Income Securities Database, and accounting data are from Compustat. The variable NUMSEG is the logarithm of the total number of segments reported by each firm in the 10-K. It is always equal to 0 if it is a stand-alone firm (one segment unit). Column 1 reports the estimation on the overall sample, column 2 in the pre-reform period, and the post-reform period in column 3, respectively. In column 4, I estimate a difference-in-difference estimation as in equation (3), where I replace the treated firms with the complete sample of conglomerate firms that changes their number of segments, and issue debt before and after the reform. The vector **X** includes the set of control variables used throughout, including year fixed effects. In all specifications, the standard errors are clustered at the firm-quarterly level. The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	1995–2000	1995–1997	1998–2000	1995–2000
Dep. Var.: SPREAD	1	2	3	4
NUMSEG	−0.103***	−0.122**	−0.111***	
	(−3.79)	(−2.50)	(−3.08)	
ln(SEG) × AFTER				−0.066*
				(−1.93)
t-Test	14.33	6.26	9.50	3.71
p-Value	(0.000)	(0.013)	(0.002)	(0.054)
Bond controls	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
Firm FE	No	No	No	Yes
No. of obs.	2,791	1,038	1,211	2,791
Adj. R^2	0.749	0.711	0.728	0.900

The results show a decrease (of between 6 and 11 bps) in the yield spreads of conglomerate firms that disclose additional segment information, as in Franco et al. (2016). Although these results are consistent with previous findings on the beneficial effect on the monitoring costs of conglomerates of segment disclosure, they do not allow for an estimation of the direct coinsurance effect of the reform; such firms are not disclosing their internal capital market for the first time.

A. Alternative Economic Channels

In this section, I test alternative theories for the results obtained. As stated, factors other than agency costs might discourage conglomerate firms from disclosing investment policy information. One such factor relates to an increase in the cost of debt following a reform-driven change in a firm's product market competition. Harris (1998) finds that the competitive environment in which a firm operates is one reason conglomerate firms do not disclose information about their investment policies. Specifically, the author finds that to remain competitive and mitigate the proprietary costs of disclosure, managers hide segments that operate in less competitive markets. Similarly, Botosan and Stanford (2005) show that some firms use the flexibility of SFAS 14 to hide information on profitable segments operating in less competitive industries, thereby allowing relatively abnormal profits.

To test whether an increase in proprietary costs drives the increase in the cost of debt, I analyze the competitive environment for single-to-multisegment firms. I employ an analysis similar to that in Botosan and Stanford (2005). The authors compare the competitive environment of conglomerates and stand-alone firms by testing the statistical difference of variables that are proxies for industry competition: i) concentration ratio (CONC), ii) net performance at the firm level (NET_PERFORMANCE), and iii) net performance at the segment level (NET_PERFORMANCESEG). The concentration ratio is the sales ratio for the 4 largest firms in an industry (by 3-digit SIC code) to total industry sales. In order to ensure a fair comparison, treatment and control firms are matched according to size in the same industry and year. The NET_PERFORMANCE at the firm level is computed as the difference between expected and realized profits (ROA) of the firm. The expected profits are computed by multiplying firm sales by an industry profit margin, the latter computed by taking the performance of a matched firm in the same primary SIC code. This variable proxies for the observable differences between realized and expected performance of treatment and control firms at the time of the introduction of the reform.

Finally, the firm performance at the segment level (or segment-level NET_PERFORMANCE) proxies for the differences in performance that were unobservable by the market participants at the time of the reform. The segment-level NET_PERFORMANCE is computed as the difference between the firm's realized profits and industry expected profits, computed at the segment level. The segment-level expected profits are computed by multiplying, for each firm, the segment sales by the industry margin, computed as the median across all stand-alone firms in the same primary SIC code (3-digit SIC code). For the treated (multisegment) firms, I compute a weighted average of industry profits for all segments. Details of the variables' construction and distribution are set out in the Appendix.

The results of my analysis using the approach from Botosan and Stanford (2005) are reported in Table 8. Panel A reports the concentration ratio of treated firms, computed as the difference between the firm's industry-concentration ratio (by 3-digit SIC code) and the weighted average segment-concentration ratio, in the year of the reform. I report the firm-level and segment-level differences in net performance between treatment and control firms in Panels B and C, respectively.

Panel A of Table 8 shows that the treated firms do not have a significant competitive advantage in the year of the reform. The *t*-test rejects the null hypothesis that the newly revealed segments operate in more competitive industries than the headquarter (according to SIC disclosed before the reform). The difference between the firm and the industry-level concentration ratio is close to 0 for treated firms, with a *t*-statistic of 0.89. The firm-level profitability analysis shown in Panel B does not support economically (and statistically) significant differences between the treatment and control firms in net performance. In addition, I do not find evidence of segments having profits that are abnormal relative to their industry peers. Overall, the analysis suggests that the treated firms do not, as a result of the segment disclosure, have a competitive advantage over stand-alone firms. Those results do not support the hypothesis of a post-reform increase in the proprietary costs of debt for single-to-multisegment firms.

