1-2021

# Accounting quality and debt concentration

Ningzhong LI
*University of Texas at Dallas*

Yun LOU
*Singapore Management University*, yunlou@smu.edu.sg

Clemens A. OTTO
*Singapore Management University*, clemensotto@smu.edu.sg

Regina WITTENBERG-MOERMAN
*University of Southern California*

# Accounting Quality and Debt Concentration

**Ningzhong Li**
University of Texas at Dallas
ningzhong.li@utdallas.edu

**Yun Lou**
Singapore Management University
yunlou@smu.edu.sg

**Clemens A. Otto**
Singapore Management University
clemensotto@smu.edu.sg

**Regina Wittenberg-Moerman**
University of Southern California
reginaw@marshall.usc.edu

We thank Joe Weber (editor), three anonymous reviewers, Ashiq Ali, Bill Cready, Zhonglan Dai, Thomas Ruchti, seminar participants at City University of Hong Kong, HEC Paris, the University of Texas at Arlington, and the University of Texas at Dallas, as well as participants at the 21st EAA Annual Meeting, Tilburg Accounting Spring Camp, and 2016 AAA FARS Midyear Meeting for their valuable comments. All errors are our own. We gratefully acknowledge the financial support of Singapore Management University, the University of Texas at Dallas, HEC Paris, the University of Chicago Booth School of Business, and the University of Southern California.

**DOI:** https://doi.org/10.2308/tar-2017-0250.

# Accounting Quality and Debt Concentration


## Abstract

We examine the relation between accounting quality and debt concentration in corporate capital structures (i.e., firms' tendency to rely predominantly on only a few types of debt). Motivated by theoretical and empirical research that supports a strong link between debt concentration and creditors' coordination costs and the importance of accounting quality in reducing these costs, we hypothesize that firms with higher accounting quality have less concentrated debt structures. Measuring accounting quality with a comprehensive index based on the occurrence of material internal control weaknesses, accounting restatements, SEC AAERs, and firms' reliance on small auditors, we find that higher accounting quality is indeed associated with less concentrated debt structures. This relation is stronger for firms with higher default risk, as the probability that creditors need to coordinate is higher, and for firms with lower liquidation values, as creditor coordination to avoid liquidation is more important.



**Keywords:** accounting quality; debt concentration; creditor coordination; bankruptcy; distress.

**JEL Classification:** M4; G32; G33.

**Data Availability:** Data are available from the public sources cited in the text.

**DOI:** https://doi.org/10.2308/tar-2017-0250.

## I. INTRODUCTION

Recent studies have documented significant heterogeneity in the mix of debt types that firms use (e.g., Rauh and Sufi 2010; Colla et al. 2013). Many firms rely on multiple types of debt simultaneously (e.g., commercial paper, term loans, lines of credit, senior bonds, subordinated bonds) and the degree of debt concentration – the extent to which firms rely on only a few types of debt (or even a single debt type) – varies widely across firms. However, despite a large theoretical literature on debt structures (e.g., Berglöf and von Thadden 1994; Bolton and Scharfstein 1996; Park 2000; Bris and Welch 2005), our understanding of the empirical determinants of debt concentration remains far from being complete. In this study, to advance this understanding, we examine the relation between accounting quality and debt concentration.

Our research is motivated by prior literature suggesting that a dispersed debt structure makes debt renegotiation more difficult because it is difficult for multiple creditors to coordinate (e.g., Asquith et al. 1994). Further, different debt types often include cross-acceleration or cross-default provisions (Beatty et al. 2012), so that the resolution of financial distress requires coordination not only within but also across debt types. Coordination across types, however, may be difficult because different debt types typically have different cash flow claims, control provisions, collateral, and seniority, and the different types' owners may differ in investment horizon or objective. Using multiple debt types simultaneously can thus increase creditor coordination costs (Ayotte and Morrison 2009; Lou and Otto 2020).[1] In other words, when a firm's debt structure comprises a larger number of different types of debt, conflicts and free-rider problems among the creditors are likely to increase and make it more difficult to agree on restructuring procedures

[1] Intuitively, if different creditors hold different types of claims against the borrower, the potential for disagreement and conflict among the creditors is larger than if all creditors hold the same type of claim.

when the firm defaults and on the division of its assets in the case of bankruptcy (e.g., Asquith et al. 1994; Berglöf and von Thadden 1994; Colla et al. 2013; Ivashina et al. 2016).

The upside of making it difficult to renegotiate the debt is that this deters strategic defaults (i.e., defaulting despite being able to service the debt). The downside is that it also increases the probability of an inefficient liquidation (e.g., liquidating a borrower that is economically solvent but short on cash).[2] The value maximizing debt structure trades off these benefits and costs of debt dispersion (e.g., Bolton and Scharfstein 1996). Hence, as "efficient corporate policies should aim at maximizing the size of the corporate pie" (Tirole 2006, p. 78), we expect that borrowers weigh the benefits of deterring strategic defaults against the costs of inefficient liquidations when choosing the dispersion in their debt structures.[3] We build on this framework and on the notion that high quality accounting information can increase the probability of successful creditor coordination and decrease the costs of coordination failure (e.g., increase liquidation values).

Prior studies have recognized the critical role of information for default resolution (e.g., Senbet and Wang 2012; Ayotte and Skeel 2013). High quality accounting information helps creditors better assess a firm's future cash flows and thus mitigates asymmetric information and disagreement among different debt holders. As a consequence, high quality accounting information increases the likelihood of efficient renegotiation outcomes in a private workout, which is substantially less costly than Chapter 7 or Chapter 11 bankruptcy procedures. Further, even if out-of-court negotiations fail, high quality accounting numbers can improve the efficiency

[2] A borrower is considered economically solvent when the present value of its future cash flows exceeds its total obligations (Wruck 1990).

[3] Strategic defaults reduce the expected repayments to creditors and, in turn, the creditors' willingness to lend. Consequently, while strategic defaults are beneficial to the borrower and detrimental to the creditors ex post, the associated costs are ultimately borne by the borrower, who suffers from a lower borrowing capacity ex ante and thus a lower ability to finance new projects.

of the formal bankruptcy procedures. In Chapter 11, where a reorganization plan must be accepted by at least one class of impaired creditors and confirmed by the court, accounting information plays an important role in determining whether the plan is fair and equitable (Warner 1977; Weiss 1990; Wruck 1990). Finally, if a firm enters Chapter 7, by reducing information acquisition and processing costs, high quality accounting information can help achieve a higher liquidation value.

Hence, as high accounting quality reduces the costs of debt dispersion by reducing the risk and costs of creditor coordination failure, we predict that firms with higher accounting quality have more dispersed debt structures (i.e., use multiple debt types).[4] This prediction is further supported by the finding that lenders price financial distress costs (Hoshi et al. 1990; Gertner and Scharfstein 1991; Giammarino 1989), which include bankruptcy costs related to creditor coordination failure. To reduce the expected costs of financial distress and, consequently, the cost of debt financing, firms with low accounting quality should thus rely on more concentrated debt structures.

To test this prediction, we measure firms' debt concentration in two ways. First, following Colla et al. (2013), we compute a normalized Herfindahl-Hirschman Index (HHI) across the different types of debt used by the firms (commercial paper, term loans, lines of credit, senior bonds, subordinated bonds, capital leases, and other debt). Second, we count the number of different debt types that the firms use. To assess firms' accounting quality, we construct an index based on the occurrence of material internal control weaknesses (ICWs), accounting restatements, SEC Accounting and Auditing Enforcement Releases (AAERs), and firms' reliance on small auditors. In doing so, we follow an extensive literature that identifies ICWs, restatements, and

[4] Note here the distinction between concentration/dispersion across different types of debt and concentrated/dispersed ownership of claims within a given type. Our interest is in the former construct, i.e., in whether firms borrow predominantly using a single type of debt or rely on multiple debt types at the same time, rather than firms' choice between, e.g., private loans with concentrated ownership and public bonds with dispersed ownership.

AAERs as common measures of accounting quality and emphasizes that auditors are an important determinant of accounting quality (e.g., Beneish et al. 2008; Palmrose et al. 2004; Dechow et al. 1996; Lennox and Pittman 2010; Dechow et al. 2010; DeFond and Zhang 2014).

We then examine the relation between accounting quality and debt concentration in a sample of U.S. public firms from 2003 to 2017. An important challenge is that accounting quality is not randomly assigned. To help mitigate this concern, we control for firm and year fixed effects (e.g., Bertrand and Mullainathan 2003; Valta 2012; Christensen et al. 2016). We further control for the determinants of firms' debt structures and time-varying characteristics that may affect accounting quality suggested by prior research (e.g., Rauh and Sufi 2010; Colla et al. 2013; Doyle et al. 2007; Efendi et al. 2007; Chang et al. 2009). Consistent with our prediction, we find that firms with higher accounting quality have significantly less concentrated debt structures, i.e., a lower debt HHI and a higher number of debt types. Economically, an increase in the accounting quality index by one notch is associated with a decrease (increase) in the debt HHI (number of debt types) by 6.3 (5.7) percent of the average within-firm standard deviation of the HHI (number of debt types).

To provide further support for our hypothesis, we examine whether the relation between accounting quality and debt concentration is more pronounced for firms with higher default risk and lower liquidation values. The idea is that creditor coordination is needed with a higher likelihood if the probability of default is higher and that creditor coordination to avoid liquidation is more important if liquidation values are low. In line with this intuition, we find that the relation between accounting quality and debt concentration is indeed stronger for firms with highly speculative grade credit ratings, firms with high cash flow volatility, firms with low Altman's (1968) z-scores, and firms with low liquidation values (estimated following Berger et al. 1996).

These results not only suggest that the relation between accounting quality and debt concentration is indeed driven by creditor coordination costs but also alleviate endogeneity concerns: It is difficult to argue that omitted variables alone account for the collective set of results from our primary and cross-sectional tests. In additional robustness tests, we further show that our findings continue to hold when we employ a changes analysis or propensity score matching, or control for additional debt structure features. Supplementary, untabulated tests confirm that our results are robust to using alternative measures of debt concentration and accounting quality.

Our paper's key contribution is to document the important role of accounting quality for firms' debt concentration decisions. Specifically, we show that firms with higher accounting quality have less concentrated debt structures: They use multiple, different types of debt at the same time (e.g., loans, bonds, commercial paper) rather than specialize on any one type. This finding is important because the contemporaneous use of multiple debt types "is a first-order aspect of firm capital structure" (Rauh and Sufi 2010, p. 4277), whose determinants are not yet well understood. As such, our contribution is to advance this understanding by documenting the role of accounting quality for firms' choice between more or less concentrated debt structures.

Prior studies on the role of accounting quality in debt markets, in contrast, have focused on firms' choice between different types of debt (e.g., Bharath et al. 2008; Dhaliwal et al. 2011; Beatty et al. 2010), ownership concentration within loan syndicates (e.g., Ball et al. 2008), and price and non-price contract terms (e.g., Graham et al. 2008; Zhang 2008; Costello and Wittenberg-Moerman 2011; Kim et al. 2011; Christensen and Nikolaev 2012). Importantly, however, these studies do not speak to the relation between accounting quality and firms' choice to use multiple types of debt simultaneously. Apart from its focus on concentration vs. dispersion across different

debt types, our study also differs from existing work in terms of the key economic mechanism that drives the predictions. Specifically, our study builds on the idea that higher accounting quality implies a higher optimal level of debt dispersion because higher accounting quality makes a dispersed debt structure less costly. At the core of this argument is the insight that higher accounting quality reduces coordination costs among lenders of different debt types and increases liquidation values. Existing studies, instead, focus on the effect of accounting quality on asymmetric information between borrowers and lenders (Bharath et al. 2008; Dhaliwal et al. 2011; Beatty et al. 2010) or between the lead arranger and syndicate participants (Ball et al. 2008).

Most closely related to our work is Ball et al. (2008), which argues that higher accounting quality allows lead arrangers to hold smaller proportions of syndicated loans because it reduces agency problems within the lending syndicate that originate from lead arrangers' information advantage. However, whereas Ball et al. (2008) examines how accounting quality helps mitigate information asymmetry within loan syndicates at loan issuance, we study how high quality accounting information reduces coordination problems between different classes of creditors upon default. As such, our study provides further support for the important role of accounting information in helping distinct lenders coordinate their interests and thereby enhances our understanding of the multifaceted role of accounting quality in debt markets.

