Organizational Form and Audit Pricing

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ABSTRACT

The conventional view in accounting is that diversification increases audit complexity and, in turn, audit fees. Conversely, the coinsurance effect of diversification hypothesis suggests that combining multiple business segments with imperfectly correlated earnings provides a coinsurance effect that could alleviate the adverse impact of several audit fee determinants. Given these opposing views, we examine the impact of organizational form on audit fees and find that diversified firms incur less audit fees than comparable portfolios of stand-alone firms. The negative effect of diversification on audit fees is stronger for Big-N audit firms, consistent with these audit firms benefitting more (suffering less) from the coinsurance (complexity) effect of diversification than non-Big N audit firms. However, the benefits of diversification fade in the presence of financial constraints, consistent with the notion that auditing financially constrained clients that are also diversified entails additional risk. We confirm our results using a battery of sensitivity analyses.

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I. INTRODUCTION

There are two competing views regarding the impact of diversification on audit fees. The first view, which we refer to as the *complexity hypothesis*, suggests that the increase in firm's complexity as a result of combining segments with high operational diversity (Bushman, Chen, Engel, and Smith 2004) is associated with a decrease in analyst forecast accuracy (Gilson, Healy, Noe, and Palepu 2001), a lower discretionary accruals quality (Demirkan, Radhakrishnan, and Urcan 2012), and/or a higher degree of information asymmetry between 1) managers and outside investors (Krishnaswami and Subramaniam 1999), and 2) corporate headquarters and divisional managers as a result of a disparity in firm knowledge (Chen, Martin, Roychowdhury, Wang, and Billett 2018). An implication of the complexity effect of diversification hypothesis is that, compared to focused firms, diversified firms should, all else equal, incur higher audit fees which, in turn, suggests that splitting a conglomerate into separately traded firms can mitigate complexity-related problems and, hence, decrease audit fees.

In contrast, based on the tenets of portfolio theory, the second view suggests that combining multiple business segments with imperfectly correlated earnings provides a diversified firm with a coinsurance effect that mitigates the adverse impact of several audit fee determinants such as client business risk (Hann, Ogneva, and Ozbas 2013), earnings volatility (Lewellen 1971; Galai and Masulis 1976), analyst forecast errors (Thomas 2002) and excess cash holdings (Duchin 2010) which could, in turn, decrease audit fees (Gul and Tsui 1998, 2001; Hay, Knechel, and Wong 2006; Stanley 2011; Gotti, Han, Higgs, and Kang 2012; Hackenbrack, Jenkins, and Pevzner 2014; Bryan, Mason, and Reynolds 2018; Newton 2019). We refer to this possibility as the *coinsurance hypothesis*.

Given these competing arguments and the lack of clear theoretical consensus, we suggest that the net effect of diversification on audit fees is ultimately an empirical question. Thus, we test this relationship using a sample of single-and multi-segment firms spanning the period 2000-2018. Similar to prior organizational form studies (Berger and Ofek 1995; Clarke, Fee, and Thomas 2004; Ahn, Denis, and Denis 2006; Subramaniam, Tang, Yue, and Zhou 2011; Hann et al. 2013; Ji, Mauer, and Zhang 2020), our empirical analyses are based on an "excess audit fees" measure that benchmarks the amount of audit fees of a diversified firm against that of a comparable portfolio of stand-alone firms. We find that the average diversified firm in our sample incurs less audit fees than a similarly constructed portfolio of single firms. Furthermore, multivariate tests indicate a negative association between diversification and audit fees, consistent with the coinsurance hypothesis. Additional analyses suggest that the reduction in audit fees due to the coinsurance effect of diversification is driven (albeit partially) by client business risk, measured as the cross-segment correlation in cash flow (Duchin 2010; Hann et al. 2013), earnings volatility (Dichev and Tang 2009; Bryan et al. 2018), and cash holding (Duchin 2010; Subramaniam et al. 2011; Bakke and Gu 2017).

Clearly the complexity and coinsurance effects of diversification are not mutually exclusive and, therefore, the net effect of diversification on audit fees is plausibly moderated by factors that magnify or alleviate the significance of one effect relative to that of the other. We test this contention by investigating the impact of an auditor attribute, namely, size (captured by Big N membership) on the relationship between diversification and audit fees.

An extensive body of research documents that, relative to non-Big N audit firms, Big N firms are more responsive to factors affecting engagement risk (Ghosh and Pawlewicz 2009; Catanach, Irving, Williams, and Walker 2011; Elliott, Ghosh, and Peltier 2013; Hunt, Hunt, Richardson, and Rosser 2022; Lee 2022). Thus, to the extent that the coinsurance effect of diversification decreases client business risk, a key component of engagement risk, it is reasonable to assume that the benefits of coinsurance are more meaningful in the case of Big

N audit firms.[1] In addition, an argument could be made that the complexity effect of diversification is less (more) detrimental/costly in the case of Big (non-Big) N audit firms for the following reasons. First, Big N audit firms can achieve economies of scale by spreading fixed audit costs associated with serving diversified firms across a larger client base, significantly reducing the average cost per client (Simunic 1980; Gist 1994; DeFond and Zhang 2014). Second, Big N audit firms invest more in audit technology and human capital and, therefore, are more efficient in conducting an audit (Sirois, Marmousez, and Simunic 2016). To the extent that audit efficiency indicates the audit firm is able to produce high quality audits with minimal effort (DeFond and Zhang 2014), we expect Big N audit firms to exert less effort and, as a result, incur less total cost than non-Big N audit firms in auditing larger and more complex multi-segment firms. Third, non-Big N firms suffer from a higher audit failure rate (Choi, Kim, Liu, and Simunic 2008) and lack the resources to obtain quality insurance coverage (GAO 2008, 55). Thus, to mitigate the audit failure risk associated with serving complex clients (Hay et al. 2006), non-Big N audit firms may exert more effort and, in turn, incur higher costs (Lawrence, Minutti-Meza, and Zhang 2011).

On the contrary, because Big N audit firms have larger portfolios of clients, they are likely more diversified than non-Big N audit firms. To the extent that audit firms apply a portfolio approach to measure total risk (Simunic and Stein 1990; Krishnan and Krishnan 1997), it can be argued that Big N audit firms can tolerate a greater client business risk (Francis and Krishnan 2002; Francis and Reynolds 2002). This implies that the coinsurance (e.g., risk-reduction) effect of diversification may be less (more) beneficial to Big N (non-Big N) audit firms.[2] In

[1] Engagement risk consists of three major components. The first component is client business risk defined as the risk related to the client's survival and profitability. The second component is auditor business risk defined as the risk of potential litigation and reputational costs associated with audit failure. The third component is audit risk defined as the risk that audit procedures may fail to detect material misstatements in the financial statements (Johnstone 2000; Stanley 2011; DeFond, Lim, and Zang 2016).

[2] This argument is based on that of DeAngelo (1981) who suggests that, due to their large client base, Big N audit firms are less dependent on a single client relative to non-Big N audit firms. This implies that a decrease in client risk due to diversification would be less (more) beneficial to Big (non-Big) N audit firms.

addition, Big N audit firms have more to lose from an audit failure (DeAngelo 1981; Jones and Raghunandan 1998; Johnstone and Bedard 2003; Bedard and Johnstone 2004; DeFond and Zhang 2014). Therefore, relative to non-Big N audit firms, Big N audit firms are likely to exert more effort and, in turn, incur higher cost in response to the increase in audit failure risk associated with the complexity effect of diversification (Hay et al. 2006). These opposing views create an interesting framework for examining how the size of the audit firm affects the relationship between diversification and audit fees. Our results reveal that the negative effect of diversification on audit fees is stronger for clients employing Big N audit firms, consistent with the argument that Big N audit firms benefit more (suffer less) from the coinsurance (complexity) effect of diversification than do non-Big N audit firms.

We also examine the impact of a client attribute, namely, financial constraints on the relationship between diversification and audit fees. We focus on financial constraints because several organizational form studies in finance (Acharya, Almeida, and Campello 2007; Duchin 2010; Hann et al. 2013) hypothesize and find that, compared to their unconstrained counterparts, financially constrained firms benefit more from the coinsurance effect of diversification. These findings imply that the decrease in audit fees, induced by diversification, should be stronger for financially constrained firms. Alternatively, studies in the accounting literature suggest that managers of financially constrained firms are likely to pursue earnings manipulation strategies to ease financial constraints (Linck, Netter, and Shu 2013; Farrell, Unlu, and Yu 2014; Kurt 2018). Given that earnings management risk is a key determinant of audit fees (Gul, Chen, and Tsui 2003; Abbott, Parker, and Peters 2006; Schelleman and Knechel 2010; Krishnan, Sun, Wang, and Yang 2013), it is reasonable to argue that the negative association between diversification and audit fees is attenuated by financial constraints. Using several proxies of financial constraints, we find that, in general, the negative effect of diversification on audit fees disappears and even becomes positive in the case of financially constrained clients, consistent with the view in the accounting literature that financial constraints are associated with greater engagement risk, which auditors price into fees.

Our results are robust to using several measures of diversification, audit fees attributable to diversification, and financial constraints. The results also remain robust when we account for selection bias and the joint endogeneity of audit fees, diversification, and auditor choice. However, it is important to mention that our results must be interpreted with due regard to their limitations and, particularly, to the caveats of the excess audit fees methodology, discussed in detail in Section III.