A second explanation for my results relates to opaque disclosure by the treated firms, which increases their cost of borrowing. Many studies stress the importance of disclosure quality in mitigating fraud and preventing earnings management (see Jones (1991)). If bondholders realize that hiding segments are a form of accounting

TABLE 8

Competitive Environment

Table 8 reports the analysis of the competitive environment as in Botosan and Stanford (2005). The sample is composed of nonfinancial (SIC codes 60–69) and nonutility (SIC code 49) treated and control firms that issue bonds (firm-year frequency) on the U.S. primary bond market, from 1995 to 2000. Data on bond issues are from the Mergent Fixed Income Securities Database, and accounting data are from Compustat. The treatment effect is the obligation to disclose the real number of segments after the reform. Firms that restate from one to multiple segments in 1998 compose my treated group, and stand-alone firms compose my control group. Panel A reports the difference between the firm industry concentration ratio and the weighted average concentration ratio of the firms' segment industries for the treated firms, in the year of the change (1998). The concentration ratio is computed by taking the ratio of the sum of sales for the 4 largest firms to total industry sales, in each 3-digit SIC code category. Panel B reports the comparison between firm-level profits of treated and control groups. NET_PERFORMANCE (FIRM_LEVEL) computes the difference between realized (ROA) end expected profits, computed by multiplying the firm's sales by the profit margin of a matched firm. The firms are matched according to the size and the industry classification. Finally, Panel C reports the NET_PERFORMANCESEG for treated and control firms, computed as the difference between firm performance and expected performance at the segment level, the latter computed by multiplying each segment sales by the industry profit margin, and then by summing the segments items to arrive to a firm-level expected profit. The industry profit margin is computed by taking the weighted performance median of all stand-alone firms in the same industry (3-digit SIC code). The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

Panel A. Competitive Environment Analysis in 1998

	Obs.	Firm Level	Segment Level	Diff.	*t*-Stat
	1	2	3	2–3	4
CONCENTRATION_RATIO (treated)	55	0.154	0.145	0.009	0.89

Panel B. Firm-Level Profitability Analysis

	Obs.	Treated	Control	Diff.	*t*-Stat
NET_PERFORMANCE in 1996	163	0.003	0.003	−0.001	(0.04)
NET_PERFORMANCE in 1997	183	−0.011	−0.012	0.001	(0.08)
NET_PERFORMANCE in 1998	175	−0.003	−0.012	0.009	(0.70)

Panel C. Segment-Level Profitability Analysis

	Obs.	Treated	Control	Diff.	*t*-Stat
NET_PERFORMANCE in 1996	163	0.004	0.004	−0.000	(0.02)
NET_PERFORMANCE in 1997	183	−0.010	−0.012	0.001	(0.10)
NET_PERFORMANCE in 1998	175	0.000	−0.009	0.009	(0.73)

manipulation of single-to-multisegment firms, they might assume these fraudulent behaviors are pervasive within the firm and thus increase the cost of debt. The (untestable) assumption behind this reasoning is that firms that engage in one form of accounting manipulation (i.e., hiding segment units) are also more likely to engage in others (earnings management). The testable assumption implies that firms more likely to engage in earnings manipulation before the reform would also suffer the greater increase in the cost of the debt after the reform.

To test this assumption, I estimate a triple difference-in-difference model when I interact my main variable (ln(SEG) $\times$ AFTER) with some (pre-reform) indices that proxy for firms' likelihood of engaging in earnings manipulation. If fraudulent managerial behavior explains the increase in the yield spread, the triple-interaction coefficient should be positive and statistically significant. The accounting literature concludes that there is no measure of earnings quality that is superior for all the decision models. For this reason, I select 4 measures: i) the magnitude of accruals, ii) the residuals from an accrual model, iii) the earnings smoothness, and iv) a proxy for the tendency of firms to meet the consensus forecast of analysts (see Burgstahler and Dichev (1997), Burgstahler and Eames (2006)).

As a proxy for earnings management, I employ the cash-adjusted accruals (CACF), as computed in Oesch and Irani (2016), and the accrual-based models (RCA) of Jones (1991) as modified by Dechow et al. (1995). The idea behind these measures is that extreme accruals are of low quality, because they represent a less persistent earnings component. As a proxy for earnings smoothness, I compute the variable EARNSMOOTH as the ratio between earnings volatility and the volatility of firm cash flow (Lambert (1984)). If managers attempt to smooth permanent changes in cash flows, firm earnings become less informative.

Finally, following the finding by Burgstahler and Eames (2006) that firm managers in the United States are more likely to report earnings that meet or beat analyst estimates, I construct the variable NOEARNSURPRISE as a dummy variable equal to 1 when firms have infrequent and small earnings surprises. The variable is computed in 2 steps. First, following Burgstahler and Eames (2006), the variable EARNING_SURPRISE is computed as the actual earnings minus the consensus, divided by the absolute value of the consensus. As shown in Table A.1 in the Appendix, the variable EARNING_SURPRISE ranges from a minimum of −0.91 to a maximum of 1 in my sample. Second, I construct the variable NOEARNSURPRISE as a dummy variable equal to 1 when the firms' earning surprise ranges between −0.1 and 0.1. A value of 1 of NOEARNSURPRISE implies that manages are more likely to meet analysts' expectations by manipulating earnings.