## II. PRIOR LITERATURE AND HYPOTHESIS DEVELOPMENT

Prior studies propose the simultaneous use of different debt types as an important feature of corporate debt structures. Rauh and Sufi (2010) find that for almost three-quarters of the firm-year observations, firms rely on more than two different types of debt. They also find that one quarter of firms experience no significant year-on-year changes in debt levels but significant changes in

debt composition. Colla et al. (2013) show that the extent to which firms borrow from multiple sources varies widely across firms: Large, rated firms tend to diversify across multiple debt types, while small, unrated firms tend to specialize on a smaller number of types. They further suggest potential economic benefits associated with the use of fewer debt types, such as lower bankruptcy costs, economies in information collection costs, and lenders' enhanced incentives to monitor.

The above findings are broadly consistent with the large theoretical literature on firms' debt structures (e.g., Diamond 1991a, 1991b, 1993; Berglöf and von Thadden 1994; Park 2000; Bris and Welch 2005; Zhong 2018). A major insight from this literature is that a dispersed debt structure makes debt renegotiation more difficult because it is difficult for multiple creditors to coordinate and agree on the debt restructuring procedures when the borrower defaults and on the division of its assets in the case of bankruptcy (e.g., Gertner and Scharfstein 1991; Asquith et al. 1994; Berglöf and von Thadden 1994; Bolton and Scharfstein 1996; Colla et al. 2013; Ivashina et al. 2016). Using multiple debt types simultaneously is likely to increase creditor coordination costs further as debt contracts often include cross-acceleration or cross-default provisions (Beatty et al. 2012), so that creditors need to coordinate not only within but also across debt types. This, however, is difficult because different debt types typically have different cash flow claims, control provisions, collateral, or seniority, and are owned by investors with different investment horizons or objectives (Ayotte and Morrison 2009; Lou and Otto 2020). Hence, using multiple debt types can make creditor coordination more difficult beyond the mere effect of a larger number of creditors.

Anecdotal evidence suggests that conflicts among creditors that hold different types of debt are indeed a relevant impediment to the efficient resolution of distress in practice. For example, in the case of Radio Shack's bankruptcy in 2015, one of the company's major private lenders

prevented the closing of 1,000 stores in an attempt to preserve the collateral backing its loan. This inhibited the timely resolution of Radio Shack's financial troubles, which ultimately resulted in a Chapter 11 filing, to the detriment of Radio Shack's other types of creditors – unsecured bondholders and other unsecured lenders. Another example is the bankruptcy of Toys 'R' Us in 2017, where unsecured creditors objected to various aspects of a liquidation plan, arguing that it unduly prioritized secured private lenders of Toys 'R' Us' term loans, who pushed for a liquidation instead of a reorganization under Chapter 11. Unsecured creditors threatened to sue the company and its private lenders, leading to months of negotiations and jeopardizing a value-maximizing liquidation of Toys 'R' Us' assets. A further example is Energy Future Holdings Corp.'s bankruptcy in 2014, where the filing of a prepackaged resolution plan (which enables a more efficient and quicker bankruptcy process) was severely jeopardized by disagreement between senior private lenders and unsecured bondholders. These two types of creditors disagreed over the value of the firm's subsidiaries and tax implications of potential subsidiary spinoffs. Even after large private lenders (mostly hedge funds and private equity funds that had issued term loans) agreed on a restructuring plan, unsecured bondholders threatened to challenge this plan in court.

The upside of a dispersed debt structure (i.e., relying on multiple debt types) is that making it difficult to renegotiate the debt deters strategic defaults and thus disciplines the borrower.[5] As Bolton and Scharfstein (1996) show, the prospect of bargaining with multiple creditors that are unable to coordinate lowers a borrower's expected payoff from defaulting strategically and thus the incentives to do so. The downside of a dispersed debt structure is that not being able to renegotiate due to difficulties in creditor coordination also increases the probability of an

[5] Apart from deterring strategic defaults, borrowing from multiple sources may also be beneficial if individual lenders can fail (Detragiache et al. 2000). It can also mitigate holdup problems between borrowers and lenders (Rajan 1992).

inefficient liquidation (e.g., after a liquidity default that is not strategic but due to a temporary lack of cash). Further, having to bargain with multiple creditors also deters potential buyers from expending resources to learn about the borrower's assets and, through this channel, reduces the expected value at which the assets can be sold in case of a default (Bolton and Scharfstein 1996).

As "efficient corporate policies should aim at maximizing the size of the corporate pie" (Tirole 2006, p. 78), we expect that borrowers choose the debt structure that maximizes total firm value.[6] This, in turn, is equivalent to choosing the debt structure that minimizes inefficiencies. In the conceptual framework outlined above, there are two sources of inefficiencies: inefficient liquidations and strategic defaults. Liquidations could be inefficient because liquidation values could be lower than going concern values. Strategic defaults are inefficient for two reasons. First, they can lead to inefficient liquidations. Second, strategic defaults reduce a firm's borrowing capacity and thus its ability to finance new projects. The intuition is that strategic defaults reduce the expected repayments to creditors and, in turn, the creditors' willingness to lend. Because creditors can anticipate the inefficiencies and price protect, the costs of inefficient liquidations and strategic defaults are ultimately born by the borrower (Jensen and Meckling 1976). When deciding on their debt structure – and, in particular, when choosing between a concentrated or a dispersed debt structure – borrowers thus face a trade-off between the benefits of deterring strategic defaults and the costs of inefficient liquidations.

Our empirical predictions build on this framework and on the notion that high quality accounting information can increase the probability of successful creditor coordination as well as decrease the costs of coordination failure. With respect to creditor coordination, high quality

[6] The intuition is that "any increase in the firm's total value brought about by a change in policy can be divided among the claimholders in a way that makes everybody better off." (Tirole 2006, p. 78)

accounting information can help resolve disagreement between different lenders and thus contributes to achieving a more efficient default resolution (e.g., Ayotte and Skeel 2013; Senbet and Wang 2012). Specifically, by allowing a more accurate assessment of a distressed firm's prospects, high quality accounting information is likely to reduce asymmetric information between different classes of debt holders and thereby increases the probability that that they will agree on a private workout plan, which is substantially less costly than other default resolutions.[7]

Further, higher quality accounting information can also improve the outcome of a formal bankruptcy process in case a private workout cannot be achieved. A Chapter 11 reorganization plan cannot be confirmed by the court unless the plan has been accepted by at least one impaired class of claims, which can comprise multiple debt types,[8] and accounting information plays an important role in determining whether such a plan is fair and equitable (Warner 1977; Weiss 1990; Wruck 1990). Studying Chapter 11 reorganization plans, Weiss (1990), for example, finds that whether a creditor class is impaired is determined primarily based on accounting values. Similarly, examining how courts determine whether creditors' claims are satisfied, Warner (1977) finds that the comparison between old and new debt securities is primarily based on accounting numbers.

Finally, even in case creditor coordination fails and the firm enters a Chapter 7 liquidation, better accounting quality can help achieve a higher liquidation value. When assets are sold by production unit, which typically yields higher prices than when assets are sold piecemeal, potential buyers commonly rely on accounting numbers to estimate a unit's going concern value. Further,

[7] Further, as loan and bond contracts treat financial misreporting (most notably, restatements and AAERs) as events of default (Li et al. 2015) and given the common use of cross-default or cross-acceleration provisions in loan and bond contracts (Beatty et al. 2012; Li et al. 2015), a deterioration of a firm's accounting quality could lead to a debt renegotiation during which creditor coordination is important. We expect this contracting channel to strengthen the relation between accounting quality and debt concentration that we predict. An untabulated analysis also shows that the relation between accounting quality and debt concentration is robust to controlling for covenant violations.

[8] For example, the class "unsecured creditors" could comprise unsecured bonds, drawn credit lines, and term loans.

higher quality accounting information reduces information acquisition and processing costs and thus incentivizes buyers to enter the bidding process for the bankrupt firm's assets, which in turn leads to higher liquidation values (Bolton and Scharfstein 1996).

The above arguments suggest that high accounting quality reduces the risk of creditor coordination failure, thus making liquidations less likely, and increases liquidation values, thus making liquidations less inefficient (i.e., less costly) (e.g., Ayotte and Skeel 2013; Bolton and Scharfstein 1996; Senbet and Wang 2012; Wruck 1990). Consequently, when accounting quality is higher, a more dispersed debt structure is needed to make a credible liquidation threat and thereby deter strategic defaults. At the same time, higher accounting quality makes a dispersed debt structure less costly and therefore increases the borrower's willingness to choose higher debt dispersion. Taken together, we thus predict that firms with higher accounting quality have more dispersed (i.e., less concentrated) debt structures.

Note that this prediction does *not* necessarily require that firms have debt concentration explicitly in mind when choosing their debt structures. Consider, for example, a firm that tries to minimize its cost of debt without explicitly thinking about debt concentration. Because investors in the debt market price financial distress costs (e.g., Hoshi et al. 1990; Gertner and Scharfstein 1991; Giammarino 1989; Wruck 1990), they incorporate the risk of creditor coordination failure and low liquidation values due to low accounting quality. In that case, if the firm has low accounting quality, it can achieve the lowest cost of debt with a more concentrated debt structure (relative to a firm with higher accounting quality, whose cost of debt is minimized with a relatively less concentrated debt structure). Hence, if firms choose among different debt financing arrangements by selecting the arrangement that yields the lowest cost of debt, then firms with

lower accounting quality will tend to select higher debt concentration than firms with higher accounting quality (possibly without even knowing this). Importantly, however, the resulting relation between accounting quality and debt concentration is ultimately still due to the fact that the value maximizing debt structure is less concentrated for firms with higher accounting quality.[9]

## III. SAMPLE, VARIABLE MEASUREMENT, AND DESCRIPTIVE STATISTICS

### Data Sources and Sample Selection

We follow Colla et al. (2013) and obtain firm-level debt structure data from Capital IQ. Other firm characteristics are from COMPUSTAT. Capital IQ decomposes each firm's total debt into seven mutually exclusive debt types: commercial paper, drawn credit lines, term loans, senior bonds and notes, subordinated bonds and notes, capital leases, and other debt. In line with Colla et al. (2013), we restrict our sample to firms listed on the AMEX, NASDAQ, or NYSE and further exclude utility and financial firms (SIC codes 4900 to 4949 and 6000 to 6999, respectively). We also drop observations with zero, missing, or apparently incorrect values of debt and total assets, such as observations for which the value of debt exceeds that of total assets. Further, we drop observations for which the difference between the firm's total debt as reported in COMPUSTAT and the aggregated debt as reported in Capital IQ exceeds 10 percent of the former.

We obtain information on material weaknesses in internal controls over financial reporting under Section 302 of the Sarbanes Oxley Act (SOX) as well as on accounting restatements from the Audit Analytics database.[10] We hand-collect the announcement dates of AAERs from the

[9] Note here the similarity to classical capital structure theory: Choosing the optimal capital structure corresponds to minimizing the cost of capital, and minimizing the cost of capital corresponds to choosing the optimal capital structure.
[10] We focus on ICW disclosures under Section 302 instead of under Section 404, which imposes ICW reporting requirements on external auditors, because prior studies suggest that the former substantially better reflect firms' accounting quality than the latter (see Dechow et al. 2010 for a summary). Our main results, however, are robust to including ICW disclosures under both Sections 302 and 404.

SEC's website and obtain from COMPUSTAT whether a Big 4 auditor audits the firm. As SOX only became effective in July 2002, information on material internal control weaknesses is not available from Audit Analytics prior to August 2002.[11] Consequently, we only keep observations from 2003 onward. Further, because we want to examine the relation between firms' accounting quality and subsequent debt structure choices, we drop debt structure observations if information on the firm's accounting quality in the previous year is not available.[12] We also remove observations for which any of the control variables required for our analysis are missing. The final sample consists of 2,835 firms and 15,392 firm-year observations from 2003 to 2017.

**Measurement of Debt Concentration**

We measure the concentration in a firm's debt structure in two ways.[13] First, we follow Colla et al. (2013) and compute the normalized Herfindahl-Hirschman Index (*HHI*) across the different types of debt used by the firm. Specifically, we calculate for firm *i* at the end of year *t*:

$$SS_{it} = \left(\frac{CP_{it}}{TD_{it}}\right)^2 + \left(\frac{DC_{it}}{TD_{it}}\right)^2 + \left(\frac{TL_{it}}{TD_{it}}\right)^2 + \left(\frac{SBN_{it}}{TD_{it}}\right)^2 + \left(\frac{SUB_{it}}{TD_{it}}\right)^2 + \left(\frac{CL_{it}}{TD_{it}}\right)^2 + \left(\frac{Other_{it}}{TD_{it}}\right)^2, \quad (1)$$

where *CP*, *DC*, *TL*, *SBN*, *SUB*, *CL*, and *Other* denote the amounts of the seven types of debt recorded in Capital IQ: commercial paper, drawn credit lines, term loans, senior bonds and notes, subordinated bonds and notes, capital leases, and other debt. $TD$ denotes the total amount of debt. We then normalize $SS_{it}$ to obtain:

$$HHI_{it} = (SS_{it} - 1/7)/(1 - 1/7). \quad (2)$$

By construction, $HHI_{it}$ ranges between zero and one. It is equal to zero if a firm uses all seven

[11] Before SOX, firms were required to disclose deficiencies in internal controls only if changing auditors (Krishnan 2005; Doyle et al. 2007).
[12] Our results are robust to requiring that data on firms' accounting quality is available for at least three previous years.
[13] Untabulated analyses confirm that our findings are robust to several alternative measures of debt concentration, such as an indicator equal to one if any debt type individually accounts for more than 90 percent of the total debt.

types of debt in equal proportion (corresponding to minimum debt concentration). It is equal to one if a firm uses only a single type of debt (corresponding to maximum debt concentration).