This paper contributes to the literature along several dimensions. First, we contribute to the audit literature by investigating whether client's organizational form affects the auditor's perception of engagement risk in the context of audit pricing. Extensive research in finance documents a relationship between organizational form and several factors that may affect audit fees such as earnings volatility (Lewellen 1971; Galai and Masulis 1976), client firm risk (Hann et al. 2013), analyst forecast errors (Thomas 2002), cash holding (Duchin 2010), and payout policy (Jordan, Liu, and Wu 2018). Hence, a natural extension of this literature is to evaluate the relation between organizational form and audit pricing by comparing multi-segment and single-segment firms in terms of audit fees. Kuppuswamy and Villalonga (2016) explain that the precise way to examine the impact of diversification on a certain outcome variable, audit fees for the purpose of this study, is to compare a firm's actual audit fees to that of a comparable portfolio of same-industry single-segment firms. Consequently, we compute a measure of excess audit fees which benchmarks the amount of audit fees of a diversified firm against that of a comparable portfolio of single firms. Our methodology is similar in spirit to the approach used in prior organizational form studies to measure excess cost of capital (Hann et al. 2013), excess firm value (Berger and Ofek 1995; Denis, Denis, and Yost 2002), excess financial leverage (Ahn et al. 2006; Ji et al. 2020), excess information asymmetry (Clarke et al. 2004), and excess cash holdings (Subramaniam et al. 2011). Our results indicate that diversified firms incur less audit fees than comparable portfolios of stand-alone firms implying that auditors perceive the benefits of diversification to exceed its costs. Therefore, splitting a conglomerate into separately traded firms would increase audit fees, contrary to the popular view in the accounting literature.

Second, the results of this study have implications for the stream of research on the consequences of Big N concentration (Carson, Simnett, Soo, and Wright 2012; Francis, Michas, and Seavey 2013; Gerakos and Syverson 2015). Regulators and researchers have expressed concerns that Big N market dominance may increase audit fees because it reduces competition (GAO 2003, 2008; Knechel 2015; Eshleman and Lawson 2017). However, a counter-argument is that splitting up Big N audit firms may reduce their economies of scale (GAO, 2008) and, in turn, increase audit fees (Pearson and Trompeter 1994; Fung, Gul, and Krishnan 2012). Indeed, empirical studies examining the price implications of audit market concentration have produced mixed results (Pearson and Trompeter 1994; Numan and Willekens 2012; Gerakos and Syverson 2015; Huang, Chang, and Chiou 2016; Eshleman and Lawson 2017). Consequently, DeFond and Zhang (2014, 312) conclude that "given the limited number of studies and the mixed findings, we believe additional research is needed in this area." Our finding that the negative impact of diversification on audit fees is stronger for clients employing Big N audit firms implies that splitting up Big N audit firms may produce unintended outcomes such as increasing audit fees.

Third, while several papers in the accounting literature document 1) an association between earnings management risk and audit fees (Gul et al. 2003; Abbott et al. 2006; Schelleman and Knechel 2010; Krishnan et al. 2013) and 2) an association between financial constraints and earnings management risk (Linck et al. 2013; Farrell et al. 2014; Kurt 2018), there is a paucity of empirical evidence on whether financial constraints affect engagement risk and, ultimately, audit fees. We take a step in furthering this literature by investigating the interplay between diversification, financial constraints, and audit fees. Our results indicate that the benefits of corporate diversification in decreasing audit fees do not apply to financially constrained clients. In fact, we find that the impact of diversification on audit fees is positive in the case of financially constrained firms.

Fourth, this paper adds to an extensively researched area in the finance literature for which empirical results are mixed: the financial implications of corporate diversification. Earlier studies document that diversified firms trade at a discount relative to the sum of the values of their segments (Berger and Ofek 1995; Denis, Denis, and Sarin 1997). However, more recent research questions the methodology and data used in prior diversification studies and argues that diversification per se does not destroy value and, in certain circumstances, diversification may create value (Campa and Kedia 2002; Graham, Lemmon, and Wolf 2002; Villalonga 2004). We contribute to this debate by examining an under-researched channel through which corporate diversification can affect firm value: the cost of audit. An implication of our findings is that diversification may enhance firm value by decreasing audit fees.

The remainder of the paper is organized as follows: Section II reviews the literature and develops the hypotheses. Section III provides description of data and variable construction. Section IV presents the empirical models and the results, and Section V concludes.

II. LITERATURE REVIEW AND HYPOTHESES DEVELOPMENT

The Complexity Hypothesis

The complexity stemming from combining diverse operating segments (Bushman et al. 2004) makes it more challenging for analysts, who often specialize in a single industry (Zuckerman 2000), to understand and evaluate the performance of diversified firms. Consequently, studies document a negative effect of diversification on the intensity of analyst coverage (Gilson et al. 2001) and the quality of analyst forecasts (Krishnaswami and Subramaniam 1999). Moreover, the monitoring hypothesis (Jensen and Meckling 1976) suggests that financial analysts play a key governance role in scrutinizing management behavior and, therefore, constrain managers from pursuing self-serving strategies that may intensify engagement risk. Consistent with the monitoring hypothesis, several studies find that audit fees decrease as the number of analysts following the firm increases (Gotti et al. 2012; Lim and Monroe 2022; Pham, Merkoulova, and Veld 2022)[3] and the quality of analyst forecasts improves (Newton 2019). Taken together, the preceding arguments imply a positive association between diversification and audit fees. In addition, several studies link diversification to earnings management risk at the firm (Rodríguez-Pérez and Hemmen 2010; Demirkan et al. 2012) and segment (You 2014) levels. To the extent that auditors plan more extensive testing and extract additional fees when earnings manipulation risk is high (Gul et al. 2003; Abbott et al. 2006; Schelleman and Knechel 2010; Krishnan et al. 2013; Greiner, Kohlbeck, and Smith 2017), it is reasonable to assume a positive relationship between diversification and audit fees.

Finally, diversification is associated with a higher degree of information asymmetries within the firm (Habib, Johnsen, and Naik 1997; Chen et al. 2018) and/or between managers and outside investors (Bushman et al. 2004). The literature on the dark side of internal capital markets (Rajan, Servaes, and Zingales 2000; Scharfstein and Stein 2000; Ozbas and Scharfstein 2010) maintains that agency problems, intensified by the high degree of information asymmetry associated with diversification, can cause a misallocation of internal cash flow across segments. These inefficient allocations of resources adversely affect firm performance (Rajan et al. 2000; Ahn and Denis 2004) and, in turn, heighten client business risk, increasing audit fees (Johnstone 2000; Stanley 2011).

[3] Specifically, Lim and Monroe (2022) document a negative (positive) association between audit fees and analyst coverage for a subsample of U.S. (non-U.S.) firms.

The Coinsurance Hypothesis

The coinsurance hypothesis suggests that diversification may decrease audit fees by mitigating the adverse effect of several audit fee determinants. First, diversification may decrease audit fees by lowering client business risk. For example, Hann et al. (2013) suggest that diversification reduces systematic risk by enabling a firm to avoid countercyclical deadweight costs. Singhal and Zhu (2013) argue, and their results reveal, that diversification diminishes bankruptcy risk by allowing a multi-segment firm to subsidize losses suffered in one segment with profits generated in another. Franco, Urcan, and Vasvari (2016) document a negative association between diversification and the cost of debt for firms with high-quality segment disclosures. In addition, there is evidence in the literature that diversification alleviates the impact of unanticipated macroeconomic conditions by enabling conglomerates to transfer capital between segments. Dimitrov and Tice (2006) find that during recessions, when credit constraints are high, bank-dependent multi-segment firms experience smaller drops in sales growth and inventory growth than do bank-dependent single-segment firms. More recently, Kuppuswamy and Villalonga (2016) examine the effect of diversification on firm value during the 2008-2009 financial crisis and document a positive association.

Second, through the combination of various segments with imperfectly correlated earnings, diversification may decrease audit fees by lowering the volatility of the firm's overall earnings (Lewellen 1971; Galai and Masulis 1976; Franco et al. 2016). Volatility increases earnings unpredictability (Dichev and Tang 2009) which, in turn, exacerbates inherent risk because it makes it more challenging for auditors to evaluate the reasonableness of current-period earnings (Bryan et al. 2018). In addition, earnings volatility may increase audit fees by intensifying earnings management risk (Graham, Harvey, and Rajgopal 2005). Consistent with these arguments, prior research provides empirical support for the assertion that audit fees are likely to increase with earnings volatility. For example, Huang, Lin, and Raghunandan (2016) examine the relationship between the volatility of other comprehensive income and audit fees and document a positive association. Similarly, based on a sample of 13,214 firm-year observations for the period from 2004 to 2012, Bryan et al. (2018) document a positive association between earnings volatility and audit fees.

Third, diversification may decrease audit fees by mitigating the effect of agency problems associated with excess cash holding. A benefit to the multi-segment firm structure is the availability of internal capital markets which enables a conglomerate to transfer cash from cash-rich segments to cash-poor segments, decreasing the need to hold cash for potential growth opportunities (Opler, Pinkowitz, Stulz, and Williamson 1999). Support for this conjecture is provided by several studies who document a negative association between diversification and cash holding (Duchin 2010; Subramaniam et al. 2011; Bakke and Gu 2017). This benefit of diversification is particularly relevant in the context of audit fees because excess cash increases auditors' assessment of inherent risk, and therefore, is associated with greater audit effort and fees (Gul and Tsui 1998; Griffin, Lont, and Sun 2010; Gleason, Greiner, and Kannan 2017).