The results of the triple-difference analysis are reported in Table 9. Other than the coefficient that measures firms' tendency to meet analysts' consensus forecast, the coefficients of the triple interactions are not statistically significant. The triple-interaction coefficient of the variable NOEARNSURPRISE is negative and statistically significant at the 10% level for single-to-multisegment firms when compared to similar stand-alone firms. The coefficient is economically relevant, implying that treated firms experiencing 0 earnings surprises also face a decrease in the cost of debt after the reform. The negative sign of the coefficient supports the view that the reform is beneficial in terms of transparency and monitoring costs (see Berger and Hann (2003)); the SFAS 131 makes it increasingly difficult for these firms to engage in opaque disclosure practices. I also investigate whether some firms are involved in a securities class action around the introduction of the SFAS 13.[6] None of the firms in my sample had any shareholder class action lawsuit against them during my sample period.

B. Confounding Factors

There are various possible events contemporary to the reform that may explain the results obtained. The reform is implemented in 1998, a year with several positive macroeconomic events. The 1998 U.S. business cycle is characterized by federal government surpluses, low unemployment, near-zero inflation, and robust national income growth.[7] The elimination of the budget deficit saw the U.S. government dramatically decrease the supply of risk-free debt. However, because of the Asian financial crisis in the same year, investors reallocated their portfolios to invest in safe U.S. government bonds (Kim et al. (2015)). An observed increase in the demand for bonds of the treatment or control firms might

[6]Data of the Stanford Law School Clearing House, available at https://securities.stanford.edu/index.html.

[7]Among many reports, see, for example, "Monetary Policy and the U.S. States and Regions: Some Implications for European Monetary Union," in J. von Hagen and C. J. Waller (1999).

TABLE 9

Managerial Self-Dealing

Table 9 reports the estimates of equation (2), where the dependent variable is the yield spread of bond issues of all nonfinancial (SIC codes 60–69) and nonutility (SIC code 49) treated and control firms that issue bonds (bond-date frequency) on the U.S. primary bond market, from 1995 to 2000. Data on bond issues are from the Mergent Fixed Income Securities Database, and accounting data are from Compustat. The treatment effect is the obligation to disclose the real number of segments after the reform. Firms that restate from one to multiple segments in 1998 compose my treated group, and stand-alone firms compose my control group. The variable ln(SEG) × AFTER is the logarithm of the number of segments after the reform. I interact the variable ln(SEG) × AFTER with 4 measures that proxy for the earnings management: i) magnitude of accruals CACF (Oesch and Irani (2016)), ii) the signed residuals of cross-sectional regressions (RCA), as in Dechow et al. (1995), iii) earnings smoothness (EARNSMOOTH), computed as in Lambert (1984), and iv) little/zero earning surprise (NOEARNSU), as in Burgstahler and Eames (2006). The details of the variable construction are in the Appendix. The vector **X** includes the set of control variables used throughout, and bond issuer and year fixed effects. In all specifications, the standard errors are clustered at the firm-quarterly level. The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: SPREAD			
	1	2	3	4
ln(SEG) × AFTER	0.299**	0.399*	0.180*	0.289**
	(2.088)	(2.018)	(2.030)	(2.435)
ln(SEG) × AFTER × CACF	−0.274			
	(−1.537)			
CACF × AFTER	0.069			
	(0.451)			
ln(SEG) × AFTER × RCA		−0.363		
		(−1.537)		
RCA × AFTER		0.201		
		(1.516)		
ln(SEG) × AFTER × EARNSMOOTH			−0.020	
			(−0.109)	
EARNSMOOTH × AFTER			0.034	
			(0.286)	
ln(SEG) × AFTER × NOEARNSU				−0.308*
				(−1.994)
NOEARNSU × AFTER				0.052
				(0.374)
t-Test (triple inter.)	2.36	2.36	0.01	3.98
p-Value	(0.137)	(0.138)	(0.914)	(0.058)
Bond controls	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
No. of obs.	722	722	722	677
Adj. R^2	0.872	0.872	0.871	0.872

confound my findings. I thus conduct a falsification test to investigate whether the quantity, maturity, and seniority of bonds issued changes across groups following the reform.

The results of these tests are set out in Table 10. In column 1, the main dependent variable is the total value of bond issues, scaled by total firm assets. I also test whether the reform affected any of the bond characteristics, namely, time to maturity (column 2), the average bond amount (column 3), and bond seniority (column 4). The coefficient in column 1 is statistically and economically negligible, suggesting there is no difference in the bond supply between the treatment and control groups after the reform. Consistent with the fact that the SFAS 131 reform reveals some agency problems for the treated firms, the time to maturity of the single-to-multisegment firms' bonds decreases after the reform (Billet, King, and Mauer (2007)).