Second, we measure debt concentration with the number of different debt types in a firm's debt structure ($NUM\ DEBT\ TYPES_{it}$). When doing so, we distinguish between the seven types of debt described above, so that *NUM DEBT TYPES* ranges from one to seven, with a higher value corresponding to a less concentrated debt structure. To focus on debt types with economically significant amounts, we count only types that make up at least 5 percent of the firm's total debt.[14]

The main difference between the two debt concentration measures is that, unlike *NUM DEBT TYPES*, *HHI* reflects not only the number of debt types but also the percentages of total debt that they account for. This is relevant because the distribution of fractional ownership is likely to play a role even for a fixed number of debt types. First, a reorganization plan in a Chapter 11 bankruptcy can only be confirmed by the court if it has been accepted by at least one class of impaired creditors, and a class is deemed to have accepted a plan if it has been accepted by creditors holding at least two-thirds in amount and more than one-half in number of the claims in the class.[15] Hence, because a class of claims (e.g., unsecured creditors) can comprise multiple debt types (e.g., unsecured bonds, drawn credit lines, and term loans), the distribution of fractional ownership accounted for by the different types plays a role. Second, if debt concentration increases because one debt type makes up a larger fraction of the total debt (say 90 percent) whereas the remaining debt types account only for very small fractions, then it is cheaper for the dominant creditor to buy out the remaining types or compensate their owners for any losses, which facilitates coordination.

[14] Untabulated analyses confirm that this 5 percent cut-off is not critical and that counting debt types that make up at least 3 percent or 1 percent of the firm's total debt (or simply counting all types) generally does not affect our results.
[15] https://www.uscourts.gov/services-forms/bankruptcy/bankruptcy-basics/chapter-11-bankruptcy-basics

A possible concern about measuring debt concentration with the HHI across different types of debt (or the number of different types) is that this only captures the concentration across types but not the concentration or number of creditors within each type. This is relevant because creditor coordination costs can be also related to the concentration or number of creditors within debt types, and higher accounting quality may also facilitate within-debt-type coordination. However, as we explain in Section II, lower debt concentration in the sense of using multiple debt types at the same time is likely to increase creditor coordination costs beyond the costs of within-debt-type coordination. Further, as we show in Section V (Table 6), our findings continue to hold when we control for firms' reliance on public debt, which has a low degree of within-type concentration.

**Measurement of Accounting Quality**

In the conceptual framework that provides the theoretical basis for our study, when choosing their debt structure, borrowers know that creditors take accounting quality and its effect on creditor coordination costs and liquidation values into account. What matters, therefore, are creditors' beliefs about accounting quality (i.e., perceived accounting quality, not necessarily "actual" accounting quality).[16] We thus rely on observable indicators of (low) accounting quality: ICWs, accounting restatements, AAERs, and firms' reliance on small auditors. Specifically, we use these indicators to construct an index of accounting quality (*ACCOUNTING QUALITY*). Our use of the different indicators is based on the extensive literature on accounting quality and is supported by Dechow et al.'s (2010) comprehensive review thereof, which identifies ICWs, restatements, and AAERs as common measures of accounting quality and emphasizes that auditors are an important

[16] For example, it could be that a firm's accounting quality is low during a particular year but that this remains unknown for some time and becomes known to creditors only later (e.g., through an accounting restatement or AAER).

determinant of accounting quality.[17]

A material ICW indicates a deficiency in internal controls over financial reporting and thus low reliability of the firm's accounting information (e.g., Beneish et al. 2008; Hammersley et al. 2008; Costello and Wittenberg-Moerman 2011; Kim et al. 2011). Accounting restatements are often linked to aggressive accounting and misreporting and perceived negatively by both equity and debt holders (e.g., DeFond and Jiambalvo 1991; Palmrose et al. 2004; Burns and Kedia 2006; Efendi et al. 2007; Graham et al. 2008). AAERs indicate earnings manipulation and thus exemplify low accounting quality (Feroz et al. 1991; Dechow et al. 1996; Karpoff et al. 2008a,b). Finally, the auditing process plays a crucial role in ensuring the credibility of financial reports (DeFond and Zhang 2014), and firms' reliance on small auditors (e.g., non-Big 4 auditing firms) is typically associated with lower accounting quality (Dechow et al. 2010; Lennox and Pittman 2010; Ball et al. 2012; DeFond and Zhang 2014; DeFond et al. 2016).

We construct the accounting quality index as follows:

$$ACCOUTING\ QUALITY_{i,t-3,t-1} = 4 - ICW_{i,t-3,t-1} - RESTATEMENT_{i,t-3,t-1} - AAER_{i,t-3,t-1} - SMALL\ AUDITOR_{i,t-3,t-1}, \quad (3)$$

where $ICW_{i,t-3,t-1}$, $RESTATEMENT_{i,t-3,t-1}$, $AAER_{i,t-3,t-1}$, and $SMALL\ AUDITOR_{i,t-3,t-1}$ are indicators equal to one if firm *i* has experienced a material ICW, a restatement, or an AAER, or is audited by a non-Big 4 auditor in any of the previous three years (i.e., years *t-3*, *t-2*, or *t-1*). The index thus ranges from zero to four, and higher values correspond to higher accounting quality.[18] We consider

[17] We do not include measures of accruals quality when constructing the index because discretionary accruals are not observed directly but must be estimated. However, as an untabulated robustness test, we add to the index a measure of accrual quality based on Dechow and Dichev's (2002) model, adjusted as in McNichols (2002) and Francis et al. (2005). Our inference that accounting quality is significantly and negatively related to debt concentration continues to hold.

[18] In untabulated tests, we consider five alternative ways to construct the index of firms' accounting quality. First, we use the first principle component of *ICW*, *RESTATEMENT*, *AAER*, and *SMALL AUDITOR* as a composite measure of

accounting irregularity events and auditor size during a three-year window since debt structure adjustments following accounting quality changes cannot necessarily be performed immediately, as issuing and retiring debt securities takes time. Another reason is that prior work suggests that lenders are likely to view indications of low accounting quality as having long-lasting effects, even after the underlying problems have been addressed (Costello and Wittenberg-Moerman 2011).

**Descriptive Statistics**

Table 1 reports descriptive statistics.[19] The average values of *HHI* and *NUM DEBT TYPES* are 0.74 and 1.71. To put the average *HHI* in perspective, consider a firm that relies on two types of debt. In that case, a debt HHI of 0.74 corresponds to one debt type accounting for 87 percent and the other for 13 percent of total debt. The average within-firm standard deviations (untabulated) of *HHI* and *NUM DEBT TYPES* are 0.158 and 0.475, indicating that the firms' debt concentration varies over time. The two debt concentration measures are also highly correlated: The Pearson correlation is -0.88 (untabulated).[20] The average value of *ACCOUNTING QUALITY* is 3.37. This high average value reflects the fact that ICWs, restatements, AAERs, and being audited by a non-Big 4 auditor are rather infrequent events. Nonetheless, there is significant within-firm variation: 62 percent of the firms have an accounting quality index that changes during the sample period (untabulated).

Table 1 also shows that the sample firms tend to be relatively large, as evidenced by their mean market value of equity of almost $4 billion. The mean market-to-book ratio is 1.9, the mean profitability is 7 percent, the mean tangibility ratio is 26 percent, the mean cash flow volatility is

accounting quality. Second, we construct four alternative indices, each based on only three of the four indicators *ICW, RESTATEMENT, AAER,* and *SMALL AUDITOR*. Our results are robust to using these alternative measures.

[19] All continuous variables are winsorized at the 1st and 99th percentile. Appendix A provides detailed definitions.

[20] The average within-firm correlation between *HHI* and *NUM DEBT TYPES* is -0.85 (untabulated).

7 percent, and the mean leverage ratio is 24 percent. About one third of the firms pay dividends, and 65 percent are unrated. The average age of the firms is ten years, defined as the number of years since their first appearance in COMPUSTAT. The average corporate governance index of Gompers et al. (2003) is nine,[21] and the average number of business segments in which the firms operate is 2.74. The mean z-score (Altman 1968) is 0.70, the mean asset growth is 9 percent, and the mean daily return volatility is 3 percent. The average restructuring charges amount to 1 percent of the firms' market capitalization, 26 percent of the observations pertain to years in which the firms raise new long-term debt and equity in excess of 20 percent of total assets, and an auditor resignation characterizes 1 percent of the observations.

## IV. EMPIRICAL RESULTS

### Accounting Quality and Debt Concentration

We now examine the relation between accounting quality and debt concentration by estimating the following model:

$$DEBT\ CONCENTRATION_{i,t} = \alpha_1 + \alpha_2 ACCOUNTING\ QUALITY_{i,t-3,t-1} + \alpha_3 Debt\ Structure\ Determinants_{i,t-1} + \alpha_4 Accounting\ Quality\ Determinants_{i,t-1} + \alpha_5 Firm\ FE + \alpha_6 Year\ FE + e_{i,t}. \quad (4)$$

*DEBT CONCENTRATION* is one of the two measures of debt concentration: *HHI* or *NUM DEBT TYPES*. We estimate a Tobit model (censored at zero and one) for *HHI* and a Poisson model for *NUM DEBT TYPES*. The independent variable of interest is *ACCOUNTING QUALITY*.

Colla et al. (2013) suggest that, in addition to creditor coordination costs, debt concentration

[21] The sample average of the indicator *G-INDEX MISSING* reveals that information on the corporate governance index is not available for 92 percent of the observations. We replace these missing values with the industry median of the G-index.

may be also affected by lenders' information collection and monitoring costs as well as by firms' access to debt capital. We therefore follow Colla et al. (2013) and control for lenders' information collection and monitoring costs with research and development expenditures (*R&D*) and for firms' access to different segments of the debt market with an indicator reflecting whether the firms are rated or not (*UNRATED*). In addition, we control for other characteristics related to firms' debt structures, including firm size (*SIZE*), market-to-book ratio (*MTB*), profitability (*PROFITIBILITY*), asset tangibility (*TANGIBILITY*), cash flow volatility (*CF VOL*), leverage (*LEVERAGE*), and an indicator reflecting whether or not the firms pay dividends (*DIVIDEND*).

An important challenge is that firms' accounting quality is not randomly assigned. To mitigate endogeneity concerns, we thus follow prior research and control for both firm and year fixed effects (e.g., Bertrand and Mullainathan 2003; Valta 2012; Christensen et al. 2016). The firm fixed effects absorb all time-invariant differences between the firms. The year fixed effects absorb all time-varying factors that are common to all firms in a given year (e.g., macroeconomic conditions). In addition, we also control for the time-varying determinants of accounting quality suggested by prior research.[22] Specifically, we control for firm age (*LN(FIRM AGE)*), the corporate governance index of Gompers et al. (2003) (*G-INDEX*), an indicator equal to one if the governance index is missing (*G-INDEX MISSING*), the number of business segments (*LN(SEGMENTS)*), Altman's (1968) z-score (*Z-SCORE*), asset growth (*ASSET GROWTH*), aggregate restructuring charges (*RESTRUCTURE*), an indicator for firms that raise significant amounts of debt and equity (*DEBT AND EQUITY FUNDS RAISED*), and an indicator for auditor resignation (*AUDITOR RESIGNATION*). Finally, we cluster all standard errors at the firm level.

[22] See Willenborg (1999), Weber and Willenborg (2003), Doyle et al. (2007), Efendi et al. (2007), Chang et al. (2009), Kim et al. (2011), and Cheng et al. (2013).