Overall, we conclude that the relation between diversification and audit fees is an empirical question, the answer to which depends on whether the complexity effect of diversification or the coinsurance effect of diversification dominates. Therefore, we formulate our hypothesis in the null form as follows:

H1: Diversification does not affect audit fees

The Effect of the Audit Firm Size

It is generally accepted in the auditing literature that Big and non-Big N audit firms have different characteristics (Hay et al. 2006; DeFond and Zhang 2014; DeFond, Erkens, and Zhang 2017; Hay and Knechel 2017). Consequently, we argue that in the contexts of the coinsurance and complexity effects of diversification, audit-firm size plays a key role for the following reasons. First, several studies document that Big N firms are more sensitive and, thus, more responsive to factors affecting engagement risk. For example, Ghosh and Pawlewicz (2009) document that Big N audit firms increased their fees more significantly than did non-Big N firms in response to the increase in legal liability and litigation risk associated with the enactment of the Sarbanes-Oxley Act (SOX). Elliott et al. (2013) document a positive relation between audit fees and risky initial engagements only for clients employing Big N audit firms. More recently, Hunt et al. (2022) examine the relation between material misstatement risk, estimated using machine learning techniques, and audit fees and document a positive relationship only for Big N audit firms. Consequently, a reasonable argument could be made that Big N audit firms may respond more favorably than non-Big audit firms to the benefit of diversification in reducing client business risk (Lewellen 1971; Hann et al. 2013; Singhal and Zhu 2013).

Second, in terms of the costs of diversification, several arguments plausibly suggest that the complexity effect of diversification may be less (more) detrimental in the case of Big (non-Big) N firms. For example, the larger customer base of Big N audit firms, relative to that of non-Big N audit firms, means they can benefit from economies of scale (Simunic 1980) by spreading (at least some of) the additional costs associated with diversification across more clients, resulting in lower average cost per client.[4] In addition, owing to their larger size, Big N audit firms have more human and economic resources in place (Sirois et al. 2016; DeFond et al. 2017) which implies that, compared to their resource-constrained counterparts, Big N audit firms will incur minimal or no additional costs in auditing diversified firms. Finally, relative to Big N firms, non-Big N firms have 1) a higher audit failure rate (Choi et al. 2008)

[4] Implicit in this argument is the assumption that some of the costs associated with the complexity effect of diversification are fixed costs.

and 2) less access to liability insurance coverage (GAO 2008, 55), which imply that non-Big N audit firms will exert more effort, relative to Big N audit firms, in auditing diversified clients (Lawrence et al. 2011).

However, the large customer base of Big N audit firms makes them more diversified, increasing their tolerance for client business risk (Francis and Krishnan 2002; Francis and Reynolds 2002). In contrast, the smaller number of clients the non-Big N audit firms serve means that the individual client's business risk plays an important role in determining the total portfolio risk of the non-Big N audit firm. Therefore, a counter-argument could be made that the risk reduction effect of diversification is less (more) beneficial to Big N (non-Big N) audit firms. Consistent with this argument, Frank, Maksymov, Peecher, and Reffett (2021) document that the benefits of audit liability insurance are greater in the case of small audit firms (e.g., non-Big N). Further, because Big N audit firms have more to lose from an audit failure (DeAngelo 1981; Jones and Raghunandan 1998), they are likely to exert more effort than do non-Big N audit firms due to the increased complexity associated with diversification (Hay et al. 2006; DeFond and Zhang 2014; DeFond et al. 2017; Hay and Knechel 2017). To synthesize, the arguments presented above imply that the effect of audit firm size on the relationship between diversification and audit fees is *ex ante* unclear. Consequently, we offer the following hypothesis, stated in the null form:

H2(a): The relationship between diversification and audit fees is not impacted by whether the auditor is a Big N or non-Big N audit firm.

The Effect of the Client's Financial Constraints

It is costlier for financially constrained firms to raise funds using external capital markets (Acharya et al. 2007). Accordingly, the findings of several organizational form studies in finance imply that the internal resource allocation benefits of diversification are stronger for firms facing greater financial constraints. For example, Yan (2006) finds that diversified firms enjoy higher valuations than focused firms during periods when external financing is costly and that the increase in the value of diversification is stronger for financially constrained firms. Hovakimian (2011) demonstrates that during financial crises, financially constrained diversified firms are more efficient in allocating funds between divisions. A study by Duchin (2010) reveals that the benefit of diversification in decreasing cash holding is stronger among financially constrained firms. Similarly, Hann et al. (2013) find that diversification is associated with a decrease in the cost of capital and, more importantly, the effect is more pronounced in the case of financially constrained firms.

However, the accounting literature proposes that a major motive for earning manipulation is to obtain external financing (Dechow, Sloan, and Sweeney 1996) which implies that managers of financially constrained firms have incentives to pursue earnings manipulation strategies to ease financial constraints. Consistent with this argument, Linck et al. (2013) find that financially constrained firms with investment opportunities pursue income increasing earnings management strategies to raise external financing. Similarly, based on a sample of 94,382 firm-year observations for the 1983-2011 period, Farrell et al. (2014) document a positive association between debt financing constraints and accruals-based earnings management. More recently, Kurt (2018) finds that, compared to unconstrained firms, financially constrained firms are more likely to engage in upward earnings management when selling equity. In addition, because diversification is likely to be associated with less accurate analysts' forecasts (Gilson et al. 2001; Duru and Reeb 2002), lower transparency and a higher degree of information asymmetry between managers and outside investors (Habib et al. 1997; Krishnaswami and Subramaniam 1999; Chen et al. 2018), it provides managers with a better opportunity for earnings manipulation. Therefore, we would expect that the negative (positive) association between diversification and audit fees to be weaker (stronger) for financially constrained firms.

Given the above opposing effects, we do not make a directional prediction regarding how the relationship between diversification and audit fees is affected by the client's financial constraints. Instead, we propose the following hypothesis, stated in the null form:

H2(b): The relationship between diversification and audit fees is not impacted by whether the client is a financially constrained or unconstrained firm.

III. DATA AND RESEARCH DESIGN

Sample

To construct our sample, we begin by identifying all firms for which data is available on Compustat's North America Industrial Annual file. Following prior research on diversification and audit fees (Berger and Ofek 1995; Francis, Reichelt, and Wang 2005; Duchin 2010; Gul and Goodwin 2010; Stanley 2011; Ball, Jayaraman, and Shivakumar 2012; Hann et al. 2013), we require firms to have data on sales, assets, and four-digit SIC codes. We eliminate firms operating in the utility and financial industries (SIC codes 4900-4999 and 6000-6999, respectively), firms incorporated outside of the United Sates, firms with assets less than or equal to zero, and firms with sales less than $20 million. Next, we eliminate firms with missing data on Compustat's Segments file. We focus on business segments and consider only the latest source year of each segment-year observation (Denis et al. 2002; Duchin 2010). We eliminate firms missing a four-digit SIC code for any of the segments, firms missing any segment sales, and firms with any segment in a financial industry. Further, to mitigate the effect of reporting errors in Compustat and to ensure the integrity of segment data, we eliminate firms in which the sum of business segment sales is not within one percent of the total firm sales.[5] Next, we eliminate firms with missing data on the Audit Analytics database and firms missing data required to compute measures of diversification, excess audit fees, and all control variables. Applying the above sampling procedures results in 24,779 firm-year observations for the period from 2000 to 2018. The number of observations in subsequent analyses may vary based on the availability of data for certain variables. We winsorize all continuous variables at both the upper and lower one-percentile to mitigate the effect of outliers.

Proxy for Excess Audit Fees

To compare a diversified firm's audit fees to the audit fees that its segments would pay as stand-alone firms, we compute a measure of excess audit fees that benchmarks the audit fees of a diversified firm against the audit fees of a comparable portfolio of single-segment firms. This approach is similar to that used by Hann et al. (2013) to compute excess cost of capital, Berger and Ofek (1995) and Denis et al. (2002) to compute the excess value of diversification, and Ahn et al. (2006), Kuppuswamy and Villalonga (2016), and Ji et al. (2020) to compute excess leverage. Following these studies, excess audit fees (*EXAF*) is the natural logarithm of the ratio of the firm's actual audit fees to its imputed audit fees and is computed in the following manner:

$$EXAF = In\frac{AF}{IAF} \qquad (1)$$

where *EXAF* is excess audit fees, *AF* is the firm's actual audit fees calculated as the natural logarithm of actual audit fees[6], and *IAF* is the firm's imputed audit fees computed by multiplying the median ratio of the firm's logarithmic audit fees to sales for single-segment

[5] If the deviation between the sum of segment sales and total firm sales is within 1%, we increase or decrease each segment's sales by the percentage deviation (Bens and Monahan 2004; Ji et al. 2020).