Another potential confounding effect relates to the Asian and Korean debt and currency crises of 1997. The latter crisis, the Russian default, and the subsequent

TABLE 10

Confounding Factors: Contemporary Changes

Table 10 reports the estimates of 1, where the dependent variables are: i) the ratio between the AMOUNT of bond issues and firm total assets (column 1), ii) time to maturity (LNMAT – column 2), iii) the average bond AMOUNT (column 3), and iv) bond seniority (column 4) of single-to-multisegment firms and stand-alone firms. The sample is composed of all nonfinancial (SIC codes 60–69) and nonutility (SIC code 49) firms that issue bonds (bond-date frequency) on the U.S. primary bond market, from 1995 to 2000. Data on bond issues are from the Mergent Fixed Income Securities Database, and accounting data are from Compustat. The treatment effect is the obligation to disclose the real number of segments after the reform. Firms that restate from one to multiple segments in 1998 compose my treated group, and stand-alone firms compose my control group. The variable ln(SEG) × AFTER takes the value of the logarithm of the number of segments in years after the reform, and 0 otherwise. The vector **X** includes the set of control variables used throughout, and bond issuer and year fixed effects. In all specifications, the standard errors are clustered at the firm-quarterly level. The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	VALUE_BONDS/ASSETS	LNMAT	AMOUNT	SECURED (Y)
	1	2	3	4
ln(SEG) × AFTER	0.0220	−0.201**	0.0387	−0.0055
	(0.85)	(−3.02)	(0.17)	(−0.22)
VALUE_BONDS/ASSETS		−0.428**	1.062	0.111
		(−2.96)	(1.47)	(0.83)
AMOUNT	0.005	0.008		−0.017
	(0.99)	(0.54)		(−1.55)
LNMAT	−0.009*		0.0336	−0.008
	(−2.71)		(0.53)	(−0.41)
t-Test	0.62	9.31	0.03	0.04
p-Value	(0.446)	(0.006)	(0.868)	(0.852)
Bond controls	Yes	Yes	Yes	Yes
Firm controls	Yes	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
No. of obs.	722	722	722	722
Adj. R^2	0.835	0.277	0.506	0.629

Latin American currency crises of 1998 were all key events contemporaneous with the reform. To address the possible impact of these, I filter the bond spreads with the stock indexes of the Asian, Russian, and Brazilian stock markets. I regress the bond spreads on these indexes and use the residual as my new dependent variable in equation (1). Table 11 shows the results.

The filtered yield spread approach is reported in columns 1–3 of Table 11 and indicates that the results remain statistically and economically significant after these modifications. In column 4, I also estimate a difference-in-difference model after excluding treated firms that, following the reform, list geographic segments in crisis-affected areas (Latin America, Russia, Brazil, Eastern Europe, and Asia). Overall, the results confirm that single-to-multisegment firms suffer an increase in the cost of debt not attributable to any event other than the disclosure of segment information.

C. Analysis Based on No-Change Firms

In this section, I investigate whether some other (unobservable) factor contemporaneous to the accounting reform impacted the yield spreads of conglomerates differently than those of stand-alone firms. To do so, I replace my control group of stand-alone firms with a different class of firms: the "no-change" firms. The no-change firms are multisegment firms that do not change their number of segments following the reform (see Cho (2015)). Since segment disclosure standards were less strict before 1998, the decision of the "no-change" conglomerates to conform

https://doi.org/10.1017/S0022109021000661 Published online by Cambridge University Press

https://doi.org/10.1017/S0022109021000661 Published online by Cambridge University Press

TABLE 11

Confounding Factors: Asian Financial Crisis

Table 11 reports the estimates of equation (1), where the dependent variable is the "filtered" yield SPREAD of bond issues of all nonfinancial (SIC codes 60–69) and nonutility (SIC code 49) treated and control firms that issue bonds (bond-date frequency) on the U.S. primary bond market, from 1995 to 2000. I filter the yield spreads with the stock indexes of the Asian, Russian, and Brazilian stock markets, by regressing the yield spreads on those indexes, and using the residuals as my new dependent variable. Data on bond issues are from the Mergent Fixed Income Securities Database, and accounting data are from Compustat. The treatment effect is the obligation to disclose the real number of segments after the reform. Firms that restate from one to multiple segments in 1998 compose my treated group, and stand-alone firms compose my control group. The variable ln(SEG) × AFTER takes the value of the logarithm of the number of segments in years after the reform, and 0 otherwise. Columns 1–3 report the filtered spreads models, whereas in column 4, I exclude from my treated sample firms with geographic segments in Latin America, Russia, Brazil, Eastern Europe, and Asia after the reform. The vector **X** includes the set of control variables used throughout, and bond issuer and year fixed effects. In all specifications, the standard errors are clustered at the firm-quarterly level. The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: SPREAD			
	Full Sample		Constant Sample	No Geog. Segment
	1	2	3	4
ln(SEG) × AFTER	0.188**	0.208**	0.205**	0.178**
	(2.23)	(2.48)	(2.43)	(2.18)
Bond controls	Yes	Yes	Yes	Yes
Firm controls	No	Yes	Yes	Yes
Firm FE	Yes	Yes	Yes	Yes
Year FE	Yes	Yes	Yes	Yes
No. of obs.	722	722	595	688
Adj. R^2	0.389	0.408	0.415	0.418

their pre-1998 segment disclosure to the stricter post-1998 standards is endogenous. For this reason, they are likely a less ideal control group than the true stand-alone firms. Had the reform not taken place, the single-to-multisegment firms could have continued to masquerade and behave as stand-alones, suggesting the post-reform behavior of true stand-alone bond yields are a better counterfactual than that of "no-change" conglomerates.