Table 2 presents the results.[23] To facilitate interpretation, we report average marginal effects. In column 1, we estimate a Tobit model (censored at zero and one) for *HHI*. The estimated effect of *ACCOUNTING QUALITY* is negative and significant at the 1 percent level. This is consistent with our prediction that firms with higher accounting quality have less concentrated debt structures. Specifically, the estimate implies that an increase in *ACCOUNTING QUALITY* by one notch is associated with a decrease in *HHI* by 0.01, which corresponds to a decrease by 6.3 percent (=|-0.010/0.158|) of the average within-firm standard deviation of *HHI* (0.158). Hence, while small in absolute terms, the implied change in *HHI* is noticeable relative to the "typical" change that we observe in the data. For comparison, a one standard deviation change in *TANGIBILITY* (*SIZE*) implies a change in *HHI* by 19.9 (16.7) percent of the average within-firm standard deviation.

We next address the potential concern that the firm fixed effects in model (4) may cause an incidental parameters problem. First, note that there is no such problem in a Poisson model (Cameron and Trivedi 2005). Second, Greene (2004) shows that the coefficient estimates in a fixed effects Tobit model (henceforth FE Tobit) are virtually unaffected by the incidental parameters problem. Nonetheless, we complement our analysis by estimating a Tobit model with correlated random effects (henceforth CRE Tobit), censored at zero and one (Wooldridge 2010):

$$HHI_{i,t} = \alpha_1 + \alpha_2 ACCOUNTING\ QUALITY_{i,t-3,t-1} + \alpha_3 Debt\ Structure\ Determinants_{i,t-1} + \alpha_4 Accounting\ Quality\ Determinants_{i,t-1} + \alpha_5 Year\ FE + c_i + e_{i,t}, \quad (5)$$

where $c_i$ is a time-invariant, unobserved firm effect that may be correlated with the other covariates (Wooldridge 2002, p. 540-542). Column 2 of Table 2 presents the results. We continue

[23] The values of R-squared for the Tobit and Poisson models in the paper are the squared correlation coefficients between predicted and observed outcomes (Wooldridge 2002, p. 529). We do not report the pseudo R-squared as it can be negative or larger than one in models with mixed continuous/discrete distributions (such as Tobit models).

to find that the estimated average marginal effect of *ACCOUNTING QUALITY* is negative and statistically significant at the 1 percent level.

Last, going back to model (4), we estimate a Poisson model for *NUM DEBT TYPES*. Column 3 shows that the estimated effect of *ACCOUNTING QUALITY* is positive (0.027) and statistically significant at the 5 percent level. This is consistent with our prediction that firms with higher accounting quality rely on more debt types. The estimate implies that a one-notch increase in the accounting quality index is associated with an increase in the number of debt types by 0.027, corresponding to 5.7 percent (= 0.027/0.475) of the average within-firm standard deviation of *NUM DEBT TYPES* (0.475). Hence, while small in absolute terms, the implied increase is noticeable in relative terms. For comparison, a one standard deviation change in *TANGIBILITY* (*SIZE*) implies a change in *NUM DEBT TYPES* by 25.8 (22.7) percent of the average within-firm standard deviation.[24] Regarding the estimated effect of the control variables, we find that, in all specifications, debt concentration decreases with *SIZE*, *TANGIBILITY*, *LEVERAGE*, *LN(FIRM AGE)*, *LN(SEGMENTS)*, and *ASSET GROWTH* and increases with *MTB*.[25, 26]

**Cross-sectional Variation in the Relation between Accounting Quality and Debt Concentration: The Role of Default Risk and Liquidation Value**

In this section, we provide further support to the proposition that creditor coordination costs

[24] It is also worth noting that *NUM DEBT TYPES* is a discrete variable, so that an average increase of 0.027 implies that some firms do not increase the number of types, whereas others increase it by at least one. Given that *NUM DEBT TYPES* is equal to one (two) for 47 (38) percent of the observations in our sample, an average increase of 0.027 thus implies that while the relative increase is zero for those firms that do not adjust the number of debt types, the increase is very large for those firms that do (e.g., 100 percent, for an increase from one debt type to two).

[25] Note that while Colla et al. (2013) report significant coefficients on most firm-level variables, the lack of statistical significance in our specification is due to the inclusion of firm fixed effects. When we replace the firm fixed effects with industry fixed effects, we find a significant relation between *HHI* and the majority of firm-level controls as in Colla et al. (2013) (untabulated).

[26] Untabulated tests show that our results are robust to using OLS models or not controlling for *LEVERAGE*, as well as to different ways of controlling for size (e.g., using dummies for size deciles or adding size squared).

play an important role for the relation between accounting quality and debt concentration. First, we expect the relation to be more pronounced for firms with higher default risk. The intuition is as follows. When the probability of default is higher, lenders and firms anticipate that creditor coordination is required with a higher likelihood and accounting quality thus more important. Second, we expect the relation to be stronger when a firm's liquidation value is low because, in that case, creditor coordination in order to avoid liquidation is more important.

Table 3 presents tests of these predictions. In Panel A, we compare the relation between accounting quality and debt concentration across sample partitions based on the firms' credit ratings. The estimated average marginal effect of *ACCOUNTING QUALITY* on *HHI* is negative and significant for firms with a highly speculative grade credit rating (B+ or worse) and insignificant for firms with a better rating. The estimated effects for firms with a highly speculative grade rating are also significantly stronger than those for firms with better ratings. In terms of economic magnitude, the estimates for firms with a highly speculative grade rating imply that an increase in *ACCOUNTING QUALITY* by one notch is associated with a decrease in *HHI* by 19.6 percent (FE Tobit) to 22.8 percent (CRE Tobit), relative to the average within-firm standard deviation of *HHI*.

Consistent with the above result, the estimated effect of *ACCOUNTING QUALITY* on *NUM DEBT TYPES* is positive and statistically significant for firms with a highly speculative grade credit rating. It implies that an increase in the accounting quality index by one notch is associated with an increase in the number of debt types by 19.8 percent of the average within-firm standard deviation. In contrast, the estimate is close to zero and not statistically significant for firms with a better rating. The estimated effect for firms with a highly speculative grade credit rating is also

significantly larger than the estimate for firms with better credit ratings.

In Panel B, we partition the sample based on firms' cash flow volatility, another proxy for default risk (e.g., Titman and Wessels 1988). Specifically, we compute each firm's cash flow volatility during the twelve quarters preceding the year in which we measure debt concentration and then classify firms whose cash flow volatility falls into the top tercile of the sample distribution as having high cash flow volatility and otherwise as having low cash flow volatility. In the sample of firms with high cash flow volatility, the estimated effect of *ACCOUNTING QUALITY* on *HHI* (*NUM DEBT TYPES*) is negative (positive) and significant. The estimates imply that an increase in *ACCOUNTING QUALITY* by one notch is associated with a decrease in *HHI* by 10.1 percent (CRE Tobit) to 12.0 percent (FE Tobit) and an increase in *NUM DEBT TYPES* by 14.1 percent of the respective average within-firm standard deviations. In contrast, the estimated effects for firms with low cash flow volatility are statistically insignificant for *NUM DEBT TYPES* and in the FE Tobit model for *HHI* and only marginally significant in the CRE Tobit model for *HHI*. Moreover, the estimated effects in the sample of firms with high cash flow volatility are significantly stronger.

In Panel C, we partition the sample based on the firms' z-scores (Altman 1968): We classify z-scores in the top tercile of the distribution as high, otherwise as low. Consistent with Panels A and B, we find significant effects of *ACCOUNTING QUALITY* on *HHI* and *NUM DEBT TYPES* for firms with low but not with high z-scores. Further, the estimated effects for firms with low z-scores are significantly stronger, except for the analysis of *NUM DEBT TYPES*. The estimates for firms with low z-scores imply that an increase in *ACCOUNTING QUALITY* by one notch is associated with a decrease in *HHI* by 11.4 percent and an increase in the number of debt types by 8.4 percent of the average within-firm standard deviations of *HHI* and *NUM DEBT TYPES*.

Finally, in Panel D, we partition the sample based on the firms' liquidation values, which we estimate following Berger et al. (1996).[27] Specifically, we classify firms with liquidation values in the bottom tercile of the sample distribution as having low liquidation values and otherwise as having high liquidation values. As predicted, for firms with low liquidation values, we find a statistically significant relation between accounting quality and debt concentration – but not for firms with high liquidation values, except in the CRE Tobit model for *HHI*, where the estimate is small in magnitude but marginally significant. The estimated effects in the sample of firms with low liquidation values are also significantly stronger, except in the FE Tobit model for *HHI*. In terms of economic magnitude, the estimates for the sample of firms with low liquidation values imply that an increase in *ACCOUNTING QUALITY* by one notch is associated with a decrease in *HHI* by 10.8 percent and an increase in the number of debt types by 11.6 percent of the respective average within-firm standard deviations of *HHI* and *NUM DEBT TYPES*.

## V. ROBUSTNESS ANALYSES

### Changes Analysis

In our primary analysis (Table 2), we rely on firm fixed effects (in the FE Tobit and Poisson models) and correlated random effects (in the CRE Tobit model) to control for unobservable, time-invariant differences between firms. An alternative approach to remove the unobserved effects is to difference the data and regress year-on-year changes in debt concentration on year-on-year changes in accounting quality and control variables (Wooldridge 2002).

Table 4 presents the results of such a changes analysis. Estimates of the relation between changes in accounting quality (Δ*ACCOUNTING QUALITY*) and changes in the debt HHI (Δ*HHI*)

[27] Specifically, the liquidation value of a firm's assets is calculated as (cash + 0.72×receivables + 0.55×inventory + 0.54×fixed assets – payables) / total assets.

are shown in column 1. Column 2 pertains to changes in the number of debt types (Δ*NUM DEBT TYPES*). We present OLS estimates because year-on-year changes in debt concentration (Δ*HHI* and Δ*NUM DEBT TYPES*) can be negative.[28] We include year fixed effects and cluster the standard errors by firm, as before. Column 1, where Δ*HHI* is the dependent variable, shows a negative coefficient estimate on Δ*ACCOUNTING QUALITY* that is statistically significant at the 1 percent level: Increases in accounting quality are significantly related to decreases in firms' debt HHI. Column 2 shows a positive and significant (at the 1 percent level) relation between Δ*ACCOUNTING QUALITY* and Δ*NUM DEBT TYPES*. That is, increases in accounting quality are significantly related to increases in the number of debt types, corroborating our primary findings.

**Propensity Score Matching Analysis**

A potential concern is that our estimations may suffer from functional form misspecification. Observations with different values of *ACCOUNTING QUALITY* may also differ along other dimensions, which may explain differences in debt concentration. Our primary analysis relies on the assumption that the relevant differences are captured by a linear combination of the control variables and fixed effects. If this assumption fails, i.e., if the functional form of the regressions is misspecified, then any uncaptured differences between observations become part of the error term. This, in turn, can create an endogeneity problem if these differences are correlated with both *ACCOUNTING QUALITY* and *HHI* or *NUM DEBT TYPES*.

Propensity score matching (PSM) can help mitigate this concern by restricting the regression sample to observations that differ in terms of treatment status but are otherwise very similar

[28] The number of observations in this estimation is smaller than in our primary analysis because differencing the data leads to a loss of observations whenever information on the prior year is not available (e.g., for the first year in our sample). Untabulated analyses reveal that the results are the same if instead of OLS we rely on a Tobit model censored at -1 and 1 to estimate the relation between Δ*ACCOUNTING QUALITY* and Δ*HHI*.

(Shipman et al. 2017). A complication is that our treatment of interest (*ACCOUNTING QUALITY*) ranges from zero to four. A classical PSM procedure, which relies on a binary treatment, is therefore not applicable.[29] However, we can exploit the fact that propensity score matching can be generalized to allow for multi-valued treatments (Joffe and Rosenbaum 1999; Imbens 2000).

In analogy to a classical PSM analysis, we start by estimating the following Poisson model,

$$ACCOUNTING\ QUALITY_{i,t-3,t-1} = \alpha_1 + \alpha_2 Debt\ Structure\ Determinants_{i,t-1} + \alpha_3 Accounting\ Quality\ Determinants_{i,t-1} + \alpha_4 Industry\ FE + \alpha_5 Year\ FE + e_{i,t-3,t-1}, \quad (7)$$

and then compute the predicted value of *ACCOUNTING QUALITY* for all observations in our sample. Thereafter, in analogy to matching on the predicted value of the treatment variable (i.e., matching on the propensity score) in a classical PSM analysis, we use the predicted value of *ACCOUNTING QUALITY* to match each observation with a control observation that has a different realized value of *ACCOUNTING QUALITY* (i.e., an observation with a very similar propensity score but a different treatment value). We require exact matches in terms of two-digit SIC code and year and impose a maximum caliper distance of 0.003. For example, an observation with *ACCOUNTING QUALITY* equal to three (say "observation A") is matched to a control observation with the same two-digit SIC code and from the same year, whose *realized* value of *ACCOUNTING QUALITY* differs from three but whose *predicted* value of *ACCOUNTING QUALITY* differs by less than 0.003 from observation A's *predicted* value of *ACCOUNTING QUALITY*. As in a classical PSM analysis, the purpose of this matching procedure is to construct a sample of observations that are very similar in terms of covariates (here: *Debt Structure Determinants*,

[29] Note that dichotomizing the accounting quality index into a 0/1 indicator (e.g., by defining an indicator equal to one if *ACCOUNTING QUALITY* is larger than the sample median, zero otherwise) would greatly diminish the power of the tests and thus increase the likelihood of a false negative (Shipman et al. 2017).