[6] Similar to the results of prior studies (Stanley 2011; Kannan, Skantz, and Higgs 2014; Bryan et al. 2018; Chen, Duh, Wu, and Yu 2019), the mean and median values of (*AF*) equal 13.39 and 13.42, respectively.

firms in a segment's industry by the segment's reported sales and then summing over the number of segments in the firm. Specifically, the firm's imputed audit fees are calculated as:

$$IAF = \sum_{i=1}^{n} S_i \; X \; [Ind_i \; ({}^{AF}/_{S})_{med} \qquad (2)$$

In equation (2), *i* is a segment-specific index, *n* is the number of reported segments in segment *i*'s firm at the fiscal year end, S_i is total sales for segment *i*, and $Ind_i({}^{AF}/_{S})_{med}$ is the median multiple of firm logarithmic audit fees to sales for all single-segment firms in the same industry as segment *i*. The industry for each segment is defined based on the narrowest SIC grouping that includes at least five single-segment firms. Specifically, we first attempt to define an industry based on the four-digit SIC code. If five or more single firms with the same four-digit SIC code as the segment meet the size and data availability requirements, that represents the segment's industry for the purposes of calculating the segment's imputed audit fees. Otherwise, we attempt to define the industry based on the segment's three-digit SIC code. If there are less than five single firms with the same three-digit SIC code as that of the segment, we define the industry based on the segment's two-digit SIC code.

Measures of Diversification

We use two measures of diversification that are commonly used in the literature (Berger and Ofek 1995; Lai and Liu 2018; Ji et al. 2020). The first one is an indicator variable, *DIV*, that equals 1 if the firm has more than one business segment, and 0 otherwise and the second one is a continuous variable, *SBHI*, that measures the intensity of diversification by the Herfindahl index. Both variables are defined in the Appendix.

Measures of Financial Constraints

There is no universally accepted measure of financially constrained firms (Linck et al. 2013) and, therefore, any single proxy is unlikely to capture all aspects of financial constraints. Consequently, we use four different measures of financial constraints (*FC*) that have been used in prior finance and accounting studies (Duchin 2010; Hann et al. 2013; Linck et al. 2013). Specifically, we measure financial constraints based on the SA Index (*SA*), the WW Index (*WW*), the KZ Index (*KZ*), and the S&P Debt Rating (*RATING).* All variables are defined in the Appendix.

Empirical Models

The Effect of Diversification on Excess Audit Fees

To test our first hypothesis, we use the following regression model to examine the relation between diversification and excess audit fees with clustered robust standard errors to correct for cross-sectional and time-series dependence (Petersen 2009):

$$\begin{aligned} EXAF_{i,t} = \quad & \beta_0 + \beta_1 DIVER_{i,t} + \beta_2 SIZE_{i,t} + \beta_3 LEV_{i,t} + \beta_4 BM_{i,t} + \beta_5 ROA_{i,t} + \beta_6 CATA_{i,t} \\ & + \beta_7\, BIGN_{i,t} + \beta_8 MKTRET_{i,t} + \beta_9 SDEARN_{i,t} + \beta_{10} EMPL_{i,t} + \beta_{11} GCON_{i,t} \\ & + \beta_{12}\, LOSS_{i,t} + \beta_{13} ISSUE_{i,t} + \beta_{14} MERGE_{i,t} + \beta_{15} LIT_{i,t} + \varepsilon \end{aligned} \tag{3}$$

where subscripts *i* and *t* indicate firm and year, respectively. The dependent variable is excess audit fees (*EXAF*) computed using the sales multiplier of the median single-segment firms as the imputed audit fees of a diversified firm. *DIVER* is one of the two proxies for diversification (*DIV* and *SBHI*). In addition, Equation (3) includes several determinants of audit fees identified in the prior studies (Simunic 1980; Francis et al. 2005; Hay et al. 2006; Gul and Goodwin 2010; Stanley 2011; Ball et al. 2012; Bryan et al. 2018).[7] Specifically, we control for *SIZE* because it is the primary determinant of audit fees (Hay et al. 2006). We also include *BIGN* because the auditing literature generally concludes that Big N audit firms are more efficient in conducting the audit which suggests that these firms are associated with a fee premium (Palmrose 1986) or discount (Simunic 1980). In addition, because auditors' effort and, in turn, fees are affected

[7] Consistent with prior studies (Bodnar, Tang, and Weintrop 1997; Denis et al. 2002; Chang, Kogut, and Yang 2016), we measure all continuous control variables in each year relative to the median value of single-segment firms in the same industry.

by audit risk (Simunic 1980; Stanley 2011; Kannan et al. 2014), we include several proxies for audit risk such as (*ROA*, *LEV*, *BM*, *LOSS*, *SDEARN*, *GCON*, *LIT*, and *MKTRET)*. Finally, following prior studies (Hay et al. 2006; Gul and Goodwin 2010; Stanley 2011; Ball et al. 2012; Kannan et al. 2014; Bryan et al. 2018), we control for the complexity of the audit using the following variables: *CATA*, *EMPL*, *ISSUE*, and *MERGE*. All variables are defined in the Appendix. In testing the first hypothesis, we are interested in the coefficient on *DIVER*. In accordance with our hypotheses, we do not make a directional prediction about the coefficient of *DIVER*.

The Impact of Audit Firm Size

To test the second hypothesis, we estimate the following audit fee model:

$$\begin{aligned} EXAF_{i,t} = \quad & \beta_0 + \beta_1 BIGN_{i,t} * DIVER_{i,t} + \beta_2\, DIVER_{i,t} + \beta_3\, BIGN_{i,t} + \beta_4\, SIZE_{i,t} \\ & + \beta_5 LEV_{i,t} + \beta_6\, BM_{i,t} + \beta_7\, ROA_{i,t} + \beta_8\, CATA_{i,t} + \beta_9\, MKTRET_{i,t} \\ & + \beta_{10}\, SDEARN_{i,t} + \beta_{11}\, EMPL_{i,t} + \beta_{12}\, GCON_{i,t} + \beta_{13}\, LOSS_{i,t} \\ & + \beta_{14}\, ISSUE_{i,t} + \beta_{15} MERGE_{i,t} + \beta_{16} LIT_{i,t} + \varepsilon \end{aligned} \tag{4}$$

All variables are defined in the Appendix. In testing the second hypothesis, we are interested in the coefficient on *BIGN*DIVER*. In accordance with our second hypothesis, we do not make a directional prediction about the coefficient on *BIGN*DIVER*.

The Impact of Financial Constraints

To test the third hypothesis, we estimate the following audit fee model:

$$\begin{aligned} EXAF_{i,t} = \quad & \beta_0 + \beta_1 FC_{i,t} * DIVER_{i,t} + \beta_2 DIVER_{i,t} + \beta_3 FC_{i,t} + \beta_4 SIZE_{i,t} + \beta_5 LEV_{i,t} \\ & + \beta_6\, BM_{i,t} + \beta_7\, ROA_{i,t} + \beta_8\, CATA_{i,t} + \beta_9\, BIGN_{i,t} + \beta_{10}\, MKTRET_{i,t} \\ & + \beta_{11} SDEARN_{i,t} + \beta_{12} EMPL_{i,t} + \beta_{13} GCON_{i,t} + \beta_{14} LOSS_{i,t} + \beta_{15} ISSUE_{i,t} \\ & + \beta_{16}\, MERGE_{i,t} + \beta_{17} LIT_{i,t} + \varepsilon \end{aligned} \tag{5}$$

where *FC* is one of the four financial constraints measures (*SA*, *WW*, *KZ*, and *RATING*), and *FC*DIVER* is the variable of interest which represents the interaction between diversification and financial constraints. All variables are defined in the Appendix. In accordance with the third hypothesis, we do not make a directional prediction about the coefficient on *FC*DIVER*.

IV. Empirical Results

Summary Statistics: Excess Audit Fees

In Panel A of Table 1, we present excess audit fees summary statistics for two subsamples defined by the two measures of diversification (e.g., *DIV* and *SBHI)*. For both measures, the results indicate that the excess audit fees for both multi-segment and single-segment firms are negative and statistically different from zero at the 0.01 level.[8] However, the magnitude of the excess audit fees is greater (more negative) in the case of multi-segment firms. Because the results are qualitatively similar across the two measures of diversification, we focus our discussion on the results for *DIVER=DIV*. Specifically, these results show that the mean (median) excess audit fees for multi-segment firms is -1.004 (-0.990). In contrast, the mean (median) excess audit fees for single-segment firms is -0.228 (-0.022).[9] Importantly, the difference in the means (medians) between the multi-segment and single-segment is -0.776 (-0.969) and significant at the 0.01 level.

Analysis of Excess Audit Fees and Diversification

Nonparametric Results

In Panel B of Table 1, we sort our sample of multi-segment firms into quintiles based on the Herfindahl Index (defined in Section III), where the lowest (highest) quintile contains multi-segment firms with the highest (lowest) *SBHI*. The mean (median) *SBHI* for Q1 (highest

[8] The significance of mean (median) is measured using a standard two-tailed t-test (Wilcoxon signed rank test).
[9] By construction, the median excess audit fees for single-segment firms should equal zero because imputed values are calculated using the audit fees of the median single-segment firm in each industry. However, because we eliminate observations with missing control variables, the median excess audit fees for single-segment firms differs from zero. The mean and median excess audit fees for single-segment firms before the elimination of any observations are -0.145 and zero, respectively.

diversification quintile) is 0.666 (0.655) and the mean (median) *SBHI* for Q5 (lowest diversification quintile) is 0.137 (0.140). We also report mean and median excess audit fees for each quintile and for single-segment firms.[10] Consistent with the coinsurance benefits of diversification hypothesis, we observe a near monotonic decrease in excess audit fees as we move from the highest diversification quintile (Q1) to the lowest diversification quintile (Q5). The mean (median) difference between Q1 and Q5 is -1.016 (-1.021) and is statistically significant at the 1% level. Similarly, the mean (median) difference in excess audit fees between the highest diversification quintile (Q1) and single-segment firms is -1.497 (-1.723) and is statistically significant at the 1% level. These results are at odds with the conventional view that diversification is associated with an increase in audit fees and are consistent with the coinsurance hypothesis: compared to focused firms, diversified firms incur lower audit fees.