Nevertheless, I also run my tests with the "no-change" conglomerates as the control group in order to determine whether my main results are driven by contemporaneous confounding systematic events that influenced conglomerates differently than stand-alone firms. If some unobservable factors affect conglomerate firms, the "no-change" firms should also experience an increase in the yield spreads after the reform.

First, I examine the Compustat Historical Segments data set and identify the conglomerate firms that do not change their segment information after 1998. Second, I include these in the sample of firms issuing debt on the corporate bond market. I find very few bonds issued by such firms. Specifically, I find only 24 conglomerate firms in the FISD Mergent sample that did not change their classification status after 1998. These issued a total of 208 bonds, which I label with the dummy NO_CHANGE_BONDS. I estimate equation (1) where I include the NO_CHANGE_BONDS as my control group. The results are set out in Table 12.

In column 1 of Table 12, I control for bond variables only. I then add firm characteristics in column 2. Column 3 shows the analysis of the constant sample. The coefficient ln(SEG) × AFTER is economically, although not statistically, significant and implies a higher cost of debt for single-to-multisegment firms of 9.6 bps, when compared with the no-change firms. In economic terms, it implies that the single-to-multisegment firms suffer an increase in the yield spread of 5%,

TABLE 12
Analysis Based on No-Change Firms

Table 12 reports the estimates of equation (1), where the dependent variable is the yield spread of bond issues of all nonfinancial (SIC codes 60–69) and nonutility (SIC code 49) treated and control firms that issue bonds (bond-date frequency) on the U.S. primary bond market, from 1995 to 2000. Data on bond issues are from the Mergent Fixed Income Securities Database, and accounting data are from Compustat. The treatment effect is the obligation to disclose the real number of segments after the reform. Firms that restate from one to multiple segments in 1998 compose my treated group. The control group is composed of NO_CHANGE_BONDS (i.e., conglomerate firms that issue bonds and did not change their number of segments after the reform). The variable ln(SEG) × AFTER takes the value of the logarithm of the number of segments in years after the reform, and 0 otherwise. Column 3 reports the results from the constant sample (i.e., excluding firms who only entered the bond market in the 2 years prior to the accounting change). The vector **X** includes the set of control variables used throughout, and bond issuer and year fixed effects. In all specifications, the standard errors are clustered at the firm-quarterly level. The symbols *, **, and *** denote statistical significance at the 10%, 5%, and 1% levels, respectively.

	Dependent Variable: SPREAD		
	1	2	3
ln(SEG) × AFTER	0.024 (0.13)	0.096 (0.46)	0.068 (0.33)
Bond controls	Yes	Yes	Yes
Firm controls	No	Yes	Yes
Firm FE	Yes	Yes	Yes
Year FE	Yes	Yes	Yes
No. of obs.	504	504	491
Adj. R^2	0.857	0.859	0.863

compared with the conglomerates that did not change their number of segments with the reform. The severe reduction in the sample size because of the limited number of NO_CHANGE_BONDS in my sample, together with the (endogenous) choice of no-change firms to fully disclose their segments before the reform, introduces a consistent bias in the analysis, and it can explain the lack of statistical significance of the coefficient ln(SEG) × AFTER.

Overall, these results support the conclusion that single-to-multisegment firms experience an increase in the yield spreads on their bond pricing related to increased disclosure of their poor-performing segment units.

VI. Conclusions

This study uses the SFAS 131 accounting reform as an opportunity to estimate the agency costs of debt in conglomerate firms. Using a sample of U.S. corporate bonds on the U.S. primary market, I employ a difference-in-difference estimation to test the effect of the reform on the yield spreads of firms that reveal themselves as conglomerates for the first time following this reform. I find that single-to-multisegment firms (i.e., those reported as single segment before the reform and as multisegment after the reform) suffer a 12% increase in the cost of debt when compared with their stand-alone peers. This effect is economically significant, because it represents an increase of $23 million in interest paid for each new bond issue.

I further investigate the characteristics of newly disclosed segments to provide an economic explanation for my results. The detrimental effect of the reform on the cost of debt applies to the post-reform single-to-multisegment firms with high cash-flow volatility across the newly disclosed segments. These findings are consistent with Myers (1977), who shows that the merger into a conglomerate of 2 firms that differ in financial risk would carry the costs of underinvestment and increase the contagion costs between the healthy and the loss-making division. I quantify these costs as the agency cost of debt that a stand-alone firm expects to pay when disclosing as a multisegment firm on the bond market for the first time.

This study offers new insights into the pricing of debt of conglomerate firms by showing that the agency costs of debt impact the (nonmonotonic) relationship between the cost of capital and the cross-segment cash-flow correlation in conglomerate organizations.

Appendix. Construction of Variables

In this Appendix, variables are defined. I report the complete distribution of the variables and the pairwise correlation at the 1% level in Tables A.1 and A.2.