*Accounting Quality Determinants*, *Industry*, and *Year*) but differ in terms of treatment (here: *ACCOUNTING QUALITY*).[30] Next, as in a classical PSM analysis, we estimate our regressions of interest (i.e., regressions of *HHI* and *NUM DEBT TYPES* on *ACCOUNTING QUALITY*, control variables, and fixed effects) using the matched sample.

Table 5 presents the results. Panel A shows the results from the first stage Poisson model. We find a significant positive relation between *ACCOUNTING QUALITY* and *SIZE*, *PROFITABILITY*, *DIVIDEND*, *R&D*, *LEVERAGE*, and *G-INDEX MISSING* and a significant negative relation between *ACCOUNTING QUALITY* and *MTB*, *LN(SEGMENTS)*, *RETURN VOL*, and *AUDITOR RESIGNATION*. Panel B shows the coefficient estimates from OLS regressions of the different covariates (*Debt Structure Determinants* and *Accounting Quality Determinants*) on *ACCOUNTING QUALITY* as well as firm and year fixed effects. In analogy to a "covariate balance test" in a classical PSM analysis, the purpose of these regressions is to assess the conditional correlation between the covariates and the treatment variable (*ACCOUNTING QUALITY*) in the matched sample. The coefficient estimates on *ACCOUNTING QUALITY* are all insignificant except in the regression relating *ACCOUNTING QUALITY* to *LN(SEGMENTS)*, where the estimate is significant at the 10 percent level. Note however, that under the null-hypothesis that *ACCOUNTING QUALITY* is unrelated to the covariates in the matched sample, the probability of finding at least one significant coefficient when estimating 19 independent regressions is 86 percent ($= 1 - 0.9^{19}$). As such, a single significant coefficient does not provide much evidence that "covariate balance" is violated. Further, to control for any remaining differences between observations with different values of accounting quality, we follow the suggestion by Shipman et

[30] To avoid repeated weighting of control observations that are the most closely comparable match for multiple treatment observations, we include such control observations only once in the matched sample.

al. (2017) and include *Debt Structure Determinants* and *Accounting Quality Determinants* when estimating the relation between accounting quality and debt concentration.

Panel C shows the results of regressing *HHI* and *NUM DEBT TYPES* on *ACCOUNTING QUALITY* and covariates using the matched sample. All regressions are specified as in Table 2. The estimated effect of *ACCOUNTING QUALITY* is -0.020 (-0.018) and significant at the 5 (1) percent level in the FE Tobit (CRE Tobit) model using *HHI* to measure debt concentration. The estimated effect is 0.069 and statistically significant at the 5 percent level in the Poisson model for *NUM DEBT TYPES*. These findings corroborate the results of our primary tests.

**Controlling for Other Debt Structure Characteristics**

A firm's accounting quality may be related to other dimensions of its debt structure (e.g., the firm's reliance on public or senior debt, maturity concentration, or the use of debt with more covenants). A concern could thus be that these dimensions – rather than creditor coordination costs – are the reason for the relation between accounting quality and debt concentration that we find. To mitigate this concern, we re-estimate the relation between *ACCOUNTING QUALITY* and *HHI* and *NUM DEBT TYPES* after including different debt structure characteristics as additional controls. Specifically, we compute the percentage of public debt (commercial paper, senior bonds, and subordinated bonds), the percentage of senior debt, and the percentage of callable debt instruments in the firm's total debt. We also compute the concentration of the debt's maturity structure by classifying all outstanding debt instruments into five categories based on their remaining maturity – less than one year, one-to-three years, three-to-five years, five-to-ten years, and more than ten years – and computing the normalized Herfindahl-Hirschman Index for these maturity categories. In addition, we construct a firm-level covenant index by counting the number

of covenants that are specified in the firm's outstanding loans and bonds.[31] We then add these variables (*PUBLIC DEBT*, *SENIOR DEBT*, *CALLABLE DEBT*, *HHI-MATURITY*, and *FIRM-LEVEL COVENANTS*) as additional controls to the regression specifications.

Table 6 presents the results.[32] We continue to find a positive relation between accounting quality and debt concentration. Indeed, the magnitudes of the estimated effects are very similar to those reported in Table 2. Specifically, the estimated effect of *ACCOUNTING QUALITY* on *HHI* is -0.009 and statistically significant at the 1 percent level in both the FE Tobit and CRE Tobit models. The estimated effect of *ACCOUNTING QUALITY* on *NUM DEBT TYPES* is 0.030 and statistically significant at the 5 percent level. These findings suggest that the relation between accounting quality and debt concentration that we document is unlikely to be driven by other debt structure characteristics.

Of particular relevance is the finding that *PUBLIC DEBT* is positively (negatively) related to *HHI* (*NUM DEBT TYPES*), i.e., that firms' use of public debt is associated with higher concentration *across* debt types.[33] This result is important because prior literature suggests a positive relation between accounting quality and the use of public debt (e.g., Bharath et al. 2008) and hence a negative relation with concentration *within* debt types (as public debt presumably has

[31] If a given covenant is included in multiple loans or bonds, we count the covenant only once. In an untabulated analysis, we further confirm that our results are robust to controlling for covenant violations.

[32] The sample size drops to 12,522 observations because information on the maturity and seniority of the different debt instruments is not always available.

[33] While it may appear surprising at first that the use of public debt is associated with more debt concentration in the data, we note that the relation between *PUBLIC DEBT* and debt concentration could a priori be positive or negative and is ultimately an empirical question. To illustrate, consider an example with only two types of debt, public and private. In that case, the relation between the percentage of public debt and the debt HHI is negative if the percentage of public debt is between 0 percent and 50 percent but positive if the percentage of public debt is between 50 percent and 100 percent. That is, a greater reliance on public debt can increase or decrease debt concentration across debt types depending on how much public debt the borrower uses. Further, better access to public debt may allow borrowers to obtain larger amounts of debt financing from a single source (e.g., public bonds) rather than having to rely on multiple sources of private debt, which can only supply smaller amounts of debt each. This provides another possible explanation for our finding that *PUBLIC DEBT* is empirically associated with greater debt concentration.

a lower within-concentration than private debt). A priori, a concern could thus have been that firms with higher accounting quality use more public debt, and that this higher reliance on public debt in turn explains our finding of a negative relation between accounting quality and debt concentration. Table 6 shows that this is not the case: Firms' use of public debt is actually associated with *more* concentration across debt types, *not less*. It follows that a higher reliance on public debt by firms with higher accounting quality cannot explain our results.

## VI. CONCLUSION

Motivated by the important role of accounting quality in facilitating creditor coordination and mitigating inefficiencies in the default resolution process, we examine whether firms with higher accounting quality have less concentrated debt structures. Using an index of accounting quality based on the occurrence of material ICWs, accounting restatements, SEC AAERs, and firms' reliance on small auditors and measuring debt concentration with a normalized Herfindahl-Hirschman Index of debt type usage and with the number of debt types that firms use, we show that higher accounting quality is indeed associated with significantly less concentrated debt structures. We further show that the relation between accounting quality and debt concentration is stronger for firms with higher default risk and lower liquidation values, consistent with the idea that creditor coordination failure is a more important concern for these firms.

Our new perspective on the role of accounting quality in facilitating creditor coordination allows us to establish an important link between accounting quality and debt concentration, a first-order aspect of firms' capital structures. Our findings also enhance our understanding of the different ways through which accounting information affects debt markets and highlight its central role in helping distinct lenders coordinate their interests.

## References


Altman, E. 1968. Financial ratios, discriminant analysis and the prediction of corporate bankruptcy. *Journal of Finance* 23 (4): 589-609.

Asquith, P., R. Gertner, and D. Scharfstein. 1994. Anatomy of financial distress: an examination of junk-bond issuers. *Quarterly Journal of Economics* 109 (3): 625-658.

Ayotte, K., and E. Morrison. 2009. Creditor control and conflict in Chapter 11. *Journal of Legal Analysis* 1 (2): 511-551.

Ayotte, K., and D. Skeel. 2013. Bankruptcy law as a liquidity provider. *The University of Chicago Law Review* 80 (4): 1557-1624.

Ball, R., S. Jayaraman, and L. Shivakumar 2012. Audited financial reporting and voluntary disclosure as complements: A test of the Confirmation Hypothesis. *Journal of Accounting and Economics* 53 (1-2): 136-166.

Ball, R., R. Bushman, and F. Vasvari. 2008. The debt-contracting value of accounting information and loan syndicate structure. *Journal of Accounting Research* 46 (2): 247-87.

Beatty, A., S. Liao, and J. Weber. 2010. Financial reporting quality, private information, monitoring, and the lease-versus-buy decision. *The Accounting Review* 85 (4): 1215-1238.

Beatty, A., S. Liao, and J. Weber. 2012. Evidence on the determinants and economic consequences of delegated monitoring. *Journal of Accounting and Economics* 53 (3): 555-576.

Beneish, M., M. Billings, and L. Hodder. 2008. Internal control weaknesses and information uncertainty. *The Accounting Review* 83 (3): 665-703.

Berger, P.G., E. Ofek, and I. Swary. 1996. Investor valuation of the abandonment option. *Journal of Financial Economics* 42 (2): 257-287.

Berglöf, E., and E. von Thadden. 1994. Short-term versus long-term interests: capital structure with multiple investors. *Quarterly Journal of Economics* 109 (4): 1055-1084.

Bertrand, M., and S. Mullainathan. 2003. Enjoying the quiet life? Corporate governance and managerial preferences. *Journal of Political Economy* 111 (5): 1043-1072.

Bharath, S., J. Sunder, and S. Sunder. 2008. Accounting quality and debt contracting. *The Accounting Review* 83 (1): 1-28.

Bolton, P., and D. Scharfstein. 1996. Optimal debt structure and the number of creditors. *Journal of Political Economy* 104 (1): 1-25.

Bris, A., and I. Welch. 2005. The optimal concentration of creditors. *Journal of Finance* 60 (5): 2193-2212.

Burns, N., and S. Kedia. 2006. The impact of performance-based compensation on misreporting. *Journal of Financial Economics* 79 (1): 35-67.

Cameron, C., and P. Trivedi. 2005. *Microeconometrics: Methods and applications*. Cambridge University Press: New York, NY.

Chang, X., S. Dasgupta, and G. Hilary. 2009. The effect of auditor quality on financing decisions. *The Accounting Review* 84 (4): 1085-1117.

Cheng, M., D. Dhaliwal, and Y. Zhang. 2013. Does investment efficiency improve after the disclosure of material weaknesses in internal control over financial reporting? *Journal of Accounting and Economics* 56 (1): 1-18.

Christensen, H., L. Hail, and C. Leuz. 2016. Capital market effects of securities regulation: Prior conditions, implementation, and enforcement. *Review of Financial Studies* 29 (11): 2885-2924.

Christensen, H., and V. Nikolaev. 2012. Capital versus performance covenants in debt contracts. *Journal of Accounting Research* 50 (1): 75-116.

Colla, P., F. Ippolito, and K. Li. 2013. Debt specialization. *Journal of Finance* 68 (5): 2117-2141.

Costello, A., and R. Wittenberg-Moerman. 2011. The impact of financial reporting quality on debt contracting: Evidence from internal control weakness reports. *Journal of Accounting Research* 49 (1): 97-136.

Dechow, P., and I. Dichev. 2002. The quality of accruals and earnings: the role of accrual estimation errors. *The Accounting Review* 77 (Supplement): 35-59.

Dechow. P., R. Sloan, and A. Sweeney. 1996. Causes and consequences of earnings manipulation: an analysis of firms subject to enforcement action by the SEC. *Contemporary Accounting Research* 13 (1): 1-36.

Dechow, P., W. Ge, and C. Schrand. 2010. Understanding earnings quality: A review of the proxies, their determinants and their consequences. *Journal of Accounting and Economics* 50 (2-3): 344-401.

DeFond, M., D. Erkens, and J. Zhang. 2016. Do client characteristics really drive the big N audit quality effect? New evidence from propensity score matching. *Management Science* 63 (11): 3628-3649.