Main Regression Results

In this section, we estimate panel regressions that control for various other variables known to affect audit fees. Table 2 reports the regression results for the audit fee model in Equation (3). We use two estimation models in our analysis: an Ordinary Least Squares (OLS) model and, for robustness, a Fixed Effect (FE) model where we control for industry and year fixed effects. All regression models use t-statistics based on robust standard errors clustered by firm and year (Peterson 2009) and report two-tailed p-values. Columns (1) and (3) report OLS results for the two measures of diversification. In line with the coinsurance argument, the results indicate a negative association between diversification and excess audit fees. For example, the coefficient estimates on *DIV* and *SBHI* are -0.502 ($p < 0.01$) and -1.230 ($p < 0.01$), respectively. Further, as shown in columns (2) and (4) the inclusion of industry and year fixed effects does not alter the results: the coefficient estimates on the two measures of diversification

[10] The *SBHI* for single firms equals zero by definition.

are both negative and statistically significant at the 1% level. Overall, our results reject the conventional complexity view in favor of the coinsurance hypothesis: diversification is associated with a reduction in audit fees.

The Moderating Impact of Audit Firm Size

H2a predicts that the size of the audit firm (Big N versus non-Big N) moderates the relationship between diversification and excess audit fees. We test this hypothesis by estimating Equation (4) using OLS and fixed effects models. The results presented in Columns (1) through (4) of Table 3 reveal that the coefficients on the interaction between the two measures of diversification and *BIGN* are always negative and highly significant ($p < 0.01$). These results indicate that the decrease in excess audit fees attributable to corporate diversification is more pronounced for clients that employ Big N audit firms.

The Moderating Impact of Financial Constraints

We also investigate whether the impact of diversification on excess audit fees is moderated by financially constrained clients. We test this hypothesis by estimating Equation (5) using OLS and fixed effects models for each of the four measures of financial constraints discussed in section III.

The results are presented in Panels A and B of Table 4 where diversification (*DIVER*) is measured as *DIV* and *SBHI*, respectively. The main coefficient of interest is the interaction term between *DIVER* and measures of financial constraints.[11] The coefficient estimates on the interaction between measures of diversification and financial constraints are all positive and significant, except for the *KZ* measure of financial constraints. Overall, these results are consistent with the arguments in the accounting literature that financial constraints are

[11] For brevity, we do not report coefficient estimates for the control variables.

positively associated with earnings management risk and, in turn, increase auditors' assessed engagement risk (Linck et al. 2013; Farrell et al. 2014; Kurt, 2018).

V. ADDITIONAL ANALYSES AND SENSITIVITY TESTS

How Does Diversification Affect Audit Fees?

The evidence presented thus far supports the conjecture that diversified firms incur less audit fees than comparable portfolios of stand-alone firms. However, this does not explain why diversified firms pay less audit fees than focused firms. In Section II, we argue that diversification may decrease audit fees by mitigating the adverse effect of several audit fee determinants such as client business risk, earning volatility, and cash holding. Consequently, to test whether diversification decreases audit fees through its impact on client business risk, earnings volatility, or cash holding, we conduct a two-stage test (Nallareddy and Ogneva 2017). In the untabulated first step, we separately regress excess audit fees (*EXAF*) on 1) *RISKRED*, 2) *CASH*, and 3) *EARNVOL*. Where *RISKRED* is the reduction in client business risk based on segment cash flow volatility and cross segment correlations in cash flows (Duchin 2010; Hann et al. 2013), *CASH* is cash and short-term investments divided by total assets, and *EARNVOL* is earnings volatility calculated by taking the standard deviation of annual income before extraordinary items from the cash flow statement deflated by average assets for the five years preceding the current year (Dichev and Tang 2009). The first, second, and third sets of fitted values represent the portion of *EXAF* that is explained by *RISKRED*, *CASH*, and *EARNVOL*, respectively. In the second stage, we regress the fitted values obtained from each of the first stage on the two measures of diversification (e.g., *DIV* and *SBHI*) and other control variables in Equation (3). Panels A and B of Table 5 show the results of the second stage where *DIVER* is measured as *DIV* and *SBHI*, respectively.[12] Across all regression specifications, *DIVER* is a

[12] For brevity, we do not report coefficient estimates for the control variables.

significant predictor of fitted excess audit fees. The magnitudes of the coefficients are smaller than those in the main regressions (Table 2), suggesting that there is also a link between diversification and excess audit fees that is not explained by the reduction in client business risk, cash holding, or earnings volatility. Overall, however, the results are consistent with the coinsurance hypothesis: diversification is associated with a reduction in audit fees, in part, because it reduces client business risk, earnings volatility, and cash holding.[13]

Endogeneity of Audit Fees and Diversification

Examining the impact of diversification on excess firm value, Campa and Kedia (2002) and Villalonga (2004) suggest that the decision to diversify is endogenous in that factors motivating the diversification decision are negatively associated with firm value. Similarly, in our analysis, there might be a relationship between diversification and excess audit fees. In other words, there is a possibility that the characteristics driving the firm to diversify are correlated with audit fees. Following Campa and Kedia (2002) and Hann et al. (2013), we address the endogeneity of diversification in two ways. First, as mentioned above, we control for unobservable characteristics that affect the diversification decision by estimating Equation (3) using Fixed Effect models where we control for industry and year fixed effects. Second, we estimate a Heckman two-stage model to correct for potential selection biases. Specifically, we estimate a probit model in the first-stage for the firm's decision to diversify. The dependent variable in the first-stage model (*DIV*) is binary that equals one if the firm has more than one segment and zero if the firm has only one segment. We follow Campa and Kedia (2002) and control for *SIZE*, *ROA*, and *CAPX*. In addition, we use two instruments namely, *FND* (the

[13] Alternatively, we follow Duchin (2010) and regress the reduction in excess audit fees implied by diversification on client business risk (*RISKRED*), cash holding (*CASH*), earnings volatility (*EARNVOL*), and all the control variables in Equation (3). The reduction in excess audit fees induced by diversification is calculated as the difference between the predicted excess audit fees from the model in Equation (3) estimated without the diversification measures and the predicted excess audit fees from the model in Equation (3) estimated with the diversification measures. A bigger difference between the two implies a larger reduction in excess audit fees due to diversification. The results (untabulated) are qualitatively similar to those reported in Panels A and B of Table 5.

fraction of all firms in the industry that are diversified) and *FSD* (the fraction of sales accounted for by diversified firms). The results of the first-stage probit estimates of the diversification decision, untabulated, show that the coefficients on the two instrument variables are positive and highly significant. Next, from the first-stage probit regression, we obtain an estimate of the inverse Mills ratio, λ_{DIVER}, and use it as a control variable in the second-stage model. The results are reported in Table 6. In all models, the coefficients on Mills are positive and significant at the 1% level. Importantly, the estimated coefficients on the two measures of diversification (*DIV* and *SBHI*) are still negative and different from zero at the 1% level of statistical significance.

More Parsimonious Model

We calculate the variance inflation factors (VIFs) for all the variables in Equation (3) and find the VIF values for *SIZE*, *BM*, *EMPL*, and *CATA* to be larger than 10 suggesting that multicollinearity might be an issue (O'Brien 2007). Accordingly, for robustness and to assure that multicollinearity does not confound the findings of the study, we estimate a more parsimonious version of Equation (3) by excluding *EMPL* and *CATA*. The untabulated results indicate that the coefficients on the two measures of diversification are still negative and statistically significant at the $p<0.01$ level. Further, we conduct diagnostic tests and find that the variance inflation factors (VIFs) for all variables are below 10, suggesting that multicollinearity is not a concern in the results.

Alternative Measures of Diversification

We estimate Equation (3) using two alternative measures of diversification: 1) *DIVDF* is an indicator variable that equals 1 if the firm has more than one unique business segment at the four-digit SIC, and 0 otherwise and 2) *NSEG* is the number of business segments a firm operates. The results, untabulated, reveal that the coefficients on *DIVDF* and *NSEG* are always negative and highly significant.

Endogeneity of Audit Fees, Diversification, and Big N

A major concern with estimating Equation (4) is the joint endogeneity of audit fees, diversification, and Big N. In Section IV, we discuss the endogeneity problem as it relates to the decision to diversify. Furthermore, it is well established in the audit literature that Big N is also endogenous (Lawrence et al. 2011). Therefore, if diversification and Big N are not random decisions by firms, the effects we observe from estimating Equation (4) could be, at least partially, attributable to selection bias. To address the endogeneity of diversification, Big N, and their interaction, we follow Ji et al. (2020) and use a modified Heckman selection model developed by Chang et al. (2016) to account for multiple endogenous variables and their interaction.