TABLE A.1

Descriptive Statistics

Table A.1 reports the summary statistics for all the variables used in the analysis. The sample consists of the intersection of the Compustat, Compustat Historical Segments, and Mergent Fixed Income Securities Database data sets. The sample includes bonds issued on the U.S. primary bond market, from 1995 to 2000, by all nonfinancial (SIC codes 60–69) and nonutility (SIC code 49) treated and control firms. Firms that restate from one to multiple segments in 1998 compose the treated group, and stand-alone firms compose the control group. For each variable, column 1 reports the number of observations, columns 2 and 3 the mean and standard deviation, and columns 4–10 the percentile distribution. Variables are defined later in this Appendix.

	Obs.	Mean	Std. Dev.	Min	1%	25%	Median	75%	95%	Max
	1	2	3	4	5	6	7	8	9	10
SPREAD (%)	722	1.483	1.344	0.015	0.095	0.620	0.975	1.881	4.282	6.670
EXCESS_SPREAD (%)	722	−0.032	0.666	−2.942	−1.591	−0.308	−0.054	0.158	1.000	6.415
NLSEG × AFTER	722	1.292	0.896	1.000	1.000	1.000	1.000	1.000	4.000	6.000
TREATED	722	0.410	0.492	0.000	0.000	0.000	0.000	1.000	1.000	1.000
RATING (AAA = 1, D = 0)	722	0.656	0.149	0.227	0.318	0.591	0.682	0.773	0.864	1.000
MATURITY (LN_MONTHS)	722	4.810	0.673	2.565	3.178	4.431	4.787	5.193	5.889	6.397
SENIOR (Y)	722	0.900	0.300	0.000	0.000	1.000	1.000	1.000	1.000	1.000
COVENANTS (Y)	722	0.511	0.500	0.000	0.000	0.000	1.000	1.000	1.000	1.000
SIZE	722	8.268	1.317	2.766	4.999	7.440	8.280	9.343	10.166	10.932
LEVERAGE	722	0.333	0.143	0.002	0.028	0.259	0.319	0.403	0.602	0.813
ROA	722	0.039	0.109	−0.771	−0.521	0.025	0.054	0.083	0.128	0.301
MB	722	1.795	0.884	0.802	0.915	1.246	1.534	2.128	3.306	4.431
LOSS	722	0.026	0.160	0.000	0.000	0.000	0.000	0.000	0.000	1.000
AGE	722	2.994	0.858	0.693	1.099	2.303	3.332	3.738	3.892	3.932
OPRISK	722	0.038	0.076	0.001	0.001	0.007	0.013	0.033	0.123	0.410
NET_CASH (NETCASH)	722	−0.029	0.178	−0.997	−0.922	−0.026	0.016	0.054	0.104	0.168
SEGMENT_CASH_FLOW_ VOLATILITY (SD(CF))	722	0.009	0.050	0.000	0.000	0.000	0.000	0.000	0.044	0.817
SEGMENT_MB_VOLATILITY (SD(MKBK))	722	0.080	0.304	0.000	0.000	0.000	0.000	0.000	0.475	2.695
FINANCIAL_ CONSTRAINTS (WW)	722	−0.356	0.081	−0.536	−0.536	−0.408	−0.364	−0.319	−0.229	0.052
SPECULATIVE_GRADE_ BOND (SPEC)	722	0.533	0.499	0.000	0.000	0.000	1.000	1.000	1.000	1.000
NET_PERFORMANCE (FIRM_LEVEL)	722	−0.013	0.075	−0.443	−0.321	−0.032	0.000	0.025	0.079	0.351
NET_PERFORMANCE (SEGMENT_LEVEL)	722	−0.013	0.078	−0.505	−0.321	−0.031	0.002	0.025	0.074	0.193
CACF	722	−0.062	0.105	−0.735	−0.735	−0.073	−0.044	−0.025	0.040	0.228
RCA	722	0.062	0.092	0.000	0.000	0.021	0.046	0.070	0.150	0.692
EARNSMOOTH	722	1.052	1.415	0.087	0.098	0.309	0.738	1.150	3.274	13.129
EARNSURPRISE	677	−0.008	0.247	−0.916	−0.852	−0.002	0.013	0.049	0.231	0.777
NOEARNSURPRISE	677	0.234	0.423	0	0	0	0	0	1	1

TABLE A.2

Pairwise Correlations

Table A.2 reports the pairwise correlations for all the variables used in the analysis, according to the Pearson method. The sample consists of the intersection of the Compustat, Compustat Historical Segments, and Mergent Fixed Income Securities Database data sets. The sample includes bonds issued on the U.S. primary bond market, from 1995 to 2000, by all nonfinancial (SIC codes 60–69) and nonutility (SIC code 49) treated and control firms. Firms that restate from one to multiple segments in 1998 compose the treatment group, and stand-alone firms compose the control group. All variables are defined later in this Appendix. The symbol * denotes statistical significance at the 1% level.