DeFond, M., and J. Jiambalvo. 1991. Incidence and circumstances of accounting errors. *The Accounting Review* 66 (3): 643-655.

DeFond, M., and J. Zhang. 2014. A review of archival auditing research. *Journal of Accounting and Economics* 58 (2-3): 275-326.

Detragiache, E., P. Garcella, and L. Guiso. 2000. Multiple versus single banking relationships: Theory and evidence. *Journal of Finance* 55 (3): 1133-1161.

Dhaliwal, D., I. Khurana, and R. Pereira. 2011. Firm disclosure policy and the choice between private and public debt. *Contemporary Accounting Research* 28 (1): 293-330.

Diamond, D., 1991a. Debt maturity structure and liquidity risk. *Quarterly Journal of Economics* 106 (3): 709-737.

Diamond, D. 1991b. Monitoring and reputation: The choice between bank loans and directly placed debt. *Journal of Political Economy* 99 (4): 689-721.

Diamond, D. 1993. Seniority and maturity of debt contracts. *Journal of Financial Economics* 33 (3): 341-368.

Doyle, J., W. Ge, and S. McVay. 2007. Accruals quality and internal control over financial reporting. *The Accounting Review* 82 (5): 1141-1170.

Efendi, J., A. Srivastava, and E. Swanson. 2007. Why do corporate managers misstate financial statements? The role of option compensation and other factors. *Journal of Financial Economics* 85 (3): 667-708.

Feroz, E., K. Park, and V. Pastena. 1991. The financial and market effects of the SEC's accounting and auditing enforcement releases. *Journal of Accounting Research* 29 (Supplement): 107-142.

Francis, J., R. LaFond, P. Olsson, and K. Schipper. 2005. The market pricing of accruals quality. *Journal of Accounting and Economics* 39 (2): 295-327.

Gertner, R. and D. Scharfstein. 1991. A theory of workouts and the effects of reorganization law. *Journal of Finance* 46 (4): 1189-1222.

Giammarino, R. 1989. The resolution of financial distress. *Review of Financial Studies* 2 (1): 25-47.

Gompers, P., J. Ishii, and A. Metrick. 2003. Corporate governance and equity prices. *Quarterly Journal of Economics* 118 (1): 107-155.

Graham, J., S. Li, and J. Qiu. 2008. Corporate misreporting and bank loan contracting. *Journal of Financial Economics* 89 (1): 44-61.

Greene, W. 2004. Fixed effects and bias due to the incidental parameters problem in the tobit model. *Econometric Reviews* 23 (2): 125-147.

Hammersley, J., L. Myers, and C. Shakespeare. 2008. Market reactions to the disclosure of internal control weaknesses and to the characteristics of those weaknesses under section 302 of the Sarbanes Oxley Act of 2002. *Review of Accounting Studies* 13 (1): 141-165.

Hoshi, T., A. Kashyap, and D. Scharfstein. 1990. The role of banks in reducing the costs of financial distress in Japan. *Journal of Financial Economics* 27 (1): 67-88.

Imbens, G. 2000. The role of the propensity score in estimating dose-response functions. *Biometrika* 87 (3): 706-710.

Ivashina, V., B. Iverson, D. Smith. 2016. The ownership and trading of debt claims in Chapter 11 Restructurings. *Journal of Financial Economics* 119 (2): 316-335.

Jensen, M., and W. Meckling. 1976. Theory of the Firm: Managerial Behavior, Agency Costs and Ownership Structure. *Journal of Financial Economics* 3 (4): 305-360.

Joffe, M., and P. Rosenbaum. 1999. Invited commentary: Propensity scores. *American Journal of Epidemiology* 150 (4): 327-333.

Karpoff, J., D. Lee, and G. Martin. 2008a. The consequences to managers for financial misrepresentation. *Journal of Financial Economics* 88 (2): 193-215.

Karpoff, J., D. Lee, and G. Martin. 2008b. The cost to firms of cooking the books. *Journal of Financial and Quantitative Analysis* 43 (3): 581-611.

Kim, J., B. Song, and L. Zhang. 2011. Internal control weakness and bank loan contracting: Evidence from SOX section 404 disclosures. *The Accounting Review* 86 (4): 1157-1188.

Krishnan, J. 2005. Audit committee quality and internal control: an empirical analysis. *The Accounting Review* 80 (2): 649-675.

Lennox, C. and J. Pittman. 2010. Big Five audits and accounting fraud. *Contemporary Accounting Research* 27 (1): 209-247.

Li, N., Y. Lou, and F. Vasvari. 2015. Default clauses in debt contracts. *Review of Accounting Studies* 20 (4): 1596-1637.

Lou, Y., and C. Otto. 2020. Debt heterogeneity and covenants. *Management Science* 66 (1): 70-92.

McNichols, M. 2002. Discussion of the quality of accruals and earnings: The role of accrual estimation errors. *The Accounting Review* 77 (Supplement): 61-69.

Palmrose, Z., Richardson, V.J., Scholz, S., 2004. Determinants of market reactions to restatement announcements. *Journal of Accounting and Economics* 37 (1), 59–89.

Park, C. 2000. Monitoring and the structure of debt contracts. *Journal of Finance* 55 (5): 2157-95.

Rajan, R. 1992. Insiders and outsiders: The choice between informed and arm's-length debt. *Journal of Finance* 47 (4): 1367-1400.

Rauh, J., and A. Sufi. 2010. Capital structure and debt structure. *Review of Financial Studies* 23 (12): 4242-4280.

Senbet, L., and T. Wang. 2012. Corporate financial distress and bankruptcy: A survey. *Foundations and Trends in Finance* 5 (4): 243-335.

Tirole, J. 2006. *The Theory of Corporate Finance*. Princeton University Press: Princeton, NJ

Shipman, J., Q. Swanquist, and R. Whited. 2017. Propensity Score Matching in Accounting Research. *The Accounting Review* 92 (1): 213-244.

Titman, S., and R. Wessels. 1988. The determinants of capital structure choice. *Journal of Finance* 43 (1): 1-19.

Valta, P. 2012. Competition and the cost of debt. *Journal of Financial Economics* 105 (3): 661-682.

Warner, J. 1977. Bankruptcy, absolute priority, and the pricing of risky debt claims. *Journal of Financial Economics* 4 (3): 239-276.

Weber, J., and M. Willenborg. 2003. Do expert informational intermediaries add value? Evidence from auditors in microcap initial public offerings. *Journal of Accounting Research* 41 (4): 681-720.

Weiss, L. 1990. Priority of claims and ex post re-contracting in bankruptcy. *Journal of Financial Economics* 27 (2): 285-314.

Willenborg, M. 1999. Empirical analysis of the economic demand for auditing in the initial public offering market. *Journal of Accounting Research* 37 (1): 225-238.

Wooldridge, J. 2002. *Econometric Analysis of Cross Section and Panel Data*. MIT Press: Cambridge, MA.

Wooldridge, J. 2010. Correlated random effects models with unbalanced panels. Working Paper, Michigan State University.

Wruck, K. 1990. Financial distress, reorganization, and organizational efficiency. *Journal of Financial Economics* 27 (2): 419-444.

Zhang, J. 2008. The contracting benefits of accounting conservatism to lenders and borrowers. *Journal of Accounting and Economics* 45 (1): 27-54.

Zhong, H. 2018. A dynamic model of optimal creditor dispersion. *Working Paper*. London School of Economics.

## Appendix A: Variable Definitions and Data Sources

| Variable | Definition | Data Source |
|---|---|---|
| Debt Structure Measures | | |
| *HHI* | Normalized Herfindahl-Hirschman index of debt concentration, computed as follows: First, we calculate the sum of the squared debt type ratios for firm *i* at the end of year *t*: $SS_{it} = \left(\frac{CP_{it}}{TD_{it}}\right)^2 + \left(\frac{DC_{it}}{TD_{it}}\right)^2 + \left(\frac{TL_{it}}{TD_{it}}\right)^2 + \left(\frac{SBN_{it}}{TD_{it}}\right)^2 + \left(\frac{SUB_{it}}{TD_{it}}\right)^2 + \left(\frac{CL_{it}}{TD_{it}}\right)^2 + \left(\frac{Other_{it}}{TD_{it}}\right)^2$ where *CP*, *DC*, *TL*, *SBN*, *SUB*, *CL*, and *Other* refer to the amounts of the seven types of debt recorded in Capital IQ: commercial paper, drawn credit lines, term loans, senior bonds and notes, subordinated bonds and notes, capital leases, and other debt, respectively. *TD* is the total amount of debt. We then normalize $SS_{it}$ to obtain: $HHI_{it} = (SS_{it} - \frac{1}{7})/(1 - \frac{1}{7})$. | Capital IQ |
| *NUM DEBT TYPES* | Number of different debt types in a firm's debt structure. To focus on debt types with economically significant amounts, we count only types that make up at least 5 percent of the firm's total debt. | Capital IQ |
| Other Debt Structure Characteristics | | |
| *PUBLIC DEBT* | Ratio of public debt (commercial paper, senior bonds, and subordinated bonds) to total debt. | Capital IQ |
| *SENIOR DEBT* | Ratio of senior debt to total debt. | Capital IQ |
| *CALLABLE DEBT* | Ratio of callable debt to total debt. | Capital IQ |
| *HHI MATURITY* | Normalized Herfindahl-Hirschman index based on the percentages of debt in different maturity categories. | Capital IQ |
| *FIRM-LEVEL COVENANTS* | Number of unique covenants in a firm's outstanding loans and bonds. | Dealscan & Mergent Fixed Income Securities Database |
| Determinants of Firms' Debt Structures | | |
| *SIZE* | Natural logarithm of the market value of equity. | Compustat |
| *MTB* | Ratio of the sum of the market value of equity and the book value of debt to total assets. | Compustat |
| *PROFITABILITY* | Ratio of operating income before depreciation to total assets. | Compustat |

| | | |
|---|---|---|
| *DIVIDEND* | Indicator equal to one if common stock dividends are positive, zero otherwise. | Compustat |
| *TANGIBILITY* | Ratio of net property, plant, and equipment to total assets. | Compustat |
| *CF VOL* | Standard deviation of quarterly operating cash flows over the previous twelve quarters scaled by total assets. | Compustat |
| *R&D* | Ratio of research and development expense to total assets. If the value of research and development expense is missing, *R&D* is assigned a value of zero. | Compustat |
| *UNRATED* | Indicator equal to one if a firm is unrated, zero otherwise. | Compustat |
| *LEVERAGE* | Ratio of the sum of long-term debt and debt in current liabilities to total assets. | Compustat |
| Accounting Quality Measure | | |
| *ACCOUNTING QUALITY* | 4 – *ICW* – *RESTATEMENT* – *AAER* – *SMALL AUDITOR*, where *ICW* is an indicator equal to one if a firm reported a material internal control weakness under SOX Section 302 in any of the previous three years, *RESTATEMENT* is an indicator equal to one if a firm experienced an accounting restatement in any of the previous three years, *SMALL AUDITOR* is an indicator equal to one if a firm relied on a non-Big 4 auditor in any of the previous three years, and *AAER* is an indicator equal to one if a firm was mentioned in an SEC Accounting and Auditing Enforcement Release in any of the previous three years. All indicators are zero otherwise. | Audit Analytics, Compustat, and SEC |
| Determinants of Accounting Quality | | |
| *LN(FIRM AGE)* | Natural logarithm of the number of years since the firm's first appearance in Compustat. | Compustat |
| *G-INDEX* | Corporate governance index based on Gompers et al. (2003) as reported in the Risk Metrics database. If the value of the index is missing in the Risk Metrics database, *G-INDEX* is assigned the industry median. | Risk Metrics |
| *G-INDEX MISSING* | Indicator equal to one if the Gompers et al. (2003) corporate governance index is missing in the Risk Metrics database, zero otherwise. | Risk Metrics |
| *LN(SEGMENTS)* | Natural logarithm of the number of business segments. | Compustat |
| *Z-SCORE* | Modified Altman's (1968) *z*-score computed as (1.2×working capital+1.4× retained earnings+3.3×EBIT+0.999×sales)/total assets. Following Graham et al. (2008), we exclude the ratio of the market value of equity to the book value of total debt from the computation because a similar term, *MTB*, enters our regression specifications as a separate control variable. | Compustat |
| *ASSET GROWTH* | Change in the natural logarithm of total assets. | Compustat |
| *RETURN VOL* | Standard deviation of daily stock returns. | CRSP |

| | | |
|---|---|---|
| *RESTRUCTURE* | Aggregate restructuring charges in years *t* and *t*–1, scaled by the firm's market capitalization at the end of year *t*. | Compustat |
| *DEBT AND EQUITY FUNDS RAISED* | Indicator equal to one if the sum of new long-term debt and new equity exceeds 20 percent of total assets, zero otherwise. | Compustat |
| *AUDITOR RESIGNATION* | Indicator equal to one if an auditor resigned, zero otherwise. | Audit Analytics |