We begin by estimating three different first-stage probit models. The first, is a model for the firm's decision to diversify. The second, is an auditor selection model in which the dependent variable (*BIGN*) is binary that equals one if the client engages a Big N audit firm, and 0 otherwise. We also include some of the control variables from our main regression model such as *SIZE*, *LEV*, *ROA*, and *CATA*. In addition, following Chaney, Jeter, and Shivakumar (2004), we include *ROA*LOSS*, *ATURN*, and *QUICK*. Where *ROA* and *LOSS* are as defined in the Appendix, *ATURN* is the asset turnover, calculated as sales divided by total assets and *QUICK* is the quick ratio, calculated as current assets minus inventory divided by current liabilities. Finally, the dependent variable in the last first-stage model is the interaction between *DIV* and *BIGN* (*BIGN*DIV*) which equals one if the client is a multi-segment firm and engages a Big N audit firm, and 0 otherwise. We also include all the variables used in the first and second probit models. Next, from the *DIV*, *BIGN* and *DIV*BIGN* first-stage probit regressions, we obtain an estimate of three inverse Mills ratios: λ_{DIVER}, λ_{BIGN}, and $\lambda_{BIGN*DIVER}$, respectively. In the second stage, we include these three Mills ratios as separate regressors (Chang et al. 2016; Ji et al. 2020). Table 7 shows these results.[14] In all models, the interaction between measures of diversification and *BIGN* is negative and statistically significant at the 1% level.

Different Breakpoint to Separate Constrained from Unconstrained Firms

As we explain in Section III, in measuring the *SA*, *WW*, and *KZ* binary variables, we use the annual median value of the SA index, WW index, and KZ index, respectively, for the *full* sample as a cutoff point. However, Duchin (2010) argues that because diversified firms are larger, they might be less financially constrained. Therefore, calculating the median based on the full sample of firms might contaminate the analysis. To deal with this problem, Duchin (2010) recommends using a cutoff point based on the median value of each measure across single firms only. Therefore, for robustness, we calculate each of the financial constraint measures using the median value of single firms as a cutoff point. The untabulated results, using the new measures of financial constraints, are very similar to those reported in panels A and B of Table 4.

Alternative Measure of Excess Audit Fees

As we explain in Section III, our primary excess audit fees (*EXAF*) variable is measured as the natural logarithm of the ratio of the firm's actual audit fees to its imputed audit fees. For robustness, we measure *EXAF* as the difference between a firm's actual audit fees and its imputed audit fees. The untabulated results are very similar to those in Tables 2, 3, and 4.

VI. CONCLUSION

[14] For brevity, we do not report coefficient estimates for the control variables.

In this study, we conjecture that diversification is likely to affect auditor engagement risk and, ultimately, audit fees. However, as we discuss above, the associations and directions are ambiguous. Our results reveal a negative and significant relation between diversification and audit fees, suggesting that auditors view the benefits of diversification to exceed the costs. We also show that the negative impact of diversification on audit fees is stronger for firms employing Big N audit firms. However, our results show that the impact of diversification on audit fees is positive for financially constrained firms, consistent with the notion that auditing financially constrained clients that are also diversified increases auditor's perception of engagement risk.

This study has limitations worth noting. First, as in other organizational form studies (Berger and Ofek 1995; Ahn et al. 2006; Hann et al. 2013; Kuppuswamy and Villalonga 2016), our dependent variable is measured based on the *imputed* audit fees for the segments of the diversified firms. Implicit in this methodology is the assumption that audit fees paid by single firms are similar to the audit fees that segments of diversified firms would pay as independent firms. However, Campa and Kedia (2002) and Villalonga (2004) show that the operations of firms that choose to diversify are different from those that operate as single firms. Accordingly, while we acknowledge that this assumption is not totally tenable, we follow this methodology because data constraints prevent us from calculating proxies for audit fees specific to segments of diversified firms. Second, we are unable to determine whether the decrease in audit fees associated with diversification stems from a decrease in audit effort, audit risk, or a combination of both. We leave this to future research to compare the number of hours spent in auditing diversified and single firms.

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TABLE 1
Summary Statistics

Panel A: Summary Statistics of Excess Audit Fees

DIVER = DIV

	Obs	Mean	Std. Dev.	25%	Median	75%
Single-segment	15,875	-0.228***	1.361	-1.047	-0.022***	0.691
Multi-segment	8,904	-1.004***	1.592	-2.113	-0.990***	0.153
MS-SS		-0.776***			-0.969***	

DIVER = SBHI

	Obs	Mean	Std. Dev.	25%	Median	75%
Single-segment	15,995	-0.225***	1.362	-1.046	-0.020***	0.692
Multi-segment	8,784	-1.019***	1.587	-2.130	-1.006***	0.129
MS-SS		-0.794***			-0.986***	

Panel B: Excess Audit Fees and Diversification

	Sort Variable = *SBHI*					
	Mean			Median		
	Obs.	Sort Variable	Excess Audit Fees	Obs.	Sort Variable	Excess Audit Fees
Multi-segment Firms						
Q1	1,756	0.666	-1.722	1,756	0.655	-1.743
Q2	1,757	0.527	-1.054	1,757	0.515	-1.145
Q3	1,757	0.457	-0.806	1,757	0.460	-0.728
Q4	1,757	0.335	-0.809	1,757	0.337	-0.768
Q5	1,757	0.137	-0.706	1,757	0.140	-0.722
Single-segment Firms	15,995	0.000	-0.225	15,995	0.000	-0.020
Q1-Q5			-1.016***			-1.021***
Q1-Single-segment			-1.497***			-1.723***

*, **, *** Represent significance at the 0.10, 0.05, and 0.01 levels, respectively.
Q1 contains the highest diversification observations while Q5 contains the lowest diversification observations. Mean differences are based on t-tests and median differences are based on Wilcoxon rank sum tests. Variable definitions are provided in the Appendix.

TABLE 2
The Effect of Diversification on Excess Audit Fees

	Dependent Variable = *EXAF*			
	DIVER* = *DIV		***DIVER* = *SBHI***	
	(1)	**(2)**	**(3)**	**(4)**
DIVER	-0.502***	-0.457***	-1.230***	-1.107***
	(-11.957)	(-11.139)	(-13.423)	(-12.109)
SIZE	-0.000	-0.001	-0.000	-0.001
	(-0.236)	(-0.948)	(-0.163)	(-0.904)
LEV	0.023	0.028	0.025	0.029
	(0.798)	(0.911)	(0.850)	(0.937)
BM	-0.010	-0.007	-0.009	-0.006
	(-1.376)	(-1.022)	(-1.301)	(-0.959)
ROA	0.038	0.030	0.032	0.026
	(1.341)	(1.141)	(1.155)	(0.980)
CATA	-0.006	-0.007	-0.007	-0.008
	(-0.712)	(-0.988)	(-0.850)	(-1.113)
BIGN	-1.153***	-1.233***	-1.141***	-1.221***
	(-21.444)	(-24.959)	(-21.444)	(-25.111)
MKTRET	-0.003	-0.002	-0.003	-0.002
	(-0.707)	(-0.596)	(-0.713)	(-0.602)
SDEARN	0.020***	0.019***	0.019***	0.018***
	(3.006)	(2.924)	(2.999)	(2.923)
EMPL	0.024***	0.027***	0.024***	0.027***
	(6.965)	(7.029)	(7.330)	(7.316)
GCON	0.368***	0.249***	0.357***	0.243***
	(4.687)	(3.320)	(4.709)	(3.394)
LOSS	0.488***	0.515***	0.481***	0.508***
	(11.738)	(11.856)	(11.822)	(11.918)
ISSUE	0.006***	0.007***	0.006***	0.006***
	(3.449)	(3.447)	(3.432)	(3.427)
MERGE	0.222***	0.099	0.222***	0.106
	(3.739)	(0.355)	(3.630)	(0.373)
LIT	-0.045	0.099	-0.059	0.080
	(-1.042)	(1.417)	(-1.376)	(1.148)
Constant	0.127	0.070	0.138	0.079
	(0.943)	(0.507)	(1.050)	(0.576)
Observations	24,779	24,779	24,779	24,779
Adjusted R^2	0.416	0.454	0.426	0.460
Industry	No	Yes	No	Yes
Year	No	Yes	No	Yes

*, **, *** Represent significance at the 0.10, 0.05, and 0.01 levels, respectively.
This table reports the coefficient estimates from Equation (3). The dependent variable is the excess audit fees (*EXAF*). *DIVER* is one of the two proxies for diversification measures (*DIV* and *SBHI*). All continuous variables are winsorized at the 1st and 99th percentiles. Numbers in parentheses are test statistics based on robust standard errors clustered at the firm and year level. Variable definitions are provided in the Appendix.