	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	
SPREAD (%)	1.0000																
TREATED	−0.0537																
NLSEG	0.0646	0.3914*															
RATING (AAA = 1)	−0.7950*	0.1156*	0.0531														
SIZE	−0.4270*	0.0402	0.1700*	0.5561*													
LEVERAGE	0.5000*	−0.1565*	−0.0091	−0.4550*	−0.1008*												
ROA	−0.3654*	−0.0003	0.0461	0.3622*	0.2366*	−0.1891*											
MB	−0.1294*	0.1982*	0.1028*	0.1549*	−0.0640	−0.3650*	−0.0537										
LOSS	0.4005*	−0.0315	−0.0343	−0.3278*	−0.2146*	0.1832*	−0.5538*	0.1053*									
AGE	−0.2952*	0.0437	0.1217*	0.3468*	0.3015*	−0.1452*	0.2576*	−0.1228*	−0.2488*								
OPRISK	0.2112*	0.0958*	−0.0341	−0.2269*	−0.0921	0.1741*	−0.1420*	0.1186*	0.2726*	−0.3134*							
CFCORR	−0.0399	−0.1679*	−0.2522*	−0.0197	0.0023	0.0378	−0.0264	0.0323	0.0230	−0.0775	0.0195						
EXCASH	−0.3779*	0.0495	0.1019*	0.4283*	0.3842*	−0.1564*	0.5747*	−0.2591*	−0.4827*	0.3934*	−0.3642*	−0.0648					
SD(CF)	0.1114*	0.2074*	0.3893*	0.0092	0.0328	−0.0104	−0.0219	0.0707	0.0547	0.0231	−0.0233	−0.0750	−0.0046				
SD(MB)	0.0563	0.3168*	0.4690*	−0.0141	0.0886	0.1097*	−0.0516	0.0532	−0.0037	0.0988*	−0.0252	−0.1889*	−0.0177	0.4379*			
FINANCIAL_ CONSTRAINTS (WW)	0.5949*	−0.0842	−0.1071*	−0.6995*	−0.8310*	0.3968*	−0.3361*	−0.0222	0.2770*	−0.2722*	0.1608*	−0.0267	−0.4645*	−0.0262	−0.0286		
NET_PERFORMANCE	−0.2824*	0.0592	0.0839	0.2890*	0.2060*	−0.2084*	0.4003*	0.0405	−0.4355*	0.3145*	−0.2883*	−0.0379	0.4725*	−0.0848	−0.0260	−0.2985*	
ACCRUALS (RCA)	−0.0055	0.2109*	0.0035	−0.0352	−0.1909*	−0.2987*	−0.1741*	0.4113*	−0.0714	−0.1125*	0.1769*	−0.0219	−0.3654*	0.0097	−0.0012	0.1689*	−0.1242*

Dependent Variables

YIELD_SPREAD: Primary Bond Market yield spreads, in basis points, reported by Mergent Fixed Income Securities database. Missing values are computed as the difference between yields and the corresponding Treasury yield having the same maturity.

YIELD: Yield on the bond issuance as reported by Mergent Fixed Income Securities database.

EXCESS_SPREAD: Difference between the bond spread and the average yield spread of a portfolio of bonds in the same rating-maturity category. Bond information is retrieved from Mergent Fixed Income Securities database.

EXCESS_YIELD: Difference between the bond yield and the average yield of a portfolio of bonds in the same rating-maturity category. Bond information is retrieved from Mergent Fixed Income Securities database.

Independent Variables

TREATED: An indicator variable equal to 1 when stand-alone firms restate as diversified.

CONTROL: An indicator variable equal to 1 for stand-alone firms (single segment).

NO_CHANGE_FIRMS: An indicator variable equal to 1 for conglomerate firms that did not change their number of segments after the reform.

ln(SEG): The logarithm of the number of segments of single-to-multisegment firms.

Debt_Characteristics (FISD Mergent)

AMOUNT: Natural logarithm of the amount of the bond issue.

CALL: An indicator variable if the bond is callable.

COV: An indicator variable equal to 1 if the bond has covenants.

RATING: Continuous variable as the ratio between the numerical value of the firm rating (starting from 1 for the lower rating category (D) until 22 for the higher rating category (AAA)) and the higher rating category (22).

SECURED: An indicator variable equal to 1 if the bond issue is secured.

SENIOR: As an indicator variable equal to 1 if the bond issue is senior.

TIME_TO_MATURITY: The logarithm of the difference (in months) between the actual date and the date of maturity.

SPECULATIVE_GRADE_BOND: Equal to 1 if the bond has a rating below BBB.

Firm Characteristics (Compustat)

CAPEX/SALES: Capital Expenditures (capx/sale).

AGE: Natural logarithm of Firm Age (in years).

CASH_FLOW: (Income Before Extraordinary Items (ib) + Depreciation (dp))/(lag) Assets.

NETCASH: Difference between the cash flow and the capital expenditure ratios.

LEVERAGE: (Short debt (dltt) + Long-term debt (dlc))/Assets (at).

LOSS: An indicator variable equal to 1 if firms have negative EBIT.

MKBK: (Assets (at) − Book Equity (seq) + Market Equity (prccf × csh))/Assets (at).

ROA: Income Before Extraordinary Items (ib)/Last Year Total Assets (at).

SIZE: Natural Logarithm of Total Assets (at).