## Table 1: Summary Statistics

This table presents summary statistics for our main variables of interest based on our final sample, which consists of 2,835 firms and 15,392 firm-year observations. All variables are defined in Appendix A.

| | Mean | P25 | Median | P75 | SD | N |
|---|---|---|---|---|---|---|
| Debt Structure Measures | | | | | | |
| *HHI* | 0.74 | 0.48 | 0.82 | 1.00 | 0.26 | 15,392 |
| *NUM DEBT TYPES* | 1.71 | 1.00 | 2.00 | 2.00 | 0.78 | 15,392 |
| Accounting Quality Measure | | | | | | |
| *ACCOUNTING QUALITY* | 3.37 | 3.00 | 4.00 | 4.00 | 0.82 | 15,392 |
| Determinants of Debt Structure | | | | | | |
| *MKT EQUITY ($MM)* | 3,896 | 137 | 552 | 2,123 | 11,519 | 15,392 |
| *SIZE* | 6.32 | 4.92 | 6.31 | 7.66 | 2.03 | 15,392 |
| *MTB* | 1.94 | 1.18 | 1.55 | 2.21 | 1.28 | 15,392 |
| *PROFITABILITY* | 0.07 | 0.06 | 0.11 | 0.16 | 0.19 | 15,392 |
| *DIVIDEND* | 0.34 | 0.00 | 0.00 | 1.00 | 0.47 | 15,392 |
| *TANGIBILITY* | 0.26 | 0.08 | 0.18 | 0.38 | 0.23 | 15,392 |
| *CF VOL* | 0.07 | 0.03 | 0.05 | 0.07 | 0.07 | 15,392 |
| *R&D* | 0.05 | 0.00 | 0.01 | 0.05 | 0.11 | 15,392 |
| *UNRATED* | 0.65 | 0.00 | 1.00 | 1.00 | 0.48 | 15,392 |
| *LEVERAGE* | 0.24 | 0.09 | 0.21 | 0.34 | 0.19 | 15,392 |
| Determinants of Accounting Quality | | | | | | |
| *FIRM AGE* | 10.34 | 7.00 | 10.00 | 13.00 | 3.83 | 15,392 |
| *LN(FIRM AGE)* | 2.27 | 1.95 | 2.30 | 2.56 | 0.37 | 15,392 |
| *G-INDEX* | 9.04 | 8.00 | 9.00 | 10.00 | 1.01 | 15,392 |
| *G-INDEX MISSING* | 0.92 | 1.00 | 1.00 | 1.00 | 0.27 | 15,392 |
| *SEGMENTS* | 2.74 | 1.00 | 2.00 | 4.00 | 2.01 | 15,392 |
| *LN(SEGMENTS)* | 0.74 | 0.00 | 0.69 | 1.39 | 0.73 | 15,392 |
| *Z-SCORE* | 0.70 | 0.42 | 1.45 | 2.31 | 3.33 | 15,392 |
| *ASSET GROWTH* | 0.09 | -0.03 | 0.06 | 0.17 | 0.29 | 15,392 |
| *RETURN VOL* | 0.03 | 0.02 | 0.03 | 0.04 | 0.02 | 15,392 |
| *RESTRUCTURE* | 0.01 | 0.00 | 0.00 | 0.01 | 0.03 | 15,392 |
| *DEBT AND EQUITY FUNDS RAISED* | 0.26 | 0.00 | 0.00 | 1.00 | 0.44 | 15,392 |
| *AUDITOR RESIGNATION* | 0.01 | 0.00 | 0.00 | 0.00 | 0.11 | 15,392 |

## Table 2: Accounting Quality and Debt Concentration

This table shows estimates of the relation between accounting quality and debt concentration. *ACCOUNTING QUALITY* is the index of firms' accounting quality. *HHI* is the normalized Herfindahl-Hirschman Index of debt concentration in firms' debt structure, and *NUM DEBT TYPES* is the number of different debt types. Columns 1 and 2 present the results from a firm fixed effects Tobit model (FE Tobit) and a correlated random effects Tobit model (CRE Tobit), both censored at zero and one, respectively. Column 3 presents the results from a Poisson model with firm fixed effects. All regressions include year fixed effects. The reported estimates are average marginal effects and corresponding *z*-statistics. The reported R-squared is the squared correlation coefficient between the predicted and observed value of the dependent variable. Standard errors are clustered by firm in the FE Tobit and Poisson models. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. All variables are defined in Appendix A.

| Dependent Variable: | *HHI* | | *NUM DEBT TYPES* |
|---|---|---|---|
| | 1 | 2 | 3 |
| *ACCOUNTING QUALITY* | -0.010*** | -0.010*** | 0.027** |
| | (-2.64) | (-3.60) | (2.17) |
| *SIZE* | -0.013*** | -0.012*** | 0.053*** |
| | (-2.73) | (-3.66) | (3.38) |
| *MTB* | 0.007** | 0.007*** | -0.022** |
| | (2.07) | (2.96) | (-2.25) |
| *PROFITABILITY* | 0.031 | 0.027 | -0.050 |
| | (0.98) | (1.27) | (-0.54) |
| *DIVIDEND* | -0.002 | -0.002 | 0.032 |
| | (-0.26) | (-0.38) | (0.93) |
| *TANGIBILITY* | -0.137*** | -0.132*** | 0.532*** |
| | (-3.44) | (-5.10) | (4.25) |
| *CF VOL* | 0.066 | 0.069 | -0.153 |
| | (0.94) | (1.50) | (-0.78) |
| *R&D* | -0.027 | -0.027 | -0.088 |
| | (-0.39) | (-0.60) | (-0.49) |
| *UNRATED* | 0.015 | 0.016* | -0.011 |
| | (1.22) | (1.87) | (-0.28) |
| *LEVERAGE* | -0.214*** | -0.208*** | 0.558*** |
| | (-8.89) | (-13.14) | (7.34) |
| *LN(FIRM AGE)* | -0.117** | -0.032** | 0.285* |
| | (-2.30) | (-2.27) | (1.93) |
| *G-INDEX* | -0.000 | -0.000 | 0.011 |
| | (-0.04) | (-0.05) | (1.37) |
| *G-INDEX MISSING* | 0.009 | 0.009 | -0.038 |
| | (1.25) | (1.43) | (-1.61) |
| *LN(SEGMENTS)* | -0.018** | -0.018*** | 0.058** |

| | | | |
|---|---|---|---|
| | (-2.44) | (-3.68) | (2.46) |
| *Z-SCORE* | 0.000 | 0.000 | -0.002 |
| | (0.07) | (0.17) | (-0.33) |
| *ASSET GROWTH* | -0.030*** | -0.028*** | 0.061*** |
| | (-3.59) | (-4.26) | (2.59) |
| *RETURN VOL* | 0.151 | 0.131 | -0.264 |
| | (0.77) | (0.83) | (-0.46) |
| *RESTRUCTURE* | 0.038 | 0.034 | 0.264 |
| | (0.60) | (0.64) | (1.29) |
| *DEBT AND EQUITY FUNDS RAISED* | 0.004 | 0.004 | -0.010 |
| | (0.87) | (0.97) | (-0.72) |
| *AUDITOR RESIGNATION* | -0.002 | -0.003 | -0.033 |
| | (-0.17) | (-0.24) | (-0.72) |
| Model Specification | FE Tobit | CRE Tobit | Poisson |
| Firm & Year Effects | Yes | Yes | Yes |
| No. of Observations | 15,392 | 15,392 | 15,392 |
| R-squared | 0.579 | 0.131 | 0.572 |

## Table 3: Variation in Firms' Default Risk and Liquidation Value

This table shows estimates of the relation between accounting quality and debt concentration for subsamples based on firms' default risk and liquidation value. *ACCOUNTING QUALITY* is the index of firms' accounting quality. *HHI* is the normalized Herfindahl-Hirschman Index of debt concentration in firms' debt structure, and *NUM DEBT TYPES* is the number of different debt types. The sample partition in Panel A is based on firms' credit rating, in Panel B on firms' cash flow volatility, in Panel C on firms' z-score, and in Panel D on firms' liquidation value. In each panel, columns 1 and 2 and columns 3 and 4 present the results from firm fixed effects Tobit models (FE Tobit) and correlated random effects Tobit models (CRE Tobit), both censored at zero and one, respectively. Columns 5 and 6 present the results from Poisson models with firm fixed effects. All regressions include year fixed effects. The reported estimates are average marginal effects and corresponding *z*-statistics. The reported R-squared is the squared correlation coefficient between the predicted and observed value of the dependent variable. At the bottom of each panel, we report the *p*-values of one-sided tests of the null-hypothesis of equal marginal effects in the subsamples. Standard errors are clustered by firm in the FE Tobit and Poisson models. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. The sample sizes in Panel A (828+4,613=5,441) and Panel D (5,078+10,154=15,232) are smaller than 15,392 because information on firms' credit ratings and the data necessary to estimate firms' liquidation value are not available for all observations. All variables are defined in Appendix A.

| **Panel A: Variation in Credit Ratings** | | | | | | |
|---|---|---|---|---|---|---|
| Dependent Variable: | *HHI* | | | | *NUM DEBT TYPES* | |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| | Highly Speculative Grade | Low Speculative/ Investment Grade | Highly Speculative Grade | Low Speculative/ Investment Grade | Highly Speculative Grade | Low Speculative/ Investment Grade |
| *ACCOUNTING QUALITY* | -0.031** | -0.001 | -0.036*** | -0.002 | 0.094* | -0.003 |
| | (-2.31) | (-0.15) | (-3.19) | (-0.31) | (1.88) | (-0.10) |
| Model Specification | FE Tobit | FE Tobit | CRE Tobit | CRE Tobit | Poisson | Poisson |
| Debt Structure Determinants | Yes | Yes | Yes | Yes | Yes | Yes |
| Accounting Quality Determinants | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm & Year Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| No. of Observations | 828 | 4,613 | 828 | 4,613 | 828 | 4,613 |
| R-squared | 0.736 | 0.606 | 0.194 | 0.138 | 0.731 | 0.573 |
| P-value for Marginal Effect Difference | 0.026 | | 0.003 | | 0.046 | |

| **Panel B: Variation in Cash Flow Volatility** | | | | | | |
|---|---|---|---|---|---|---|
| Dependent Variable: | *HHI* | | | | *NUM DEBT TYPES* | |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| | High *CF VOL* | Low *CF VOL* | High *CF VOL* | Low *CF VOL* | High *CF VOL* | Low *CF VOL* |
| *ACCOUNTING QUALITY* | -0.019*** | -0.007 | -0.016*** | -0.006* | 0.067*** | 0.016 |
| | (-2.86) | (-1.37) | (-3.20) | (-1.86) | (3.16) | (0.99) |
| Model Specification | FE Tobit | FE Tobit | CRE Tobit | CRE Tobit | Poisson | Poisson |
| Debt Structure Determinants | Yes | Yes | Yes | Yes | Yes | Yes |
| Accounting Quality Determinants | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm & Year Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| No. of Observations | 5,130 | 10,262 | 5,130 | 10,262 | 5,130 | 10,262 |
| R-squared | 0.645 | 0.598 | 0.116 | 0.122 | 0.651 | 0.585 |
| P-value for Marginal Effect Difference | 0.035 | | 0.026 | | 0.018 | |

| **Panel C: Variation in Z-Score** | | | | | | |
|---|---|---|---|---|---|---|
| Dependent Variable: | *HHI* | | | | *NUM DEBT TYPES* | |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| | Low Z-Score | High Z-Score | Low Z-Score | High Z-Score | Low Z-Score | High Z-Score |
| *ACCOUNTING QUALITY* | -0.018*** | -0.006 | -0.018*** | -0.005 | 0.040** | 0.016 |
| | (-2.81) | (-1.16) | (-3.88) | (-1.45) | (1.97) | (1.02) |
| Model Specification | FE Tobit | FE Tobit | CRE Tobit | CRE Tobit | Poisson | Poisson |
| Debt Structure Determinants | Yes | Yes | Yes | Yes | Yes | Yes |
| Accounting Quality Determinants | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm & Year Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| No. of Observations | 5,130 | 10,262 | 5,130 | 10,262 | 5,130 | 10,262 |
| R-squared | 0.646 | 0.581 | 0.168 | 0.129 | 0.657 | 0.566 |
| P-value for Marginal Effect Difference | 0.043 | | 0.007 | | 0.156 | |

| **Panel D: Variation in Liquidation Value** | | | | | | |
|---|---|---|---|---|---|---|
| Dependent Variable: | *HHI* | | | | *NUM DEBT TYPES* | |
| | 1 | 2 | 3 | 4 | 5 | 6 |
| | Low Liquidation Value | High Liquidation Value | Low Liquidation Value | High Liquidation Value | Low Liquidation Value | High Liquidation Value |
| *ACCOUNTING QUALITY* | -0.017** | -0.006 | -0.017*** | -0.006* | 0.055** | 0.014 |
| | (-2.40) | (-1.40) | (-3.35) | (-1.80) | (2.38) | (0.98) |
| Model Specification | FE Tobit | FE Tobit | CRE Tobit | CRE Tobit | Poisson | Poisson |
| Debt Structure Determinants | Yes | Yes | Yes | Yes | Yes | Yes |
| Accounting Quality Determinants | Yes | Yes | Yes | Yes | Yes | Yes |
| Firm & Year Effects | Yes | Yes | Yes | Yes | Yes | Yes |
| No. of Observations | 5,078 | 10,154 | 5,078 | 10,154 | 5,078 | 10,154 |
| R-squared | 0.607 | 0.612 | 0.119 | 0.131 | 0.593 | 0.619 |
| P-value for Marginal Effect Difference | 0.151 | | 0.076 | | 0.084 | |