TABLE 3
The Effect of Diversification on Excess Audit Fees: The Impact of Audit Firm Size

	Dependent Variable = *EXAF*			
	DIVER = DIV		***DIVER = SBHI***	
	(1)	**(2)**	**(3)**	**(4)**
*BIGN * DIVER*	-0.421***	-0.370***	-0.962***	-0.841***
	(-4.939)	(-4.432)	(-5.256)	(-4.772)
DIVER	-0.178**	-0.175**	-0.462***	-0.439***
	(-2.606)	(-2.655)	(-3.148)	(-3.121)
BIGN	-1.020***	-1.114***	-1.021***	-1.115***
	(-19.149)	(-22.433)	(-19.906)	(-23.353)
SIZE	-0.000	-0.001	-0.000	-0.001
	(-0.227)	(-0.947)	(-0.139)	(-0.898)
LEV	0.023	0.028	0.025	0.029
	(0.809)	(0.911)	(0.863)	(0.939)
BM	-0.010	-0.007	-0.009	-0.006
	(-1.365)	(-1.010)	(-1.283)	(-0.940)
ROA	0.036	0.029	0.030	0.024
	(1.279)	(1.091)	(1.074)	(0.912)
CATA	-0.006	-0.007	-0.007	-0.008
	(-0.721)	(-0.993)	(-0.879)	(-1.137)
MKTRET	-0.003	-0.002	-0.003	-0.002
	(-0.670)	(-0.568)	(-0.683)	(-0.578)
SDEARN	0.019***	0.018***	0.019***	0.018***
	(2.967)	(2.890)	(2.964)	(2.893)
EMPL	0.023***	0.027***	0.024***	0.027***
	(6.878)	(6.969)	(7.307)	(7.309)
GCON	0.370***	0.252***	0.361***	0.248***
	(4.831)	(3.434)	(4.861)	(3.517)
LOSS	0.486***	0.513***	0.480***	0.507***
	(11.728)	(11.877)	(11.829)	(11.942)
ISSUE	0.006***	0.007***	0.006***	0.006***
	(3.432)	(3.429)	(3.423)	(3.417)
MERGE	0.172**	0.057	0.176*	0.069
	(2.165)	(0.196)	(1.978)	(0.231)
LIT	-0.051	0.088	-0.065	0.070
	(-1.208)	(1.280)	(-1.538)	(1.015)
Constant	0.033	-0.011	0.051	0.004
	(0.241)	(-0.078)	(0.379)	(0.029)
Observations	24,779	24,779	24,779	24,779
Adjusted R^2	0.419	0.456	0.429	0.463
Industry	No	Yes	No	Yes
Year	No	Yes	No	Yes

*, **, *** Represent significance at the 0.10, 0.05, and 0.01 levels, respectively.
This table reports the coefficient estimates from Equation (4). The dependent variable is the excess audit fees (*EXAF*). *DIVER* is one of the two proxies for diversification measures (*DIV* and *SBHI*). All continuous variables are winsorized at the 1st and 99th percentiles. Numbers in parentheses are test statistics based on robust standard errors clustered at the firm and year level. Variable definitions are provided in the Appendix.

TABLE 4
The Effect of Diversification on Excess Audit Fees: The Impact of Financial Constraints
Dependent Variable = *EXAF*

	FC = SA Index		***FC = WW Index***		***FC = KZ Index***		***FC = Rating***	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**	**(7)**	**(8)**
Panel A: *DIVER = DIV*								
*FC * DIVER*	0.389***	0.294***	0.380***	0.211***	-0.072	0.024	0.236***	0.181**
	(5.882)	(4.818)	(6.160)	(3.740)	(-1.101)	(0.395)	(3.566)	(2.868)
DIVER	-0.466***	-0.377***	-0.565***	-0.433***	-0.456***	-0.453***	-0.620***	-0.549***
	(-9.441)	(-7.975)	(-11.304)	(-9.330)	(-7.688)	(-7.928)	(-10.647)	(-9.659)
FC	1.011***	1.138***	0.696***	1.005***	-0.030	-0.179***	0.271***	0.283***
	(23.225)	(22.527)	(14.470)	(23.729)	(-0.653)	(-4.466)	(5.034)	(5.303)
Controls	Yes		Yes		Yes		Yes	
Observations	24,769	24,769	24,735	24,735	23,359	23,359	24,779	24,779
Adjusted R^2	0.531	0.577	0.480	0.543	0.405	0.445	0.431	0.467
Industry	No	Yes	No	Yes	No	Yes	No	Yes
Year	No	Yes	No	Yes	No	Yes	No	Yes
Panel B: *DIVER = SBHI*								
*FC * DIVER*	0.799***	0.597***	0.777***	0.405***	-0.041	0.156	0.620***	0.519***
	(5.730)	(4.489)	(5.508)	(3.138)	(-0.275)	(1.130)	(4.578)	(3.996)
DIVER	-1.073***	-0.865***	-1.311***	-1.001***	-1.205***	-1.161***	-1.527***	-1.359***
	(-10.471)	(-8.378)	(-12.486)	(-9.906)	(-8.719)	(-8.701)	(-12.522)	(-11.163)
FC	1.020***	1.145***	0.706***	1.009***	-0.049	-0.188***	0.262***	0.270***
	(23.748)	(22.446)	(15.181)	(24.642)	(-1.046)	(-4.724)	(5.104)	(5.343)
Controls	Yes		Yes		Yes		Yes	
Observations	24,769	24,769	24,735	24,735	23,359	23,359	24,779	24,779
Adjusted R^2	0.536	0.580	0.488	0.547	0.415	0.453	0.441	0.474
Industry	No	Yes	No	Yes	No	Yes	No	Yes
Year	No	Yes	No	Yes	No	Yes	No	Yes

*, **, *** Represent significance at the 0.10, 0.05, and 0.01 levels, respectively.

This table reports the coefficient estimates from Equation (5). The dependent variable is the excess audit fees (*EXAF*). *DIVER* is one of the two proxies for diversification measures (*DIV* and *SBHI*). For brevity, we only present the coefficients on the key independent variables. All continuous variables are winsorized at the 1st and 99th percentiles. Numbers in parentheses are test statistics based on robust standard errors clustered at the firm and year level. Variable definitions are provided in the Appendix.

TABLE 5
Excess Audit Fees Linked to Risk Reduction, Cash Holding, and Earnings Volatility

	Dependent Variable = Fitted Values from regressing EXAF on CFCORR		***Dependent Variable = Fitted Values from regressing EXAF on CASH***		***Dependent Variable = Fitted Values from regressing EXAF on EARNVOL***	
	(1)	**(2)**	**(3)**	**(4)**	**(5)**	**(6)**
Panel A: *DIVER = DIV*						
DIVER	-0.146***	-0.144***	-0.053***	-0.099***	-0.003**	-0.003***
	(-19.356)	(-19.362)	(-8.463)	(-10.251)	(-2.449)	(-3.467)
Controls	Yes		Yes		Yes	
Observations	24,769	24,769	24,777	24,777	24,779	24,779
Adjusted R^2	0.168	0.178	0.105	0.277	0.009	0.011
Industry	No	Yes	No	Yes	No	Yes
Year	No	Yes	No	Yes	No	Yes
Panel B: *DIVER = SBHI*						
DIVER	-0.326***	-0.325***	-0.120***	-0.237***	-0.007***	-0.006***
	(-18.640)	(-18.719)	(-9.798)	(-12.880)	(-3.146)	(-4.342)
Controls	Yes		Yes		Yes	
Observations	24,769	24,769	24,777	24,777	24,779	24,779
Adjusted R^2	0.191	0.202	0.108	0.284	0.009	0.011
Industry	No	Yes	No	Yes	No	Yes
Year	No	Yes	No	Yes	No	Yes

*, **, *** Represent significance at the 0.10, 0.05, and 0.01 levels, respectively.
This table reports time-series regressions of *EXAF* related to *RISKRED*, *CASH*, and *EARNVOL* (estimated separately) on diversification (*DIVER*) and control variables. The dependent variables are fitted values from the regressions of *EXAF* on *RISKRED*, *CASH*, and *EARNVOL* (estimated separately). *DIVER* is one of the two proxies for diversification measures (*DIV* and *SBHI*). For brevity, we do not report the coefficients on control variables. All continuous variables are winsorized at the 1st and 99th percentiles. Numbers in parentheses are test statistics based on robust standard errors clustered at the firm and year level. Variable definitions are provided in the Appendix.

TABLE 6
The Effect of Diversification on Excess Audit Fees Controlling for Selection Bias in Diversification

	Dependent Variable = *EXAF*			
	DIVER* = *DIV		***DIVER* = *SBHI***	
	(1)	**(2)**	**(3)**	**(4)**
DIVER	-0.186***	-0.162***	-0.637***	-0.544***
	(-4.224)	(-3.885)	(-6.245)	(-5.760)
SIZE	-0.000	-0.001	-0.000	-0.001
	(-0.140)	(-0.944)	(-0.098)	(-0.913)
LEV	0.025	0.024	0.026	0.024
	(0.905)	(0.837)	(0.932)	(0.853)
BM	-0.010	-0.007	-0.009	-0.007
	(-1.485)	(-1.094)	(-1.430)	(-1.050)
ROA	0.032	0.026	0.029	0.023
	(1.225)	(1.045)	(1.091)	(0.933)
CATA	-0.005	-0.006	-0.006	-0.007
	(-0.672)	(-0.926)	(-0.760)	(-1.005)
BIGN	-1.079***	-1.123***	-1.075***	-1.118***
	(-20.602)	(-22.592)	(-20.651)	(-22.717)
MKTRET	-0.002	-0.002	-0.002	-0.002
	(-0.518)	(-0.491)	(-0.506)	(-0.481)
SDEARN	0.018***	0.017**	0.018***	0.016**
	(2.913)	(2.764)	(2.892)	(2.751)
EMPL	0.021***	0.025***	0.021***	0.025***
	(7.039)	(7.321)	(7.246)	(7.471)
GCON	0.338***	0.242***	0.332***	0.239***
	(4.987)	(3.749)	(4.941)	(3.746)
LOSS	0.396***	0.425***	0.394***	0.422***
	(10.099)	(10.414)	(10.168)	(10.438)
ISSUE	0.005***	0.006***	0.005***	0.006***
	(3.362)	(3.377)	(3.352)	(3.366)
MERGE	0.260***	0.111	0.254***	0.111
	(3.849)	(0.481)	(3.309)	(0.472)
LIT	-0.175***	-0.159**	-0.183***	-0.167**
	(-4.239)	(-2.305)	(-4.450)	(-2.439)
λ_{DIVER}	0.760***	0.868***	0.714***	0.832***
	(12.484)	(12.882)	(11.455)	(12.335)
Constant	-0.803***	-0.947***	-0.720***	-0.881***
	(-6.945)	(-7.426)	(-6.341)	(-6.934)
Observations	24,731	24,731	24,731	24,731
Adjusted R^2	0.462	0.502	0.467	0.505
Industry	No	Yes	No	Yes
Year	No	Yes	No	Yes