OPRISK (Operational risk): Standard deviation of the quarterly firm cash flow (Compustat quarterly data) of last 20 quarters prior to the bond issuance.

Proxies for Agency Costs and Coinsurance

CFCORR: The variable is performed in two stages. First, the industry cash flows are the residuals from a regression of the average industry cash flow of stand-alone firms on the average cash flow of the market and Fama and French (1993) factors, for each year and industry. Next, the pairwise industry correlations at the closest SIC code (3-digit and 2-digit SIC codes) are computed using the prior 5-year industry cash flows, for each year and industry in the sample. The industry pairwise correlation is imputed to each segment pair in the conglomerate firms. Finally, I compute the weighted average of those segment cash-flow correlations, where weights are the ratios between the segment sale and the total firm sales.

SD(CFVOL): Cross-segments cash-flow volatility. This is computed in several steps. First, for each year and industry (3-digit SIC codes), I construct the asset-weighted average of the time-series standard deviations of quarterly cash flow (EBITDA/assets) over the prior 20 quarters, to serve as a proxy for the industry operating risk, for all stand-alone firms in the industry. I then assign to each segment unit the correspondent industry cash-flow volatility, according to the closer SIC code. Finally, compute the standard deviation of the segment cash-flow volatility of the segment units.

SD(MB): Cross-segments market-to-book volatility. This is computed in several steps. I use a firm's market-to-book value in the pre-reform period as a proxy for firm growth opportunities. Second, I construct the standard deviation of the market-to-book value across segments units as the asset-weighted average of the time-series market-to-book values of stand-alone firms over the prior 20 quarters, for each industry (3-digit SIC codes) and year. Third, I assign to each segment unit the average market-to-book value in the correspondent industry, according to the closer SIC code. Finally, I construct the standard deviation of the market-to-book value of all the segment units newly disclosed after the reform.

Other Variables

CONC: Concentration ratio, computed by taking the ratio of the sum of sales for the 4 largest firms in an industry (3-digit SIC) to total industry sales.

CURRACCRUALCF (CACF): Following Barton and Simko (2002), I calculate the absolute value of current accruals as follows:

$$\text{(A.1)} \qquad \text{CA}_{it} = (\Delta\text{CAT}_{it} - \Delta\text{CL}_{it} - \Delta\text{CASH}_{it} - \text{DEP}_{it})/A_{i,t-1},$$

where ΔCAT is the change in current assets (item act), ΔCL is the change in current liabilities (item lct), ΔCASH is the change in cash holdings (item che), and DEP is the depreciation and amortization expense (item dp).

EARNINGS_SMOOTHNESS: Ratio between earnings volatility and the volatility of firm cash flow, quarterly computed on a window of last 5 years, as in theorized in Lambert (1984).

NOEARNSURPRISE: Dummy equal to 1 when firms have earning surprise between −0.1 and 0.1. Following Burgstahler and Eames (2006), the variable earning surprise is computed as the actual earnings minus the consensus, divided by the absolute value of the consensus (IBES).

NET_PERFORMANCE (FIRM_LEVEL): Computes as in Botosan and Stanford (2005) as the difference between realized (ROA) end expected profits. I estimate the expected profits at the firm level by multiplying the firm's sales by the industry profit margin, the latter computed by taking the performance of a matched firm in the same primary SIC code. The firms are matched according to the size and the industry classification.

NET_PERFORMANCE (SEGMENT_LEVEL): Computes as in Botosan and Stanford (2005) as the difference between realized (ROA) end the segment-level expected profits. The segment-level expected profits are computed by multiplying, for each firm, the segment sales by the average industry margin of all stand-alone firms, according to the primary SIC code of the firm. For the treated (multi-segment) firm, I also take an average of all segments profits to compute the final (segment-level) expected profits.

RESIDUALS_FROM_ACCRUAL_MODELS (RCA): Following Dechow et al. (1995), I estimate, for each firm, the firm-specific parameters as follows:

$$\text{TA}_t = \alpha_1(1/A_{t-1}) + \alpha_2(\text{REV}_t) + \alpha_3\text{PPE}_t,$$

where TA is the total accruals scaled by lagged total assets, REV is the net revenues in year t, and PPE is the gross property plant and equipment scaled by lagged total assets. I then use the firm-specific coefficient to estimate the following model:

$$\text{(A.2)} \qquad \text{NDA}_t = \alpha_1(1/A_{t-1}) + \alpha_2(\Delta\text{REV}_t - \Delta\text{REC}_t) + \alpha_3\text{PPE}_t,$$

where NDA are the nondiscretionary accruals, A_{t-1} are the total assets at $(t-1)$, ΔREV are the net revenues in year t minus net revenues in year $(t-1)$, and ΔREC are the net receivables in year t less net receivables in year $t-1$, both scaled by total assets at $(t-1)$. The residuals of this regression are a measure for the discretionary accruals.

WHITED_WU_INDEX_FINANCIAL_CONSTRAINTS (WW): Index of financial constraints as computed in Whited and Wu (2006).

Supplementary Material

To view supplementary material for this article, please visit http://doi.org/10.1017/S0022109021000661.

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