## Table 4: Changes Analysis

This table shows estimates of the relation between year-on-year changes in accounting quality and year-on-year changes in debt concentration. Δ*HHI* is the change in the normalized Herfindahl-Hirschman Index of debt concentration in firms' debt structure from year *t-1* to year *t*, and Δ*NUM DEBT TYPES* is the change in the number of different debt types from year *t-1* to year *t*. Δ*ACCOUNTING QUALITY* is the change in the index of firms' accounting quality from year *t-2* to year *t-1*. All other independent variables are defined analogously. Columns 1 and 2 present the results from OLS regressions with year fixed effects. The reported estimates are coefficient estimates and corresponding *t*-statistics. Standard errors are clustered by firm. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. All variables are defined in Appendix A.

| Dependent Variable: | Δ*HHI* | Δ*NUM DEBT TYPES* |
|---|---|---|
| | 1 | 2 |
| Δ*ACCOUNTING QUALITY* | -0.012*** | 0.046*** |
| | (-2.77) | (3.53) |
| Δ*SIZE* | 0.003 | 0.012 |
| | (0.51) | (0.65) |
| Δ*MTB* | 0.003 | -0.009 |
| | (1.04) | (-0.96) |
| Δ*PROFITABILITY* | -0.003 | 0.001 |
| | (-0.12) | (0.01) |
| Δ*DIVIDEND* | -0.013 | 0.054 |
| | (-1.19) | (1.57) |
| Δ*TANGIBILITY* | -0.116*** | 0.271** |
| | (-2.83) | (1.98) |
| Δ*CF VOL* | -0.031 | 0.226 |
| | (-0.45) | (1.18) |
| Δ*R&D* | 0.050 | -0.220 |
| | (0.86) | (-1.47) |
| Δ*UNRATED* | 0.028* | -0.003 |
| | (1.81) | (-0.06) |
| Δ*LEVERAGE* | 0.021 | 0.015 |
| | (0.87) | (0.21) |
| Δ*LN(FIRM AGE)* | -0.140** | 0.202 |
| | (-2.32) | (1.08) |
| Δ*G-INDEX* | -0.001 | 0.003 |
| | (-0.59) | (0.42) |
| Δ*G-INDEX MISSING* | 0.006 | -0.020 |
| | (0.91) | (-0.93) |
| Δ*LN(SEGMENTS)* | -0.004 | 0.005 |
| | (-0.50) | (0.22) |
| Δ*Z-SCORE* | -0.001 | 0.004 |
| | (-0.31) | (0.58) |
| Δ*ASSET GROWTH* | 0.000 | -0.022 |

| | | |
|---|---|---|
| | (0.05) | (-0.98) |
| Δ*RETURN VOL* | 0.313* | -0.384 |
| | (1.73) | (-0.68) |
| Δ*RESTRUCTURE* | 0.082 | 0.004 |
| | (1.23) | (0.02) |
| Δ*DEBT AND EQUITY FUNDS RAISED* | -0.004 | 0.012 |
| | (-0.88) | (0.84) |
| Δ*AUDITOR RESIGNATION* | -0.001 | -0.006 |
| | (-0.07) | (-0.14) |
| Model Specification | OLS | OLS |
| Year Fixed Effects | YES | YES |
| No. of Observations | 11,090 | 11,090 |
| R-squared | 0.009 | 0.008 |

## Table 5: Accounting Quality and Debt Concentration – Propensity Score Matching

This table shows estimates of the relation between accounting quality and debt concentration using a propensity score matched sample. Panel A presents the results of the Poisson model used to estimate the propensity scores. The dependent variable is *ACCOUNTING QUALITY*, the index of firms' accounting quality. The reported estimates are average marginal effects and corresponding *z*-statistics. The reported R-squared is the squared correlation coefficient between the predicted and observed value of *ACCOUNTING QUALITY*. Panel B presents a covariate balance test by showing the estimated coefficients and corresponding *t*-statistics on *ACCOUNTING QUALITY* from OLS regressions that regress the different control variables on *ACCOUNTING QUALITY* and year and firm fixed effects. Panel C shows the estimates of the relation between accounting quality and debt concentration in the propensity-score-matched sample. *HHI* is the normalized Herfindahl-Hirschman Index of debt concentration in firms' debt structure, and *NUM DEBT TYPES* is the number of different debt types. Columns 1 and 2 present the results from a firm fixed effects Tobit model (FE Tobit) and a correlated random effects Tobit model (CRE Tobit), both censored at zero and one, respectively. Column 3 presents the results from a Poisson model with firm fixed effects. All regressions include year fixed effects. The reported estimates are average marginal effects and corresponding *z*-statistics. The reported R-squared is the squared correlation coefficient between the predicted and observed value of the dependent variable. Standard errors are clustered by firm in the FE Tobit and Poisson models. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. All variables are defined in Appendix A.

| **Panel A: Poisson Regression of Accounting Quality on Control Variables** | |
|---|---|
| Dependent Variable: | *ACCOUNTING QUALITY* |
| *SIZE* | 0.141*** |
| | (17.38) |
| *MTB* | -0.035*** |
| | (-3.96) |
| *PROFITABILITY* | 0.178* |
| | (1.76) |
| *DIVIDEND* | 0.131*** |
| | (5.34) |
| *TANGIBILITY* | 0.049 |
| | (0.65) |
| *CF VOL* | -0.126 |
| | (-0.66) |
| *R&D* | 1.377*** |
| | (8.92) |
| *UNRATED* | -0.012 |
| | (-0.42) |
| *LEVERAGE* | 0.141** |
| | (2.20) |
| *LN(FIRM AGE)* | -0.035 |
| | (-0.78) |
| *G-INDEX* | 0.010 |
| | (1.06) |
| *G-INDEX MISSING* | 0.050* |
| | (1.85) |
| *LN(SEGMENTS)* | -0.067*** |
| | (-4.01) |

| | |
|---|---|
| *Z-SCORE* | 0.006 |
| | (0.84) |
| *ASSET GROWTH* | -0.037 |
| | (-1.27) |
| *RETURN VOL* | -3.219*** |
| | (-4.30) |
| *RESTRUCTURE* | 0.017 |
| | (0.06) |
| *DEBT AND EQUITY FUNDS RAISED* | -0.011 |
| | (-0.52) |
| *AUDITOR RESIGNATION* | -0.735*** |
| | (-8.19) |
| Model Specification | Poisson |
| Industry & Year Fixed Effects | Yes |
| No. of Observations | 15,392 |
| R-squared | 0.217 |

| **Panel B: Covariate Balance Test** | | |
|---|---|---|
| Dependent Variable: | Coefficient | *t*-statistic |
| *SIZE* | 0.053 | 1.40 |
| *MTB* | 0.012 | 0.24 |
| *PROFITABILITY* | 0.007 | 1.07 |
| *DIVIDEND* | -0.006 | -0.47 |
| *TANGIBILITY* | 0.002 | 0.55 |
| *CF VOL* | 0.005 | 1.63 |
| *R&D* | -0.000 | -0.07 |
| *UNRATED* | -0.007 | -0.54 |
| *LEVERAGE* | 0.008 | 0.95 |
| *LN(FIRM AGE)* | 0.000 | 0.14 |
| *G-INDEX* | -0.035 | -1.45 |
| *G-INDEX MISSING* | 0.010 | 0.93 |
| *LN(SEGMENTS)* | 0.041 | 1.90 |
| *Z-SCORE* | 0.140 | 1.57 |
| *ASSET GROWTH* | 0.017 | 1.12 |
| *RETURN VOL* | 0.001 | 0.83 |
| *RESTRUCTURE* | -0.002 | -1.32 |
| *DEBT AND EQUITY FUNDS RAISED* | -0.006 | -0.26 |
| *AUDITOR RESIGNATION* | 0.001 | 0.92 |

| **Panel C: The Relation between Accounting Quality and Debt Concentration in the Matched Sample** | | | |
|---|---|---|---|
| Dependent Variable: | *HHI* | | *NUM DEBT TYPES* |
| | 1 | 2 | 3 |
| *ACCOUNTING QUALITY* | -0.020** | -0.018*** | 0.069** |
| | (-2.09) | (-4.22) | (2.27) |
| Model Specification | FE Tobit | CRE Tobit | Poisson |
| Debt Structure Determinants | Yes | Yes | Yes |
| Accounting Quality Determinants | Yes | Yes | Yes |
| Firm & Year Effects | Yes | Yes | Yes |
| No. of Observations | 4,763 | 4,763 | 4,763 |
| R-squared | 0.771 | 0.141 | 0.776 |

## Table 6: Controlling for Other Debt Structure Characteristics

This table shows estimates of the relation between accounting quality and debt concentration controlling for other characteristics of firms' debt structures. *ACCOUNTING QUALITY* is the index of firms' accounting quality. *HHI* is the normalized Herfindahl-Hirschman Index of debt concentration in firms' debt structure, and *NUM DEBT TYPES* is the number of different debt types. *PUBLIC DEBT*, *SENIOR DEBT*, and *CALLABLE DEBT* are the percentages of public, senior, and callable debt in firms' total debt. *HHI MATURITY* is the measure of concentration of the maturity structure of firms' debt. *FIRM-LEVEL COVENANTS* is the number of covenants in firms' outstanding loans and bonds. The number of observations is smaller than in Table 2 because information on the additional debt structure characteristics is not available for all observations. Columns 1 and 2 present the results from a firm fixed effects Tobit model (FE Tobit) and a correlated random effects Tobit model (CRE Tobit), both censored at zero and one, respectively. Column 3 presents the results from a Poisson model with firm fixed effects. All regressions include year fixed effects. The reported estimates are average marginal effects and corresponding *z*-statistics. The reported R-squared is the squared correlation coefficient between the predicted and observed value of the dependent variable. Standard errors are clustered by firm in the FE Tobit and Poisson models. ***, **, and * denote significance at the 1 percent, 5 percent, and 10 percent levels, respectively. All variables are defined in Appendix A.

| Dependent Variable: | *HHI* | | *NUM DEBT TYPES* |
|---|---|---|---|
| | 1 | 2 | 3 |
| *ACCOUNTING QUALITY* | -0.009*** | -0.009*** | 0.030** |
| | (-2.56) | (-3.33) | (2.45) |
| *PUBLIC DEBT* | 0.102*** | 0.095*** | -0.313*** |
| | (8.69) | (13.74) | (-8.51) |
| *SENIOR DEBT* | 0.093*** | 0.091*** | -0.269*** |
| | (4.94) | (8.16) | (-4.51) |
| *CALLABLE DEBT* | 0.063*** | 0.065*** | -0.187*** |
| | (6.14) | (8.82) | (-5.11) |
| *HHI MATURITY* | 0.293*** | 0.292*** | -0.830*** |
| | (27.24) | (40.77) | (-24.72) |
| *FIRM-LEVEL COVENANTS* | -0.001 | -0.001** | 0.001 |
| | (-1.12) | (-2.01) | (0.62) |
| Model Specification | FE Tobit | CRE Tobit | Poisson |
| Firm & Year Fixed Effects | Yes | Yes | Yes |
| Debt Structure Determinants | Yes | Yes | Yes |
| Accounting Quality Determinants | Yes | Yes | Yes |
| No. of Observations | 12,522 | 12,522 | 12,522 |
| R-squared | 0.682 | 0.361 | 0.645 |