*, **, *** Represent significance at the 0.10, 0.05, and 0.01 levels, respectively.
This table reports the second stage of the Heckman analysis based on Equation (3) to control for selection bias in the decision to diversify. The probit in the first step (untabulated) models the choice to diversify and is used to derive the Inverse Mills Ratio (λ_{DIVER}) which controls for selection bias in the second step. The dependent variable is the excess audit fees (*EXAF*). *DIVER* is one of the two proxies for diversification measures (*DIV* and *SBHI*). All continuous variables are winsorized at the 1st and 99th percentiles. Numbers in parentheses are test statistics based on robust standard errors clustered at the firm and year level. Variable definitions are provided in the Appendix.

TABLE 7
The Effect of Diversification on Excess Audit Fees: The Impact of Audit Firm Size Controlling for Selection Bias and Endogeneity

	Dependent Variable = *EXAF*			
	DIVER = *DIV*		*DIVER* = *SBHI*	
	(1)	**(2)**	**(3)**	**(4)**
*BIGN * DIVER*	-0.382***	-0.330***	-0.924***	-0.805***
	(-7.229)	(-7.202)	(-7.981)	(-7.941)
DIVER	0.099**	0.113***	0.180*	0.253***
	(2.257)	(3.008)	(1.906)	(3.062)
BIGN	-0.082*	0.053	-0.086**	0.051
	(-1.984)	(1.533)	(-2.136)	(1.507)
λ_{DIVER}	-0.694***	-1.048***	-0.701***	-1.046***
	(-4.287)	(-4.786)	(-4.387)	(-4.828)
λ_{BIGN}	2.141***	2.397***	2.140***	2.397***
	(23.042)	(20.860)	(23.391)	(21.064)
$\lambda_{BIGN*DIVER}$	1.023***	1.374***	1.006***	1.359***
	(5.879)	(5.895)	(5.906)	(5.898)
Controls	Yes		Yes	
Observations	24,731	24,731	24,731	24,731
Adjusted R^2	0.704	0.776	0.707	0.778
Industry	No	Yes	No	Yes
Year	No	Yes	No	Yes

*, **, *** Represent significance at the 0.10, 0.05, and 0.01 levels, respectively.
This table reports the second stage of a modified Heckman analysis based on Equation (4) to control for selection bias in the decision to diversify and hire a Big N audit firm. The probit models in the first step (untabulated and estimated separately) model the choice to diversify and hire a Big N audit firm, and are used to derive the Inverse Mills Ratios (λ_{DIVER}, λ_{BIGN}, and $\lambda_{BIGN*DIVER}$) which control for selection bias in the second step. The dependent variable is the excess audit fees (*EXAF*). *DIVER* is one of the two proxies for diversification measures (*DIV* and *SBHI*). For brevity, we only present the coefficients on the key independent variables. All continuous variables are winsorized at the 1st and 99th percentiles. Numbers in parentheses are test statistics based on robust standard errors clustered at the firm and year level. Variable definitions are provided in the Appendix.

APPENDIX
Variable Definitions

Variable		Definition
EXAF	=	excess audit fees attributable to diversification (see Section III for details);
DIV	=	an indicator variable that equals 1 if the firm has more than one business segments, and 0 otherwise;
NSEG	=	the number of business segments reported by the firm;
DIVDF	=	an indicator variable that equals 1 if the firm has more than one unique business segment, and 0 otherwise. We define a unique business segment at the four-digit SIC code;
SBHI	=	a sales-based Herfindahl Index calculated as follows: $SBHI_{ct} = 1 - \sum_{i=1}^{N} S_i^2$ where $SBHI_{ct}$ is the sales-weighted Herfindahl Index for firm c in year t, S_i is the sales-weighted share of segment i, and *N* is the number of segments;
BIGN	=	an indicator variable that equals 1 if the firm retains a Big N auditor (per Audit Analytics), and 0 otherwise;
SA	=	an indicator variable that equals 1 if the Hadlock and Pierce (2010) size and age index (SA) for the firm is greater than the median (SA) in each year, and 0 otherwise. Following Hadlock and Pierce (2010), the (SA) is calculated as (-0.737 * SIZE) + (0.043 * SIZE * SIZE) + (-0.040 * AGE), where Size equals the log of inflation-adjusted Compustat item (*AT*) (in 2004 dollars) and Age is the number of years the firm is listed with a non-missing stock price on Compustat. We cap Size at (the log of) $4.5 billion and Age at 37 years;
WW	=	an indicator variable that equals 1 if the Whited and Wu (2006) index (WW) for the firm is greater than the median (WW) in each year, and 0 otherwise (Duchin, 2010). The (WW) is calculated as (-0.091* ((*IB+DP)/AT*)) + (-0.062 * an indicator variable equals 1 if the sum of *DVC* and *DVP* is positive, and 0 otherwise) + (0.021 * (*DLTT/AT*)) + (-0.044 * (LOG (*AT*))) + (0.102 * average industry sales growth, estimated separately for each three-digit SIC industry and year) + (0.035 * sales growth ((*SALE - LAG_SALE)/ LAG_SALE*));
KZ	=	an indicator variable that equals 1 if the Lamont, Polk, and Saa-Requejo (2001) measure based on Kaplan and Zingales (1997) index for the firm is greater than the median (KZ) each year, and 0 otherwise. The (KZ) is calculated as –1.001909[(*IB* + *DP*)/ LAG_*PPENT*] + 0.2826389[(*AT* + *PRCC_F* × *CSHO* - *CEQ* - *TXDB)/AT*] + 3.139193[(*DLTT* + *DLC*)/(*DLTT* + *DLC* + *SEQ*)] – 39.3678[(*DVC* + *DVP*)/ LAG_*PPENT*] – 1.314759[*CHE*/ LAG_*PPENT*], where all variables in italics are Compustat data items;
RATING	=	an indicator variable based on Hann et al. (2013) that differentiates between investment grade and speculative debt ratings. We assign a value of 0 if (SPLTICRM) equals (A-, A+, AA, AA-, A+, AAA, or BBB), and 1 otherwise. This definition excludes firms with negative debt (Compustat item

		DLTT) as they are not considered financially constrained. We consider firms with no debt rating as financially constrained;
RISKRED	=	the reduction in client business risk based on segment cash flow volatility and cross-segment correlations in cash flows (This measure is described in detail in Duchin (2010). In particular see Equation 4, page 962);
CASH	=	cash and short-term investments (*CHE*) divided by total assets (*AT*);
EARNVOL	=	earnings volatility calculated by taking the standard deviation of annual income before extraordinary items from the cash flow statement (*IBC)* deflated by average total assets (*AT*) for the five years preceding the current year;
Control Variables (*All continuous control variables are measured in the relative form)*		
SIZE	=	the natural log of total assets (*AT*);
LEV	=	long-term debt (*DLTT*) divided by total assets (*AT*);
BM	=	the book value of common equity (CEQ) divided by the market value of common equity (*PRCC_F* * *CSHO*). If the book value is negative, the ratio is assigned a value of 0;
ROA	=	income before extraordinary items (*IB*) divided by total assets (*AT*);
CATA	=	current assets (*ACT*) divided by total assets (*AT*);
MKTRET	=	natural log of 1 plus buy-and-hold stock return over current fiscal year (*PRCC_F* - LAG_*PRICE*)/LAG_*PRICE*;
SDEARN	=	the standard deviation of EPS (*EPSPI*). We calculate the standard deviation over 5 years from *t-1* to *t-5*;
EMPL	=	the square root of the number of employees (*EMP*);
GCON	=	an indicator variable that equals 1 if the firm received a going concern audit opinion in the current fiscal year (per Audit Analytics), and 0 otherwise;
LOSS	=	an indicator variable that equals 1 if net income (*NI*) is negative, and 0 otherwise;
ISSUE	=	the number of days between the company's fiscal year-end (*FISCAL_YEAR_END_OP*) and the auditor's signing date (*SIG_DATE_OF_OP_S*) (per Audit Analytics);
MERGE	=	an indicator variable for mergers or new financing that equals 1 if Compustat footnote *SALE_FN* equals “AB”, and 0 otherwise;
LIT	=	An indicator variable that equals 1 if the company-year is in a high litigation industry, defined as SIC codes: 2833-2836, 3570-3577, 3600-3674, 5200-5961, and 7370, and 0 otherwise;